

Frontrunners: a series of policy briefs to inform national governments on the economic and social benefits of action for sustainable cities

Resilient and affordable housing for all: Lessons on house building from Kochi and Trivandrum, India

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Where and how housing is built over the next few years as urban populations swell will have a huge impact on our ability to meet the Paris Climate goals of decarbonisation and resilience. Access to adequate, safe and affordable housing is the first indicator of the 11th Sustainable Development Goal. Worldwide, one in eight people live in informal settlements, without access to decent housing, legal tenure, clean water or sanitation. Clear national government leadership is key to ensuring everyone has a well-located, affordable, low-carbon and resilient home, including by providing support to municipal authorities to take ambitious and innovative approaches.

This paper analyses lessons from Kochi and Trivandrum, Kerala, India, where municipal government and community partnerships on house building projects have led to better quality new housing stock while reducing costs and environmental impacts. It finds that by placing participation at the heart of their processes, these cities have achieved 100 per cent occupancy rates at a lower cost, while also cutting carbon emissions and providing economic benefits. Nationwide, costs and occupancy levels of Kochi and Trivandrum could save Rs. 118 billion (US\$1.71 billion), or build an additional 816,000 homes.

This policy brief is one of a series on frontrunning climate actions in cities around the world. The objective of this series is to strengthen the evidence on the economic and social implications of low-carbon, climate-resilient urban development. The series



Photo credit: Visty Banaji

About this policy brief

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focuses on providing robust data on actual or ex post outcomes of climate action, ranging from better public health to job creation to greater equity. Each case study explores some of the preconditions for the successful design and delivery of urban climate action and provides national policy recommendations that could enhance their effectiveness and benefits.

Highlights

- Access to adequate, safe and affordable housing is the first indicator of the 11th Sustainable Development Goal. Housing is necessary because it allows people to lead healthy, secure, productive and dignified lives and because it is as a durable asset that provides owners with a way to save and gain access to credit. **A sufficient supply of affordable, low-carbon, climate-resilient housing is critical to ending poverty and supporting economic development in cities around the world.**
- Worldwide the number of people without access to adequate, safe and affordable housing is expected to grow to 1.6 billion by 2025.¹ **An estimated 1 billion new homes will be needed by 2025**, costing up to US\$11 trillion.²
- **The new housing stock needs to be compatible with the Paris Agreement.** This is challenging, because low-carbon building materials are often more expensive than traditional materials and securing affordable, well-located, safe urban land, which could improve accessibility and climate resilience in cities, is difficult.
- Given India's rapid urban population growth, 110 million new housing units will need to be constructed by 2022. **About 90 per cent of them will be required in urban areas.**³
- In the absence of sufficient formal housing provision by either markets or the state, informal settlements have grown rapidly. Conservative estimates suggest that at least **99 million people—about a quarter of India's urban population—live in informal settlements**, most of which lack risk-reducing infrastructure such as drains and sewers.
- The Government of India established the Basic Services for the Urban Poor (BSUP) Mission, a policy to support upgrading informal settlements in 65 Indian cities. Most of the housing built under BSUP failed to meet the needs of the intended beneficiaries in terms of location, quality or affordability. As a result, about 1 in 10 homes built under the programme is currently vacant. This problem underscores **the need for governance arrangements that focus on quality and sustainability as well as quantity.**
- In Kerala the involvement of a community-based organisation (Kudumbashree) helped improve implementation of the BSUP Mission. **Involving urban residents in planning, designing and building has ensured that the houses are culturally appropriate; easy to build; inexpensive to live in; and located close to jobs, services and amenities.** Many of the design features address growing climate impacts and risks: the new houses use less steel and concrete (which are very carbon intensive) and have better insulation and ventilation.
- Working with two municipalities, Kochi and Trivandrum, the Kerala state government and Kudumbashree approved seven projects under BSUP to build a total of 23,577 houses, worth Rs. 343 (US\$50 million). As of April 2018, **80 per cent of the houses have been completed.**
- By placing community participation at the centre of their processes, Kerala achieved 100 per cent occupancy and the lowest cost per unit of housing (Rs. 144,000/US\$2,100) while building homes that improve climate resilience. **Building homes at this unit cost and achieving these occupancy rates would have reduced the nationwide costs of BSUP by Rs. 118 billion (US\$1.71 billion).** Alternatively, BSUP could have built an additional 816,000 homes with the same level of investment.

The challenge: Building sufficient urban housing in a changing climate

Ensuring access to adequate, safe and affordable housing for all is the first target of the 11th Sustainable Development Goal (SDG 11), which calls for building sustainable cities and communities. It is also at the centre of the New Urban Agenda. Globally, an estimated 881 million people—equivalent to one person in every eight—live in informal settlements without access to decent housing, legal tenure or water and sanitation services.⁴ This figure likely underestimates the number of people living in slum conditions, as the criteria for housing and service quality are not rigorous enough to ensure reliable, affordable and safe provision.⁵ Without transformative action, the number of people affected by the global affordable housing gap will increase by 30 per cent to 1.6 billion by 2025.⁶ Expanding the supply of decent housing has thus emerged as a major priority for countries and cities worldwide.

Housing accounts for 70 per cent of land use in most cities and is a major determinant of urban form.⁷ An adequate home is more than just four walls and a roof. It is fundamental for health, security and dignity. Adequate housing should be affordable, in that its costs should not compromise occupants' ability to satisfy other basic needs; it should be accessible to all segments of the population, including people with disabilities, older people and other marginalised groups; it should be connected to services and infrastructure, and not located on polluted or hazardous sites; and there should be a degree of security of land tenure that guarantees protection against forced eviction and other threats.⁸ Climate change mitigation and adaptation impose additional requirements: building materials should be low-carbon, architectural and travel choices should minimise energy use, and homes should not be exposed to climate risks such as increased flooding or sea level rise.

A shortage of such housing is a common challenge in both developed and developing country cities. An estimated 1 billion new homes will be needed worldwide by 2025, costing up to US\$11 trillion.⁹ Large-scale public housing schemes designed to address this shortage tend to focus on the quantity of units delivered rather than where the housing is sited. Accordingly, homes are often of inferior quality and poorly integrated into city-wide planning.¹⁰ The private sector has a track record of providing low-quality housing for low-income groups in many cities, despite state subsidies.¹¹ Profit-making imperatives often lead firms to build the maximum number of units per acre, at the expense of the quality of the development. Land prices can lead to housing developments that are located far from labour markets and other services, with limited amenities.

Informal settlements expand because residents cannot afford to participate in formal land and housing markets. They are typically located where land is cheap—on the urban periphery, where connections to employment, services and amenities are weak, or on hazardous sites such as steep slopes, river banks and flood plains and other vulnerable areas, where formal development is prohibited.¹² High exposure to environmental risk and the lack of “risk-reducing” infrastructure creates multiple health risks. For example, overcrowding coupled with inadequate water, sanitation and solid waste management leads to high rates of disease transmission. Substandard construction materials mean that housing is unable to withstand even slight variations in weather. Residents of informal settlements are consequently among the most vulnerable to climate change impacts.¹³ Extreme weather events such as flooding and heat waves have already begun to affect these communities, leading to large-scale loss of life and resources as well as increases in infectious diseases and population displacement.¹⁴

The high level of overlap across the agendas of poverty eradication, economic development and climate change adaptation can lead to fragmented or conflicting policies, but it can also create opportunities for policies to secure multiple benefits.¹⁵ There is a clear need to improve housing provision so that it achieves these benefits, particularly through more effective spatial planning and more appropriate architectural practices.

The location of housing and its connectivity to jobs, services and amenities is central to reducing socio-spatial inequalities¹⁶ and transitioning to a low-carbon economy.¹⁷ The lifetime emissions of new buildings can be high if they are not designed to minimise energy use. Ensuring that housing is located near either high-quality public

transport networks or employment and services helps households avoid exclusion and car dependence. Compactness can also reduce the costs of housing provision, because it requires less investment in infrastructure such as sewers, electricity grids, paved roads and pavements. One estimate suggests that higher population density can reduce the costs of providing public services by up to 30 per cent.¹⁸ The costs and risks of building in areas that are hard to reach, ecologically sensitive or vulnerable to environmental disasters need to be avoided.

Sustainable housing strategies should address not only the environmental impacts of the site but also the emissions embedded in construction. The production of cement alone generates about 5 per cent of global carbon dioxide emissions.¹⁹ Replacing conventional building materials with low-carbon options such as bamboo can slash emissions (subsidies may be required to offset higher construction costs). Other low-cost additions, such as basic insulation, passive water heaters, natural ventilation and rainwater capture, can improve liveability while mitigating potential environmental impacts and risks.²⁰ The opportunities vary for formal and informal housing (particularly where urban dwellers depend on self-build options), but around the world, up-to-date and well delivered building standards and certifications are helping guide public and private investment in housing.^{21, 22}

Sustainable and inclusive housing strategies can lay the foundations for long-term economic development with smaller environmental footprints. Low-carbon construction that balances environmental objectives with the interests of the intended beneficiaries and is integrated into wider spatial planning presents an opportunity to move towards more effective climate action and sufficient housing provision.

It is increasingly accepted that community participation in planning, design and construction can address some of the most common problems associated with mass housing schemes.²³ This case study focuses on the ways that involving local organisations of the urban poor improved the delivery of national housing programmes in Kerala, India, and whether further reforms could increase the environmental and social benefits.

HOUSING IN INDIA

India is urbanising at a rate of 3.2 per cent a year;²⁴ its urban population is expected to reach 800 million by 2050.²⁵ The current housing deficit and soaring demand suggests that about 110 million units will need to be constructed by 2022, 90 per cent of them in urban areas,²⁶ at a cost of more than US\$2 trillion. An estimated 70 per cent of these homes will be needed for low-income populations, defined as households with annual incomes of Rs. 300,000–600,000 (about US\$4,200–US\$8,400).²⁷

This shortfall in availability and affordability leads to the proliferation of informal settlements and overcrowding. According to official statistics, at least 99 million people—about a quarter of India's urban population—live in slums²⁸ (and the actual number is likely to be much higher, for the reasons cited above).

These settlements are often located in areas that are very exposed to the impacts of climate change, such as low-lying coastal zones, steep slopes and floodplains. India is already experiencing a warming climate, particularly in some built-up areas, as a result of the urban heat island effect.²⁹ Additional impacts include more frequent heavy rainfall events, as well as increased variability in monsoon patterns, and an increase in the number of extreme weather events such as storms and cyclones.³⁰ The foothills of the Himalayas often experience flash floods; areas in the south, such as the low-lying and coastal urban areas of Kerala, experience extreme weather during monsoon season and struggle to manage flood waters, water supplies and sanitation.³¹ Flooding in August 2018—the worst in a century—caused an estimated US\$2.7 billion damage,³² much of it in urban centres such as Trivandrum and Kochi, the two towns studied for this case study.

An estimated 22 per cent of India's greenhouse gas emissions come from the construction sector.³³ The sector has immense potential for cost-effective climate change mitigation.³⁴ Construction is also important as a source of employment, with nearly 30,000 mostly small and medium-size enterprises employing 41 million people in 2011, the vast majority of them unskilled workers.³⁵

The large-scale but locally appropriate provision of adequate, safe and affordable housing, delivered in a pro-poor manner and integrated into wider spatial planning processes, could therefore deliver a wide range of co-benefits, significantly improving the living conditions of millions of people, creating new employment and reducing India's carbon footprint.³⁶

Methodology

This case study was carried out by a team of researchers from the University of Leeds, in conjunction with colleagues from the TERI School of Advanced Studies in India. The team conducted extensive documentary analysis, drawing on primary data collected from states and cities that have implemented BSUP as well as publicly available data and documents published by the Government of India. Academic literature and expert reports from the housing sector in India were reviewed to inform the case study design and contextualise the findings within the institutional framework of India's multilevel political system. In Kerala the team also analysed state and city reporting on BSUP progress as well as architects' reports and guidelines, to explore the particularities of housing project governance there.

In July/August 2018 the team interviewed key stakeholders in the housing sector, including representatives of three civil society organisations, one non-profit organisation, and one national government-owned corporation. It also consulted with experts at the national level with regard to housing politics and policy in India, in order to develop the case study focus in Kerala. It visited two housing developments (in Kochi and Trivandrum), to assess their place within the local physical and natural environment and to gather the views of local communities. In addition, it interviewed local officials from Kudumbashree and Kerala-based architects, to explore the practicalities of implementing these projects.

The policy context: State and city implementation of national housing missions

NATIONAL POLICY CONTEXT

The Indian government recognises the need to improve access to housing for the country's rapidly growing urban population. An estimated 70 per cent of urban housing needs through 2022 pertain to people the government classifies as lower-income groups.³⁷

The central government has launched various ambitious schemes and missions that aim to address the housing shortage. They include the Integrated Housing and Slum Development Programme (IHSDP) for small municipalities; the Rajiv Awas Yojana (RAY) programme, which envisaged a "slum-free India"; the Pradhan Mantri Awas Yojana (PMAY) "Housing for All by 2022" Mission, launched in 2015; and Basic Services for the Urban Poor (BSUP).

Many state and municipal governments have struggled to implement national housing policies, in part because of insufficient revenues.³⁸ These schemes are not yet reaching the poorest communities.³⁹ Despite evidence demonstrating that participatory processes can reduce costs and increase satisfaction among future residents, houses are frequently delivered in a prescribed way set by the goals of developers and funders.⁴⁰ An alternative approach that is community-led and participatory could ensure that housing policies reach the targeted groups.⁴¹

BASIC SERVICES FOR THE URBAN POOR

BSUP was launched in 2005 as a submission of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), the flagship scheme of the Ministry of Housing and Urban Affairs. BSUP was designed to ensure access to basic services for people living in informal settlements in 65 Indian cities, selected based on their population and cultural and touristic

importance. Participating municipalities were mandated to earmark 25 per cent of their municipal budget for the provision of basic services to the urban poor, which covered 12–25 per cent of total project costs, depending on the city. Households paid up to 12.5 per cent of the costs. Central and state governments bore the remaining costs.⁴²

BSUP was intended to expand access to water supply, sanitation, education, health and social security to low-income households; climate resilience was not directly referenced as an overarching goal. Three delivery models were established: relocation to new sites where the state constructed mass housing, *in situ* slum upgrading without community participation, and redevelopment with community participation.⁴³ In practice, most BSUP projects demolished and rebuilt without consulting community members.⁴⁴ Much of the mass-constructed new housing was unsatisfactory, because of undesirable siting, high costs and poor-quality construction.⁴⁵ Satisfaction with the homes built is generally low.⁴⁶ As a result, occupancy rates are less than 50 per cent in New Delhi, Punjab, Uttarakhand, Sikkim, Rajasthan and Maharashtra. Across BSUP as a whole, more than 1 in 10 homes is vacant.⁴⁷

Despite the scope and considerable budget of the BSUP sub-mission, many projects are still incomplete 13 years after the programme's inception. As of April 2018, only 111 of the 477 projects approved (25 percent) had been completed; only 690,000 houses out of 780,000 approved (88 percent) had been built, of which just 580,000 (84 percent) were occupied.⁴⁸ In many informal settlements where BSUP projects were completed, living conditions were not meaningfully improved.⁴⁹

The case study: Improving the implementation of housing programmes through participatory governance in Kerala

The south Indian state of Kerala has a unique political, economic and cultural history. During the late 20th century, poverty levels were drastically reduced, despite only modest economic growth. Social scientists and commentators refer to the strong civic sector as a primary driver of development, championing the seemingly sustainable form of growth as the “Kerala model”.⁵⁰ Socio-cultural factors, such as multifaith communities and matriarchal family structures, may partly explain its high literacy rates and gender equality.

Some of the unique characteristics of Kerala may mean that it is difficult for other states to replicate its processes. For example, low-income communities in the state enjoy higher rates of land ownership and stronger tenure rights, providing greater scope to resist market forces and forced evictions.

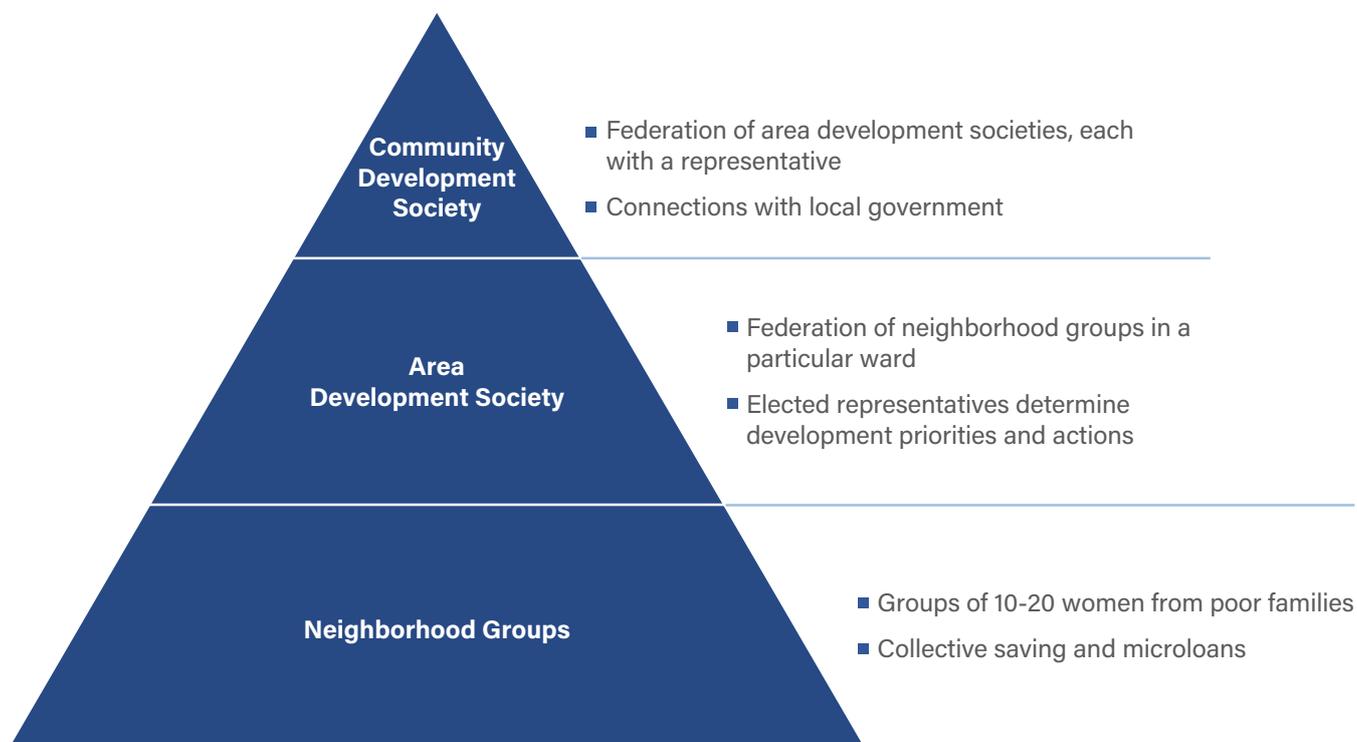
Enthusiasm for the Kerala model has been tempered recently by rising inequality and persistent power imbalances between castes, genders, and rural-urban populations.⁵¹ In the 10 years between the 2001 and 2011 censuses, the urban population in Kerala increased but the housing supply increased at a slower pace, pushing more than 200,000 people into informal settlements.

Kerala has been more successful than other Indian states in implementing the BSUP sub-mission and providing housing to its people. Including low-income communities and representatives from informal settlements in decision making has both reduced delivery costs and increased the uptake of public housing.⁵² At the core of this approach is a partnership between the state and a women's community-based organisation called Kudumbashree (“prosperity of the family”).

Established in 1997, Kudumbashree has membership of 4.3 million women, supported by 941 community-level societies. It is officially responsible for implementing various central and state government policies, including BSUP.

Kudumbashree is structured as a three-tiered hierarchy operating at the neighbourhood, ward and municipal scale, thereby providing formal links between low-income groups and decision-makers at various levels (see Figure 1). This structure provides a route for low-income citizens to feed their priorities into political decision-making and for governments to engage in dialogue with urban residents. Improving access to knowledge and decision makers in this way can build adaptive capacity and strengthen democratic governance.⁵³

Figure 1
Structure of Kudumbashree



TAILORING NATIONAL POLICIES TO LOCAL CONTEXTS

The state government of Kerala and Kudumbashree started by adjusting the guidelines set by the national government, which included some flexibility in terms of governance and contracting required Detailed Project Reports to be submitted before funding would be released. First, they reviewed the processes for determining whether relocation, state-led redevelopment or community-led upgrading would be adopted.⁵⁴ Because of the participatory governance arrangement, households could raise factors such as the importance of accessing schools or livelihoods, which strengthens the case for *in situ* options and choosing multiple relocation sites rather than one large-scale development. It also provided a window for evaluating wider environmental impacts and siting concerns. Housing plans in Kerala explicitly considered factors such as site orientation, topography and geology, the climate and vegetation, available local materials, religious and cultural patterns, and the main local occupations.⁵⁵

Other points of departure from central government guidelines included permitting larger dwellings (also built in other states, such as Gujarat) and the creative use of public–private partnerships. A collective approach to planning meant that housing projects could be designed to benefit communities both socially and economically—by, for example, including communal facilities and creating space for local enterprises. Even children were consulted at the design stage.⁵⁶

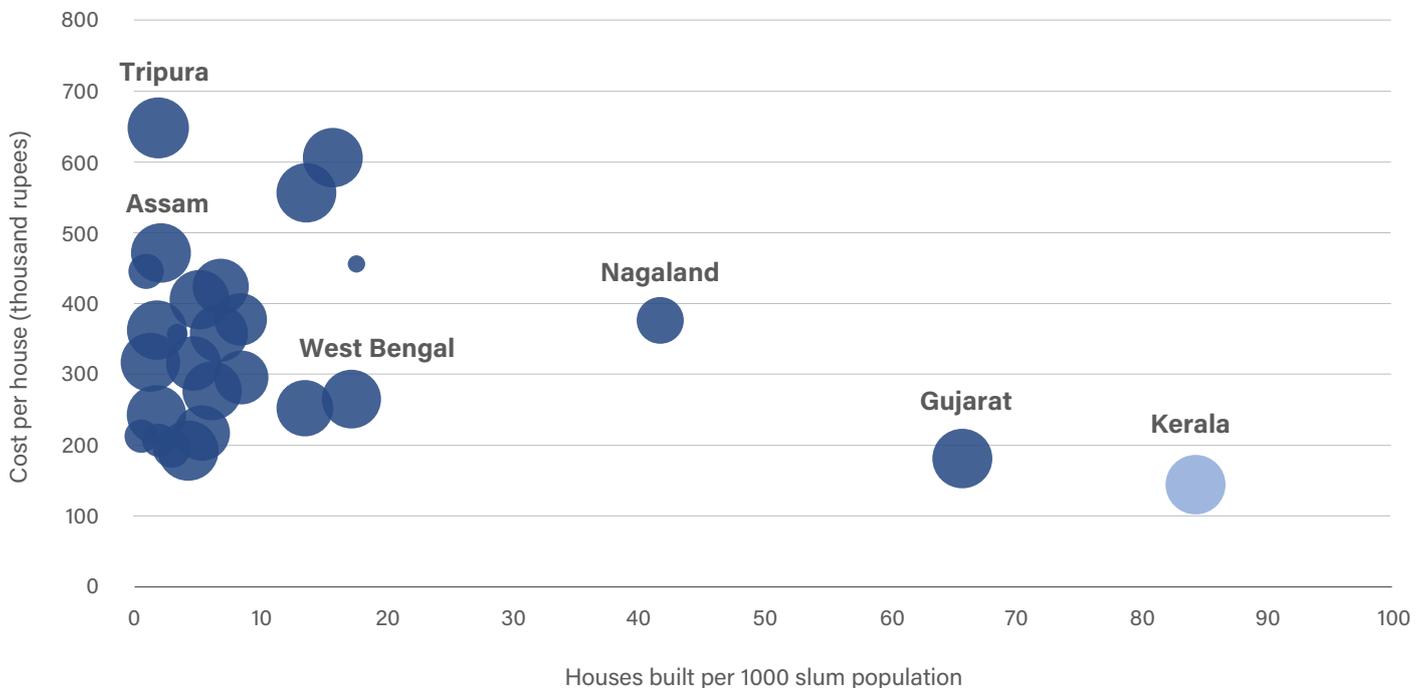
Kerala provides the option of self-building a home, by directly transferring the subsidy to households. Self-building is possible in Kerala because households there already have access to or own land. In many other states, where they do not, BSUP is being implemented by large developers as a mass house building exercise. The Kerala delivery model gives households greater responsibility over the siting, finances and construction of their houses, enabling them to adopt cost-saving measures, strengthen their capacities and tailor their homes to their needs.

Housing constructed in Kerala drew on local knowledge and innovative architectural practices, provided by the Centre of Sciences and Technology for Rural Development (COSTFORD), to enhance social and environmental sustainability. Its housing designs avoid fashionable elements, such as large windows, roofs with changing pitches and painted brick walls. Instead, it incorporates elements of indigenous Kerala architecture, including bricks instead of concrete, *jali* walls (brick walls with alternating gaps that allow for ventilation) and small windows that do not require expensive metal grating. More innovative design elements include filler slab roofing, a technique that reduces the amount of steel and concrete needed for roof building; curved corners, which reduce the number of bricks needed in construction; and rat-trap bond masonry, a technique for wall building that uses vertical bricks to create hollow spaces that improve insulation. These design features ensured that the housing built was culturally appropriate, inexpensive and easy to build, long-lasting and low cost to maintain.

IMPACTS IN KERALA

Working with two municipalities, Kochi and Trivandrum, the Kerala state government and Kudumbashree approved seven projects under BSUP, comprising 23,577 houses worth Rs. 343 (US\$50 million). As of April 2018, 80 per cent of the homes had been completed. The average cost was less than half the cost of the average BSUP home (Rs. 144,000 [US\$2,100] versus Rs. 293,000 [US\$4,300]) (see Figure 2), and occupancy was 100 per cent. These impressive outcomes suggest that Kerala has been able to overcome some of the challenges of affordability and acceptance among communities that have led to underoccupancy in other states.

Figure 2
Cost and occupancy rates of BSUP housing units, by state



Note: Figure is based on houses built between 2005 and April 2018. The size of the bubble indicates the occupancy rate. Chandigarh (which built 186 homes per 1,000 slum population) is excluded because of its relatively small population (about 1.1 million). Sikkim (where the per house cost was Rs. 1,322) is also excluded for the same reason.

The partnership between the state of Kerala, Kudumbashree and COSTFORD promoted the widespread use of sustainable architecture practices. Examples include building flood water retention and drainage in houses in coastal communities, using materials and layouts that regulate indoor temperature, adding rain harvesting and biogas facilities to reduce energy consumption costs and blending houses in with their natural environment. All of these factors helped reduce the costs and carbon intensity of construction as well as the energy needs of inhabitants and their impact on the local environment. They also contributed to the satisfaction of residents, as evident in the high occupancy rates.

Scaling up the benefits

Through effective partnerships involving state government, municipal authorities, community-based organisations and research institutes, Kerala was able to achieve impressive levels of cost efficiency and occupancy rates when implementing national-level housing policies. If these occupancy rates and building costs could have been achieved across India, the overall cost of BSUP could have been reduced by Rs. 118 billion (US\$1.71 billion). Alternatively, an additional 816,000 homes could have been built nationwide for the same level of investment.

If the average costs and occupancy levels seen in Kerala could be replicated in future national programmes, governments in India would be able to reduce total expenditure by an estimated 58 per cent. The cost of providing safe and adequate housing to every slum dweller in India would fall from Rs. 7 trillion (US\$102 billion) to Rs. 2.9 trillion (US\$42 billion).

A significant reason for the high occupancy rates and cost-efficiency in Kerala was the involvement of communities in decision-making about house designs and locations, supported by community-based expertise in sustainable building. The emphasis was on quality and needs, not quantity; empowering communities to push for *in situ* redevelopment and upgrading that enables them to stay connected to their livelihoods and access affordable and adequate housing.⁵⁷

There are some challenges and constraints to this delivery model. The flexible approach to building and upgrading creates a mismatch between project proposals and project outcomes. All BSUP implementers are required to provide Detailed Project Reports in order to secure funding from the central government. Although there is rhetorical recognition by the national government that they are “living documents” that are likely to change as projects develop (because communities adapt project plans or unforeseen challenges arise), the amount of funding allocated at the outset does not change; any increase in project costs has to be covered by state or city governments and the beneficiaries. Finding the extra funding can be difficult.

In the few cities in India where the BSUP sub-mission was successful, participatory approaches that incorporated local knowledge and preferences and emphasised self-governance were essential to achieving value for money and household satisfaction.⁵⁸ Achieving consensus and buy-in from all stakeholders can lead to long lead-in times for projects, however, delaying projects and access to homes. Ensuring accountability and achieving inclusive and expedient decision-making is especially challenging for projects delivered through partnerships with civil society organisations such as Kudumbashree.

Policy recommendations

Five main policy recommendations emerge from this case study.

1. **Ensure that housing policy is integrated with land use, transport and other urban development policies**

Urban form is at the heart of sustainable and inclusive cities. The agendas of housing projects need to be aligned with other national and local development agendas from the planning stage through completion. New housing stock needs to be located in ways that enhance economic opportunity and social participation while minimising environmental impacts and risks. During the approval and review processes for the Detailed Project Reports, the central government should assess whether projects clearly address the spatial needs of residents. Doing so is likely to lead to *in situ* development rather than relocation. Where relocation is unavoidable, governments need to clearly demonstrate that the new housing stock is close to the original settlement or well connected to jobs, services and amenities.

2. **Ensure that climate change is mainstreamed into the design and delivery of national, state and city-level housing policies**

Housing policy and climate policy can either complement or conflict with each other. Both are central to the realisation of India's broader development goals. Housing helps define India's levels of energy use and carbon emissions, as well as its exposure to climate risk. Because of the projected rate and scale of the expansion of housing in India, decisions taken now will shape its emissions and vulnerability for decades to come. Mainstreaming or integrating climate considerations and agendas into housing policy will lead to better housing and development outcomes over the long term. For instance, adapting to flood risks can prevent potentially significant economic damage in the future. Multilevel commitments need to be aligned to ensure that national climate strategies and policies translate into real practices in urban (housing) development.

3. **Require that built-environment professionals be trained in sustainable design**

Built-environment professionals (architects, engineers and town planners) play an essential role in implementing the BSUP sub-mission. Across the country, there is a need to build their capacity to mainstream environmental goals, particularly climate mitigation and adaptation. Financiers also need to appreciate the economic returns associated with more sustainable practices, including reduced operating costs and disaster risk. Information, education and certification programmes can help equip these professionals with the skills necessary to support governments and civil society organisations in scaling affordable, climate-compatible housing.

4. **Support community-based organisations working on low-income housing and basic services, including through financial and technical assistance**

National policies provide scope for state and city governments to adopt participatory processes, but they could do more to facilitate and incentivise co-production. One option would be to require state and city governments to partner with community-based organisations in the design and delivery of housing programmes. Another would be to provide grants, loans and technical assistance to civil society organisations and subnational governments. Thailand's Baan Mankong programme has enabled systematic upgrading of informal settlements by enhancing the legitimacy of community-based organisations and improving their access to resources.⁵⁹ It could serve as a model.

5. **Explore opportunities to scale private investment by demonstrating cost efficiency and high occupancy rates**

Low-income households are willing and able to make some financial contributions towards housing and services,⁶⁰ creating some opportunities for cost recovery. Community-based organisations such as the Society for the Protection of Resource Areas (SPARC) have secured commercial bank loans for the construction of affordable housing (development assistance played an important role in providing bridging capital).⁶¹ Monitoring and evaluation to demonstrate the cost-effective implementation and benefits of participatory delivery of housing projects would help leverage future funding. The national government should explore opportunities to involve private investors, particularly domestic commercial banks, so that public funding can go farther and focus on households with the least ability to pay.

Conclusions

An estimated 1 billion new homes will be needed worldwide by 2025, most of them for low-income populations. Business-as-usual housing development often fails to reach the poorest members of society. It is a major contributor of global greenhouse gas emissions and is vulnerable to the impacts of climate change, such as heatwaves and flooding. Innovative approaches to housing are therefore needed.

In response to the challenges of rapid urbanisation and the spread of informal settlements in its largest cities, the Indian government has pursued mass housebuilding and slum upgrading programmes. One programme, BSUP, ran for 10 years. Plagued by high costs, poor quality and underoccupancy, it failed to stem the rise in slum populations.

At the state level, inclusive governance arrangements that incorporate the views of local stakeholders and engage eco-friendly architects can generate a wide range of co-benefits and produce housing that is environmentally sound, desirable to beneficiaries and affordable. Low-carbon construction that incorporates environmental objectives in a pro-poor manner presents an opportunity to move towards both more effective climate action and more inclusive housing provision.

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ABOUT THE COALITION FOR URBAN TRANSITIONS

The Coalition for Urban Transitions – launched in 2016 at the Climate Leaders’ Summit in New York – is a major new international initiative to support decision makers to unlock the power of cities for enhanced national economic, social, and environmental performance, including reducing the risk of climate change. The Coalition provides an independent, evidence based approach for thinking about ‘well managed’ urban transitions to ensure that the growth of urban areas, and the accompanying process of economic, social, and environmental transformation, maximises benefits for people and the planet.

The initiative is jointly managed by the **C40 Cities Climate Leadership Group (C40)** and **World Resources Institute (WRI) Ross Center for Sustainable Cities**. Members include over 20 major institutions spanning five continents, including research institutions, city networks, international organizations, infrastructure providers, and strategic advisory companies. The initiative will be overseen by a Global Urban Leadership Group to steer and champion the work.

Follow the Coalition’s work at www.coalitionforurbantransitions.org on LinkedIn, on Twitter @NCEcities and Facebook @coalitionforurbantransitions.

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