Theme: Inclusive Housing
FROM THE EDITOR-IN-CHIEF

The theme of this issue of Shelter is ‘inclusive housing’. As the world is slowly coming back to normalcy from the COVID Pandemic, the provision of inclusive housing assumes critical importance, especially for a country like India which was witness to large scale reverse migration owing to urgent need of shelter and livelihood opportunities. Due to its strong inter-industry linkages which helps in capital formation, income and employment generation, the role of housing in driving sustainable and inclusive economic transformation at the national, regional and local levels is well documented. This is further reinforced under Sustainable Development Goal no. 11 which mandates nations to ensure access to adequate, safe and affordable housing for all as well as basic services and upgrade slums by 2030. As a large proportion of urban poor including migrants, senior citizens, working women, widows, students, alternately abled, etc. lives in unplanned slums and unauthorized colonies, any programme on ‘Housing for All’ would mean social, economic and financial inclusion of all socio-economic groups, especially the vulnerable segments.

Inclusive housing has always been a focus area of the Government of India since independence and a large number of programmes and policies have been designed to cater to the housing needs of different socio-economic groups, the latest being the PMAY-Urban. The Pradhan Mantri Awas Yojana–Housing for All (Urban) Mission of the Government of India, with four economically viable affordable housing verticals, has been a commendable effort towards an inclusive housing program intervention that addresses the diverse nature and extent of housing shortage with differential socio-economic housing condition and tenure status across scales of urban demography. The PMAY Mission will substantially improve the access of the urban poor for formal sector housing finance as well as making the houses affordable to the urban poor segment. For empowering women through PMAY, the inclusion of the name of female head is ensured by valid ownership documents for the house. In addition, the Government of India has undertaken a number of demand-side and supply-side steps in order to catalyse the inclusive housing market in India. The programme not only ensures a pucca house having basic amenities like toilet, water supply, electricity and kitchen to all eligible urban households by the year 2022, but also guarantees a dignified living along with sense of security and pride of ownership to the beneficiaries as well as acts as an engine of economic growth through the provision of more employment, income and livelihood support.

Till now, the PMAY-HfA(Urban), world’s largest housing programme, has approved construction of more than 11.5 million houses involving total investment of Rs.7.56 lakh crore with central assistance of Rs. 1.93 lakh crore, out of which Rs. 1.30 lakh crore has been released to States in the framework of cooperative federalism.

In order to address the shelter needs of the migrants and urban poor in the country, the Govt. of India has launched the ‘Affordable Rental Housing Complexes (ARHCs) Scheme, as a sub-scheme under PMAY-HfA(Urban). This policy level intervention is one of the significant steps towards more inclusive housing which will improve their living conditions and provide access to dignified and planned housing close to their workplace in industrial sector as well as in non-formal urban economy.

However, towards further enhancing inclusive housing, there is a need for a new paradigm of planning and housing strategies addressing some of the key focus areas such as: availability of land at suitable locations; security of tenure and land rights; availability of cheaper, long-tenure and accessible housing finance; technology suitability; and developer & construction related constraints.

This volume of Shelter, being published on the occasion of the 52nd HUDCO Foundation day celebration, contains a bouquet of articles which provide diverse insights into a range of issues related to promoting inclusive housing. HUDCO has been promoting inclusive housing since its inception, with 92 per cent of houses funded by it are for economically weaker sections and lower income groups. The theme papers highlight the issues relating to inclusive urban planning and development through the earmarking of land and housing for the urban poor; challenges in cost effective, eco-friendly and disaster Resilient Design and Construction for net-zero achievement; inclusive housing push in the Union Budget 2022-23; and a comparison of urbanisation & housing in India & China. In the policy review section, two key articles discuss the role of PMAY for building back better through green, affordable and climate resilient housing in India; and importance of including Revenue Administration in implementing inclusive housing programmes. This volume also presents three case studies contributed on different aspects of inclusive housing programmes in India such as learnings from BLC implementation under PMAY-Urban; housing solutions for low income settlements in Delhi; and Citywide Slum Rehabilitation Strategies for the Urban Poor in Kolhapur. These case studies would serve as a guide for scaling up the inclusive housing programmes in other cities and towns.

Hope you enjoy reading this issue of Shelter.
The theme of this issue of Shelter is ‘inclusive housing’. As the world is slowly coming back to normalcy from the COVID Pandemic, the provision of inclusive housing assumes critical importance, especially for a country like India which was witness to large scale reverse migration owing to urgent need of shelter and livelihood opportunities. Due to its strong inter-industry linkages which helps in capital formation, income and employment generation, the role of housing in driving sustainable and inclusive economic transformation at the national, regional and local levels is well documented. This is further reinforced under Sustainable Development Goal no. 11 which mandates nations to ensure access to adequate, safe and affordable housing for all as well as basic services and upgrade slums by 2030. As a large proportion of urban poor including migrants, senior citizens, working women, widows, students, alternately abled, etc. lives in unplanned slums and unauthorized colonies, any programme on ‘Housing for All’ would mean social, economic and financial inclusion of all socio-economic groups, especially the vulnerable segments.

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HUDCO’s HSMI organized a 3-days eITEC Online International Training Programme for Overseas Professionals on “Housing for Sustainable Habitats – Policy, Planning, Design and Construction Technologies” during 20th-22nd October 2021. This is the 45th International Training Programme for Overseas Professionals conducted by HUDCO’s HSMI sponsored by the Ministry of External Affairs, GoI under its International Technical & Economic Cooperation (ITEC) programme. This course was attended by 21 delegates from eleven countries with diverse backgrounds such as Architects, Planners, Engineers, Government officers & Technical Officers. The Sessions were scheduled on the MS Teams platform. On 20th Oct, 2021, Mr. M Nagaraj, Director Corporate Planning HUDCO inaugurated the Training Programme, in the presence of Dr. D Subrahmanyam, Senior Executive Director, HSMI, Mr. Somnath Chatterjee, Director DPA-II MEA and HSMI faculty members and delivered the inaugural address. Dr. D Subrahmanyam gave the welcome address.

The Technical Sessions in the programme were delivered by eminent domain experts such as Ms. Parul Agrawala, Country head UN Habitat; Mr. Ram Khandelwal, Senior Urban Planner UN Habitat; Prof. (retd) Neelima Risbud, School of Planning & Architecture, New Delhi; Mr. A. K. Jain, Ex Planning Commissioner (retd) DDA; Mr. Pankaj Gupta, Deputy Chief, Building Materials Technology Promotion Council; Dr K K Pandey, Professor at Indian Institute of Public Administration, New Delhi; apart from in-house experts from HSMI & HUDCO. Mr. D Guhan, Director Finance, HUDCO was the chief guest in the Valedictory session and he delivered the Valedictory address. Training coordinator for the programme was Ms. Pooja Nandy, Joint General Manager (Projects) & Fellow HSMI’s HUDCO.
URBANIZATION, HOUSING, AND HOUSEHOLD AMENITIES IN INDIA AND CHINA

DR. ARJUN KUMAR

This article aims to illustrate the trends and patterns of urbanization, urban housing, and household amenities, their challenges, and the character of emerging habitat and settlements in India and China. The rationale behind the whole exercise is that India and China are the two most populous countries of the world and their citizens bear the brunt of the ‘urban governance conundrum’. It provides an analysis of the urbanization and urban housing policies of both the countries towards how both nations can be the torchbearers of an urban housing revolution and inclusive and sustainable habitat.

INTRODUCTION

Cities are the engines of productivity and prosperity. However, unbridled urbanization poses a burden on natural resources and public facilities and reinforces urban-rural inequalities. In the era of Sustainable Development Goals (SDGs), it has become mandatory to have responsible and sustainable smart cities and urban transformation founded on the principles of conscious urbanization, adequate and affordable housing, and human settlements. By 2007, half of the world’s population lived in urban areas. As per estimations, 60% of the global population will reside in urban settlements by 2030 (United Nations, 2014). The population in Indian urban centres accounts for 11% of the global urban population, the second largest in the world after China (The World Bank, 2020). With China and India placing paramount importance on economic growth, both the countries bear appreciable responsibility towards planning a sustainable and inclusive urbanization and combating existing challenges.

The challenges to India’s urbanization are manifold - including a complex and diverse urban governance landscape, growth in the absence of ‘master plans’, sub-optimal utilisation of urban land, an increasing risk of water scarcity, planning for disaster mitigation, pressure on coastal habitation, and addressing slums and the magnitude of informal

“It is important to incorporate affordable and social housing and youth aspirations and opportunities for inclusive growth of urban centers and ensuring ‘Right to Housing’.”

Key words: Urbanisation, Housing, Household amenities, India, China, SDG.

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settlements, and the need for a multi-disciplinary and multi-sectoral approach, as highlighted by a recent NITI Aayog Report\(^1\). The Report also highlights a central sector scheme - 500 Healthy Cities Programme\(^2\) - recommended by its Advisory Committee, as “Every city must aspire to become a ‘healthy city for all’ by 2030.”

Owing to the rapid economic growth and urbanization in China, human welfare has risen, socio-economic inequality has widened, and the environment and its capacity are under severe pressures. The impact is so detrimental that it is advised to move from maximizing economic development towards improving environmental quality. Recently, the literature is rife with articles on China’s housing bubble about to burst owing to the rising growth rate in house prices over the last decades and speculative markets. Moreover, the global media has also reported about several ghost towns and projects associated with the same.

This article provides an analysis of the urbanization and urban housing policies of India and China towards how both nations can be the torchbearers of an urban housing revolution and inclusive and sustainable habitat.

**URBANIZATION IN INDIA AND CHINA: AN OVERVIEW**

While urbanization has the potential of being the powerhouse of development and large-scale prosperity, yet there are a few fundamental human development challenges, especially if the process of urbanization is unplanned. For instance, exacerbation of economic disparities and unsanitary conditions because of poor urban infrastructure - such as unreliable water supply, power systems, congested roads and poor public transport, inefficient ports and inadequate schools, etc. (Palanivel, 2017).

India has undergone gradual urbanization post the 1991 economic reforms. The pace of the same is forecasted to rise to achieve 50% of its population in urban settlements by 2045 (Figure 1). China has experienced rapid urbanization post its opening up of the economy in 1982. This will not be sustained and will modestly increase to reach over 70% of urbanization.

**Urbanization in India**

When compared to China, India has been conservative in its urbanization, with its policies being less foresighted and more reaction-based. As per the 2011 Census of India, the total urban population in the country is more than 377 million, constituting 31% of the total population. The total number of urban households

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in 2011 was 78.9 million, it increased by more than 25.2 million (46.9%) as against 53.7 million households in 2001. These numbers are expected to double by 2031. Apart from the obvious rise in the population, the numbers of urban households have increased due to the addition of new urban areas from the last census (Kumar, 2015), a 52% increase from 5161 to 7933 Census Towns.

India remains dominated by a large number of small towns and a small number of large cities. This is evidenced by the fact that 53 metropolitan centres account for more than 43% of the urban population. Delhi, Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Pune, and Ahmedabad are a few large metropolitan cities.

Urbanization in the country is marked by rural to urban migration in search of employment prospects. The economy has been service-driven, while the manufacturing sector has been missing in terms of contribution to the Gross Domestic Product (GDP) and employment generation. The ratio of urban to rural income in India is 1.6, half of that of China’s (Hnatkovska and Lahiri, 2017).

Further, it has also been evidenced that amid a moderate increase in public spending on slum improvement, there has been a simultaneous increase in the informal settlements and slums on the periphery of the cities. Thus, besides socio-economic exclusions, policy-making efforts have trailed with the inefficient top-down policy implementation, and urbanization is characterised as ‘messy and hidden’.

Urbanization in China

China, in its urbanization strategy, has been localised and consistent. According to the Seventh Population Census of China, the total urban population is roughly 902 million in 2020, accounting for 63.9% of the total population. This estimate stands against the urban population’s share of 37.1% in total population in 2000, and 51.3% in 2010, indicating a stunning pace of urbanization.

In China, urbanization has taken place along the coast. Roughly 70% of all built-up land and more than 50% of all new built-up land added between 1990 and 2010 is included in village landscapes (Li et al. 2019). This indicates that there is leeway for policymakers to expand the megacities rather than focusing on the spread of population across the country. A few of these megacities include Shanghai, Suzhou, Chengdu, Hangzhou, Beijing, Guangzhou, Shenzhen, and Chongqing.

The motivation for migrating is rooted in not just a higher income but social welfare benefits as well. The urbanization miracle (Chen et al., 2013) can be attributed to stellar performance in manufacturing and exports, resulting in a double-digit surge in real wages and contribution to the GDP, further feeding into demand for housing. The ratio of urban to rural income is 3.2, the highest in the world (Luo and Zhu, 2008). Chinese President Xi Jinping’s Semi-Suburban Model has been exemplary in its impact and reach and continues to provide direction to economic growth and urbanization.

It should be added that the housing system follows the Hukou system in China, where only residents who have obtained local Hukou (a system of household registration used in mainland China) can access the local welfare system. Thus, migrants tend to cluster in the cheaper suburban areas, which offer low-skilled

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job opportunities. Further, housing affordability and emerging inequality have arisen as serious problems in all large cities of China.

Urbanization in India and China: A Comparative Analysis

As per a McKinsey Report (2020), India spends $17 per capita on capital investments in urban infrastructure annually, while China spends $116. A significant proportion of the disparities in the urban transformation between the two countries can be attributed to the discrepancies in land use, housing, and transportation.

The main mode in obtaining funds for infrastructure from banks in China is through Urban Development and Investment Companies (UDICs), subsidiaries of local governments. The practice involves selling land for development to supplement the limited local governments’ revenues and pay for investment in the provision of local services. Thus, municipal debt has increased sharply since 2008 owing to the binge borrowing and overinvestment in infrastructure. The objective of the same was to minimise the effects of the global financial crisis by stimulating the Chinese economy.

In India, cities have been in a perpetual state of fiscal crisis due to the stalled devolution of power from the state to municipal governments (Ren, 2015). India has approved Special Purpose Vehicles (SPVs) to fund infrastructural projects and to manage smart cities, however, its efficacy to bring investment using land as a tool has been limited as compared to China.

The inner-city area is often dilapidated. While China is substantially improving, in India this remains a significant issue. However, governance and planning roadblocks for informal settlements are now being slowly addressed through various levers, such as taxation and registration. Many such advanced measures point to a maturing housing market, with different dimensions in different cities, from property rights to regulation to management to financing. Sustainable consumption using local resources and spatial planning is another important component, especially in the SDGs era to ensure intergenerational equity.

India has the potential to reap the benefits of demographic dividend, which if realised will be larger than that of China owing to the latter’s aging population. If India optimises the productivity of its cities and maximises its GDP, the economy could add more than 170 million urban workers to its labour force from 2005 to 2025, compared with 50 million in China over the same period (McKinsey, 2020).

URBAN HOUSING CONTINUUM
AND HOUSEHOLD AMENITIES: INDIA AND CHINA

In India, rapid migration and unplanned urbanization has led to a proliferation in informal settlements and slums, with people living in unsanitary and congested conditions. With an evidenced shortage of housing,
especially for the urban poor, recent steps of the government include increased budgetary allocation for the purpose of construction of low-cost, affordable housing. It also includes provision of credit and government assistance, increased role of urban local bodies, rental and migrant housing and workers’ hostels. Housing studies establish the manifestation of rising inequality between those in need of housing and those in abundance (Kumar, 2016).

Despite China’s regulated housing market and Hukou system, there exists a dichotomy in the housing scenario of the country. For both countries, issues such as housing stock affordability, speculative investment, housing market imbalances, social housing, vacant housing, as well as prevailing wealth inequalities have led to imbalances in housing demand and supply. Rapid migration towards the urban centers has propelled the demand for social, rental and migrant housing.

The rapidity with which housing demands are increasing in the two countries can be traced to the slow pace of housing governance. The discussion below briefly describes the governments’ role in providing housing to their people in the two countries.

**Historicity**

The governance in India in reference to the housing sector has undergone various changes. From provider of ownership housing in the 1970s-80s and financing housing in the 1980s-90s, the government’s role has become extensive in providing social housing as well as that of a facilitator and incorporator of private players (Table 1).

Since the start of the 21st century, the Government of India has focused its attention on creating world-class urban spaces in the country. Several policies were created to attain the objectives of providing urban infrastructure, affordable housing for all, maintenance and renovation of heritage sites, providing and financing the basic amenities.

Over the decades, market system-based housing reforms and real estate development in China have replaced the socialist welfare housing provision. China has undergone two ‘Housing Revolutions’ in the 20th Century, from a socialist revolution to a neo-liberal capitalist one. At the beginning of the 1980s, about 80 percent of Chinese urban residents rented their accommodation, mostly from state-owned employers, and lived in overcrowded communal buildings inside work unit compounds. Thus, housing was linked to employment. More than four-fifth of official urban residents now own their homes and live inside gated communities (Wang, 2013).

Through a series of reforms involving a gradual change from private rental housing to public rental housing in 1949-1956 and 1956-1976 to private

**Table 1: Housing Policies and Reforms in India, 1970-2020**

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<tr>
<th>Year</th>
<th>Reform</th>
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<tbody>
<tr>
<td>1970s-1980s</td>
<td>Provider of Ownership Housing</td>
</tr>
<tr>
<td>1980s-2000s</td>
<td>Provider of Ownership Housing to Financing Housing</td>
</tr>
<tr>
<td>2000s</td>
<td>Financing Housing to Facilitator of Housing Activity and Incorporation of Private Players</td>
</tr>
<tr>
<td>Post Pandemic</td>
<td>Housing Supply, Private Sector Participation, Real Estate Regulations and Governance, Affordable, Rental, Migrant Housing, Housing Finance, Technology</td>
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</tbody>
</table>

*Source: Author*
family ownership in 1977-1991 and 1992-1998, to a market dominated homeownership in 1998-2007, and finally, towards mixed-ownership housing system in 2008 (Table 2). The People’s Republic of China (PRC) has managed to replace its welfare-based urban housing system with a market-based housing provision scheme. PRC has successfully expanded urban homeownership and impressively increased per capita housing consumption.

The literature points out China’s housing features of state-led gentrification. Since the 2000s, urban redevelopment has been the focus which is driven by ambitious urban upgrading programs to build world-class cities. The state played a significant role in urban renewal using the market instrument of land development.

**Recent Housing Trends**

Careful perusal of estimations of floor space and dwellings in India and China highlight the glaring issues of congestion and spatial inequality. The consistent and significant gap between the measures is appalling. Not only is the percent of dwellings far lower in India as compared to China, the size of these dwellings is also less. The problem

<table>
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<th>Year</th>
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<tr>
<td>1950s-1970s</td>
<td>Private Rental Housing to Public Rental Housing</td>
</tr>
<tr>
<td>1970s-1990s</td>
<td>Public Rental and Work Unit Ownership to Private Family Ownership</td>
</tr>
<tr>
<td>1990s-2000s</td>
<td>Toward Market-Dominated Homeowning Urban Society</td>
</tr>
<tr>
<td>2000s-2010s</td>
<td>Mixed Ownership Housing System</td>
</tr>
<tr>
<td>Post Pandemic</td>
<td>Housing Market Regulations and Effective Governance by the State/Local, Focus on Rental, Social, Migrant Housing, Housing Finance, Technology</td>
</tr>
</tbody>
</table>

*Source: Author*
is exacerbated by the large household sizes, with over five members, on average, reducing the available per capita floor space (Figure 3). From 2005 to 2025, India will need to add 700 million to 900 million square meters of floor space a year, while for China, the required measure could be 1,600 million to 1,900 million square meters (Figure 4) (McKinsey, 2020).

Livability Aspects of Housing: Insights from the SDG Performance Index

The ‘livability’ aspect of housing has gained prominence by including drinking water, sanitation, solid waste management, and drainage. These parameters act as the basis for Service Level Benchmarking (SLB), which measures and monitors utility service provision and lays its standard to minimize gaps. Further, with the given COVID-19 pandemic, the lack of the same makes hygiene and social distancing difficult.

In India, while there has been an improvement in the availability of the amenities such as drinking water, sanitation, electricity, and drainage arrangement, etc. by the urban households, yet the statistics show, there has been a stark deprivation especially in slums and informal settlements (Figure 5).

China has achieved improvements in the same parameters as well. However, advancement in terms of access to clean fuels and concentration of particulate matter has been slow, directing attention towards environmental capacity and sustainability. China’s progress on SDGs 6, 7, and 11, is promising (Figure 6),

Figure 5: India’s Performance on SDGs 6, 7 and 11

Figure 6: China’s Performance on SDGs 6, 7 and 11

(Source: SDG Development Report 2021)
and India, too, has a positive journey. However, India’s pace in attaining SDG targets is tardy, and remains slower than that of China.

**Housing Market and Prices**

Rapid acceleration in residential prices relative to household incomes, a perceptible divergence between fundamental prices and speculative prices, oversupply of residential spaces, and non-monitored shadow banking for financing indicate an imminent housing bubble crash. This leads towards the fact that housing in China has peaked. An overview of price to income ratio among countries in 2021 evidences the severity of the issue (Figure 7).

A focused comparison of residential property prices in select cities of India and China prove that the estimate in Beijing and Shanghai is roughly three to five times than that in Delhi and Mumbai, respectively. A similar picture is available for gross rental yield, which is roughly half³.

**Recent Policies and Schemes**

**India**

In the recent years, schemes that gained prominence under the Urban Missions include the Pradhan Mantri Awas Yojana – Urban (PMAY-U) (2015), the Atal Mission for Rejuvenation, and Urban Transformation (AMRUT) (2015), the Smart Cities Mission (SCM) (2015), and Swachh Bharat Mission (2014). Further, through a variety of other infrastructure projects of the government, such as the Shyama Prasad Mukherjee Rurban Mission (SPMRM), the National Infrastructure Pipeline (NIP) and the PM Gati Shakti, etc, well-distributed urbanization is envisaged which will consequently take care of the inclusive housing needs of the people.

Government of India’s initiative of providing ‘housing for all’ in urban areas by 2022 through the PMAY-U that was launched in 2015 deserves a special mention. It has four verticals through which the government aims to address the housing issues of the Economically Weaker Sections (EWS) and Low-Income Group (LIG) households: In-situ Slum Redevelopment (ISSR); Credit Linked Subsidy Scheme (CLSS) (which is further categorized into CLSS I (for EWS and LIG) and CLSS II (for middle-income groups); Affordable Housing in Partnership (AHP); and Beneficiary-led Construction or enhancement (BLC), which

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underscore the public-private collaboration.

The Ministry of Housing & Urban Affairs (MoHUA), Govt. of India has also taken several measures for housing industry such as Real Estate (Regulation and Development) Act, 2016 (RERA), geo-tagging of PMAY houses, discussions of utilizing vacant government lands, the Global Housing Construction Technology Challenge (GHTC), Model Tenancy Act 2020, etc. For the urban poor and homeless there has also been schemes such as Deendayal Antyodaya Yojana National Urban Livelihood Mission (DAY-NULM). Recognizing the importance of rental housing, the government launched the Affordable Rental Housing Complexes (ARHCs) for Migrants Workers/ Urban Poor scheme in 2020.

Overall, the housing sanction under PMAY (Urban) stood at around 11.5 million as of March 2022, total housing demand being 11.2 million. The resources have been also raised from Extra Budgetary Resources (EBR) such as Central Road and Infrastructure Fund (CRIF).

Overall, the houses sanctioned since 2015-2022 demonstrate unprecedented exponential growth as well compounded development as per the planning of phase-wise implementation of the Mission, harnessing scale and technology. This pace and scale would be one of the best examples in the world in terms of any public program in general and social housing in particular.

The complex and challenging issues, however, pertaining to redevelopment of slums and unplanned settlement (e.g., land, community mobilization, private participation, gestation period, project finances, identification of beneficiaries) requires thrust from all the stakeholders. For this, the active role of state government and urban local bodies as well as communities is of paramount importance, learning from the best practices and bad experiences.

China

Similarly, in China, several steps have been taken by the government to ensure housing security for its citizens. For instance, the Housing Policy of 2007, 2009, 2013, and 2016 aimed to restrict housing stock demand and borrowing using tightening measures. The target was to combat rising residential prices. The same was linked to the Hukou system and undertaken for a short-term.

The ambitious Belt and Road Initiative (BRI) announced in 2013 aims to vigorously expand and meet the infrastructure and development requirements of China and the partner countries. It incorporates and strategizes road and sea trade routes for global infrastructural development. It lays emphasis on unity and understanding between variegated cultures. The BRI promises to open horizons for China to export urbanization while also enhancing the quality of life of the people.

The Chinese government envisioned the attainment of a ‘comfortable society by 2020’. It includes the most important component of shelter for all residents. It makes it contingent upon the municipal governments in assisting low-income households in acquiring a reasonable quality house, irrespective of their financial standings. Further, it defines controls and regulations to ensure affordable housing, including controlled investment returns and construction standards and loans to developers from a special housing provident fund. For the urban poor, rent subsidy based on standards and household income and direct provision of public housing for a rent determined as a proportion of dispensable income.
The China Housing Development Report (2020-2021)\(^4\) shows that in the absence of major policy shifts, new external shocks, and a significant improvement in the epidemic situation, the overall property market in China will remain stable, but its structural potential remains. It is expected that China’s property market will continue to recover steadily in 2021. The year-on-year growth rate of commercial housing sales may maintain positive growth and hit a record high again.

The Report also provides broad counter-measures and suggestions for planned urbanization and housing security in China. It advocates among other measures, to establish systematic and quantitative policy benchmarks to strengthen precise and effective regulation; quantify the effective boundary of various specific policy objectives and strengths such as housing demand policy, housing supply policy, housing land policy, housing finance policy, housing tax policy, etc.; and combine various policy objectives and effective boundaries to make various policies.

Critical Assessment

Despite the motivations and intentions of the governments of both India and China, the housing conditions remain far from ideal. Several phenomena contribute to this. For example, the problem of vacant housing in China is roughly 22% or 50 million (Li, 2019). Similarly in India, the vacant housing stock has been estimated to be over 11 million.

Another challenge, especially in the case of China relates to housing speculation. The practice of purchasing for investment rather than dwelling is prevalent. The ghost city phenomenon is driven by debt, which in turn was triggered by the recovery process from the global financial crisis. Thus, these cities are marked by extensive infrastructural development, but lack the people to inhabit it. However, not all ghost cities remain so. For instance, Pudong area in Shanghai, a former swamp across the river, is now an urbanized and modern area. It remains an exception and not a generalization.

The recent debacle of the Chinese real estate giant Evergrande demonstrates the impact upon private investors and prospective homeowners because of mismanagement and default by the company that has a huge political clout in the country. Similarly, in India, real estate sector requires effective governance for the smooth functioning of the sector amidst private sector mismanagement, RERA is a step in that direction.

The densification of households in urban India has led to drastic changes in the needs of urban settlements. Issues such as economic competitiveness of cities, provision of easy access to affordable housing to check massive housing shortages, empowerment of Urban Local Bodies (ULBs) and Para-Statal agencies, provision of adequate quality infrastructure, amenities and other municipal services and their pricing and affordability, slums redevelopment, formalization/regularization of informal/unauthorized colonies, congestion and crowding, and steep rise in vacant houses have cropped up in the recent past.

The throes of the COVID-19 pandemic hit the housing market, real estate sector, and most importantly the construction sector. The cities, often referred to as engines of economic growth, have

been derailed due to massive disruption in economic and related activities inflicted by COVID-19. However, with gradual opening up of economic activities, there are green shoots of recovery and both countries are taking steps to revive the pace of the real estate sector. It is worth noting that these sectors have regained their momentum over the second half of 2021 (Toh, 2021).

CONCLUSIONS AND THE WAY FORWARD

India and China are countries with an accelerating pace of growth. With a commensurate increase in urbanization and population, housing affordability and shortages emerge as major challenges. To reconcile with socio, economic and environmental sustainability, both countries need to focus on a set of key issues. These include the redevelopment of slums, informal settlements and old areas, affordable, adequate, responsible housing stock supply and planned housing including non-ownership (rental) housing, and workers’ hostels and dormitories for migrant and marginalized families, senior citizens and student housing, considering environmental sustainability, local needs and harnessing technology. The use of official and market-based data systems and mapping to understand urban systems will prove central to the process.

Going forward, it is imperative to engage the community of each country and indulge in bilateral cooperation on various technical aspects, for the responsible urban housing revolution. Decentralized approach is needed towards planning and implementation to cater to the local needs and opportunities. Scaling up technological interventions and techno-financing institutions, which are environmentally feasible and scalable, along with well-planned policies will achieve sustainable urbanization.

In order to insulate the housing market from any impending collapse, it is important that the countries ensure sound processes of urbanization and well-distributed land and real-estate development. It is pertinent to avoid concentration of urbanization in some regions while ignoring others and move towards balanced regional development. Proper urban planning through active citizen participation in the policymaking processes and financial viability would be important to prevent the build-up of housing bubbles.

It is important to incorporate affordable and social housing and youth aspirations and opportunities for inclusive growth of urban centers and ensuring ‘Right to Housing’. To ensure planned and sustained development, careful analysis of gestation period, resource mobilization, housing standards, among other factors need to be mulled over and solidified through a holistic approach incorporating well-planned processes – such as densification – for sustainability. Housing and amenities, which are crucial to Ease of Living, have to be at the core of city development strategies, to move towards policy and action for impact, especially for China and India in the coming decades.

Acknowledgments

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INCLUSIVE URBAN PLANNING AND DEVELOPMENT THROUGH EARMARKING OF LAND AND HOUSING FOR THE URBAN POOR

PROF. RAMAKRISHNA NALLATHIGA

“Inclusive urban planning & development is becoming the order of the day given the vast urban population already living in slums as larger number of people are moving to cities in search of livelihoods. Preparedness towards accommodating such large low-income immigrant population would require enabling policy that provides urban space for such population and its implementation needs to be attempted at all levels of government. The current paper reviews such attempts towards it - both International and Indian experiences (States and Cities); it then suggests the requirements of such action. The implementation process of earmarking land/housing for urban poor is also discussed.”

Key words: Housing Policy, Urban Poor, Planning Approach, NBC, JNNURM.

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INTRODUCTION

India has been experiencing a steady rise of urban population for last few decades, though not at the pace and level of some other developed and developing countries, which accommodate more and more people into cities (Kundu 2006). The process of urbanization is primarily geared up towards the concentration of economic activities in cities and the creation of livelihoods therein. Structural changes such as shift from manufacturing to services in large cities has also led to the loss of jobs in industry and gain of the same in services (D’Monte). Migration of population, an important phenomenon associated with urbanization, is not only confined to the population with skillset (which is primarily urban-urban migrant population) but also unskilled or semi-skilled population which is primarily rural-urban population. Development processes of cities tend to be exclusive in their approach in terms of planning for housing and built spaces for such migrants and low-income population. It becomes, therefore, imperative for cities to make efforts to create living spaces in order to meet the requirements of these segments of population, who play an important role in the city economy. This approach is also sometimes called as ‘inclusive development’ or ‘inclusive planning’ so that the people, whose built space requirements are hitherto not
taken into account, would find some reflectance through such effort.

**DEFINING EARMARKING**

Earmarking refers to setting aside something for a purpose. It was ‘coined’ as a concept by the economists working in public sector which is not so widely used in town planning as much as it is in public finance. In public finance, it refers to devoting (a sum/ proportion of) public funds/ revenue for a specific expenditure/ programme. Likewise, in public policy, it is used as a means to achieve any strategic goal/objective viz., housing the urban poor. Earmarking of land/ housing for the urban poor refers to setting aside a proportion of land/ housing in cities for the poor people, so that they can find a living space in them. Earmarking therefore ensures inclusivity of the housing needs of current (un-housed) as well as future population that cannot afford housing on their own.

Earmarking, in general as practiced in public economics/finance, is carried out for a specific purpose and with a specific objective, which is primarily fiscal. Earmarking of land and housing in urban areas is considered as an inclusive approach towards urban poor by providing for living spaces to them. Earmarking of land / housing is required to counter the fact that land and housing markets do not take care of the people at ‘the bottom of pyramid’. However, if earmarking goes unchecked, it may promote inefficiency/ bad governance (especially in terms of use of such earmarked land and housing serving contrarian purposes). Earmarking of funds or planned/built space becomes imperative as the conventional markets do not account for the living space needs of poor people i.e., they are priced out of the market and not enough supply takes place in that segment.

**INTERNATIONAL EXPERIENCES OF LAND/ HOUSING MARKETS FOR POOR: A REVIEW**

Several countries have already undertaken policies that promote inclusivity of urban poor through the allocation policies/ strategies of land and housing. Some of the examples are:

**The United Kingdom:** In the UK, the earmarking of land/ housing has traditionally been done at local level by the local planning agencies, on public land based on an assessment and the land development is done by Local Governments (LGs) in partnership with private developers. Earmarking of private land is avoided and planning conditions are imposed on them so as to develop low-income houses. Recently, the National Planning Policy Framework of UK has specified earmarking guidelines.

**The United States of America:** In the USA, local governments take public finance route by making use of the provisions of earmarking funds for specific community development projects which include urban renewal projects that provide housing for the poor and also land procurement for housing. Such community development projects are undertaken by local governments which finance the projects and, often, they are executed by private developers. Provision of earmarking of funds has, however, set a route for abuse in the USA – fiscal and process – as the municipal executives/council members who had information would use their own links to prosper through the award of such development schemes and monies to them.

**South Africa:** South Africa has adopted a ‘rights based approach’ to the development in general as well as that of cities. In South Africa, an equalitarian legislation ensured “right to housing for all”, which makes it a constitutional right. However, the Government has to ensure taking enough steps to realize...
this conferred right. It awards grants for housing for low income population.

**Latin America:** Latin American countries are known for their approach based on the ‘Security of tenure for the urban poor’. In Brazil, the Government recognized the need to provide land tenure security for long term benefits of integration of the urban poor. Local governments work towards it through regularisation of slums and improve the access of poor to land and shelter.

**Asia Pacific:** Asia Pacific countries are diverse in their composition and have been using diverse methods of inclusive planning and housing development. In Philippines and the Republic of South Korea, emphasis is made on demand driven and market oriented housing programmes with the help of private sector; whereas Singapore has a mix of housing provided by (predominant) public and private developers. In Thailand, Vietnam and Cambodia, there has been a shift in government policies towards upgradation of communities by leveraging donor aid and local resources – both community organisation & finance tools. Moreover, Asia Pacific countries have made use of innovative instruments for ensuring land and shelter to the poor in the form of land expropriation, banking, land sharing as well as land readjustment, transfer of development rights, etc. (ESCAP 1995; Lemaire and Kerr 2017).

**INTEGRATING HOUSING NEEDS OF URBAN POOR IN INDIA: A REVIEW OF APPROACHES**

In India, three major strands of approaches are taken towards integrating housing needs of urban poor – Policy approach, Standards approach and Programme Planning approach.

**Policy Approach**

**National Housing Policy:** National Housing Policy of India provides the directions and framework for development of housing. It underwent a significant change over time, particularly from the pronunciation of Government’s role as facilitator than direct provider for promotion of affordable housing through fiscal and tax incentives. The National Urban Housing and Habitat Policy (NUHHP) 2007 is perhaps the first to propose ‘earmarking of land/ housing for urban poor’ as a principle to be followed by cities in their planning process. NUHHP 2007 expected the State governments to formulate State level Policy and Action Plans for cities and to amend planning legislations to that effect. However, it was not taken seriously by cities and States until it was made a part of reform agenda under JNNURM.

**Housing Policies of the States:** Housing policies of States are supposed to be rolled out based on the framework as well as the directions of Central/ Union government policy after adapting it to the specific needs and context of the States respectively. However, only two States - Maharashtra and Kerala - made formal housing policies (promulgated) at the State level. Housing policies of Rajasthan and Punjab have been finalized and are under approval. Orissa State Government also came out with a State level Policy and Karnataka State Government has prepared a Policy document pending for approval. Elsewhere, there is a policy vacuum of housing at the State level, which is substituted by programmes (which are often donor-assisted). However, the Scenario changed with the launch of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and the Rajiv Awas Yojana (RAY) 2000s.
Approach of Standards

National Building Code (NBC) Provisions of Housing for Poor:
The National Building Code (NBC) of 2005 has provided for housing for the urban poor through specifications for settlements planning. It allowed the development of housing as plotted development and/or group housing on cluster pattern. The development pattern can be on the following lines:

For plotted developments, minimum plot size to be less than 60 sq m in metropolitan cities and less than 100 sq.m. in other cities;

For group housing, at least 75% of dwelling units not to exceed 30 sq.m. in metropolitan cities and 40 sq.m. size in small & medium towns; and

For cluster development, the minimum size of plot can be as small as 15 sq.m. for 100% ground coverage and it can go upto 25 sq.m. with FSI 1.2.

NBC 2005 also specified different development densities for slum housing (with a maximum of 500 DUs) for various developments. Development Norms and Building Service Norms were also developed by it for low income housing: 65-120 DUs per ha for plotted developments; 75-100 DUs per ha for mixed developments in small towns; 100-125 DUs per ha for mixed developments in medium towns; and 125-150 DUs per ha for mixed developments in metropolitan cities.

Programme Planning Approach

Slum Rehabilitation Scheme in Mumbai: Mumbai is perhaps the first Indian city to take the development of housing for urban poor seriously through the Slum Rehabilitation Scheme (SRS) for the urban poor living in slums. Under the SRS, Slum Rehabilitation Authority (SRA) was established as nodal agency for slum redevelopment in partnership with private and public sectors. SRA was formed as a special planning authority and was given powers to approve the SRSs without referring them to local/ regional government bodies. It provided a higher Floor Space Index (FSI) of 2.5 (much higher than the prevailing) for all SRSs and further incentivized slum redevelopment by allowing unutilized /surplus FSI transferable in the form of TDRs. The developer has to build housing that accommodates slum dwellers at an entitlement of 225 sq ft per family (this has been further relaxed to include more space at an expense of slum dweller). The success of the scheme, however, is mixed in nature due to complexity of process associated with getting majority consent of slum dwellers.

Planning Policies of Cities:
Master Plans of Cities: Master Plans of Hyderabad – both Hyderabad Urban Development Authority (HUDA) and Hyderabad Airport Development Authority (HADA) – have earmarked land for urban poor through zoning regulations (layout level). Likewise, the Master Plan of Chennai provided land for urban poor, especially in dense settlements. Chandigarh city has a definite earmarking of land and a programme for housing the urban poor on such land, which makes it one of the few cities with sound planning and implementation mechanisms of housing for the urban poor. Master Plans of Pune and Nagpur also earmarked land for housing the urban poor (which is also followed now in other towns of Maharashtra). Recently, Master Plan of Delhi also provided for land to be developed for housing the poor in dense settlements, which is worth reviewing as presented in the next section.

Master Plan for Delhi 2021: MPD 2021 has rightly addressed housing the urban poor in Delhi. It has provided 54% of its housing component for urban poor comprising: 25% for JJ schemes of in-situ redevelopment; 14% for Group housing schemes; 6% in un-authorised colonies;
and 4% in planned residential areas on independent plots. It aims to achieve above earmarking with modifications in planning norms, zoning/land use, density, FAR and building controls. Development norms were relaxed so as to accommodate urban poor. It also provided for: Dwelling Units (DU) of 1-2 rooms with a plinth area of 25-40 sq.m.; High net residential density of 500-600 DUs per hectare; Housing targeting informal workers; and Relocation of existing dwellers for in-situ redevelopment. MPD 2021 also emphasizes on multi-pronged strategy involving public, private and community sectors. In case of new residential areas, it has provided earmarking of housing for urban poor comprising: Minimum 15% of FAR; 35% of dwelling units; Social infrastructure – health and education; and Community infrastructure – markets, community halls, etc. In case of redevelopment of old developed areas, the same provisions apply. Informal sector is given attention by evolving planning norms for them in various land uses.

RECASTING THE EARMARKING OF LAND/HOUSING FOR URBAN POOR THROUGH JNNURM

The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) made ‘earmarking of land in housing for urban poor’ as an optional reform at State level. It has been primarily achieved through executive orders by State Governments in all States, except a few. Statutory provisions for earmarking developed land or houses for urban poor through Act have been made by the States of Haryana, Punjab, Gujarat and Tamil Nadu.

Implementation Process

The following diagram (Figure 1) shows the implementation process of the JNNURM reform and the steps/stages are explained in the subsequent paragraphs.

Decide on the extent of reservation required for urban poor: First, estimate the demand for land/housing for the urban poor and also estimate the number of urban poor households. Subsequently, decide on the extent of land and housing required based on the entitlement. Reviewing of city master plan needs to be done later to identify the potential land for development to earmark. Finally, re-conceptualise development from horizontal to vertical using appropriate tools.

Amend legislations/notifications to bring in appropriate changes in Planning tools: As first step towards amendment, review the FSI/FAR permissible and amend it. Second, prepare city specific urban housing policy and/or roadmap for housing the urban poor. Third, upgrade current land management information

**Figure 1: implementation process of the JNNURM reform**
systems of cities so as to obtain the full scale data at local level. Fourth, review and revise city master plan to make reservations for urban poor. Fifth, determine the proportion of land required to be reserved and notify it. Finally, review and revise building bye laws and create incentives for increase in supply of land.

Engage with State Government for implementing Land/housing for poor: The first step is to revise/amend the State Town and Country Planning Act. Subsequently, State Government has to regulate Local government adherence to earmarking through Planning approval/ DCRs and Building bye-laws in respective cities. Township development through Public Private Partnership has to be promoted by local governments. It is also important to ensure adherence to earmarking provision and create Shelter Fund for financing of such housing schemes.

Ensure and increase access of land/housing to urban poor: First, facilitate home finance for urban poor so that the housing is built on the land earmarked for urban poor. This can be a mix of loans with low interest and grants. Monitor and review the land development and housing for the urban program from time to time.

**REQUISITES OF EARMARKING OF LAND/HOUSING FOR THE URBAN POOR**

The following are some of the requirements of earmarking programme to become successful.

- **First**, define the types and intensity of development that comes under the ambit of policy/act: Plotted developments; Development layouts; Group housing; Gated developments; Apartment development; Area development; Township development; and Development Schemes.

- **Second**, develop enabling approaches to housing urban poor such as: Security of land tenure; Specifying built space entitlement of the poor; Specifying incentive FSI/FAR; Specifying higher gross/net density; Specifying relaxed planning norms for Dwelling unit area & Support services; and Specifying relaxed development norms for Internal area & Building code.

- **Third**, evolve planning and policy framework for earmarking: Spatial planning at Regional level- identification of growth areas and zoning of land for specific purposes like housing; City master planning-estimation of land and housing gap for the poor, Zoning of land use to include that for urban poor, earmarking land and housing in plotted development & group development; and Separate housing and infrastructure plan-estimation of housing requirements and support infrastructure (forecast).

- **Fourth**, develop appropriate management and fiscal tools: Incentives for low income housing developers in registration fee, income tax, value added tax, service tax, etc.; Levy and collection of Shelter cess/ fund; Cross-subsidy in maintenance and user charges; Innovative land management tools like: land pooling/ readjustment, land swaps; incentive FSI/ FAR, Transferable Development Rights, etc.; and Leveraging land value wherever possible.

- **Last**, develop appropriate policy and governance framework: Regulation of planning permissions/ approval and development control regulations; Policy for the
upgradation of slums/housing; Legislative amendments to Planning Acts; Designation of an oversight agency for housing poor; Information systems and monitoring; Public-private/community partnership framework; and Participatory approaches in local/action plans, Master plans, Quality control and Monitoring & evaluation.

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Welcome Independent Directors to HUDCO Board of Directors

The hon’ble Minister of Housing & Urban Affairs and Petroleum & Natural Gas, Govt. of India Shri Hardeep Singh Puri welcomed the Independent directors appointed to the Board of Housing and Urban Development Corporation Limited in his office.

Hudco family extends a warm welcome to the Independent Directors of HUDCO, Mrs. Sabitha Bojan, Dr. Ravindra Kumar Ray, Dr. Siyaram Singh and Mr. Bansi Lal Gujar.
As the number of buildings and associated infrastructures increases drastically in order to cope with the increasing population in cities, tremendous resources are required for the construction, and maintenance of these buildings. Design of these buildings become very crucial. Over the years, there has been tremendous effort put in to design “cost effective, eco friendly and disaster resilient Buildings”. Building systems such as air conditioning and lighting are energy guzzlers, which can consume more than 60% of the energy consumption in a typical building. They can also impact the indoor environmental quality. Thus, energy efficiency of the systems is crucial. Selection of materials, which can minimize the embodied energy and construction waste is also important. Challenges in cost effective, eco-friendly and disaster resilient design and construction have been discussed in detail in this article. A case study has also been discussed.

INTRODUCTION

Cities are growing toward megacities with higher density urban planning, narrower urban corridors, and more high-rise urban structures. Increasing urbanization causes the deterioration of the urban environment, as the size of housing plots decreases, thus increasing densities and crowding out greeneries (Santamouris et al., 2001). Cities tend to record higher temperatures than their non-urbanized surroundings, a phenomenon known as urban heat island (UHI) (Oke, 1982; Jusuf et al., 2007). Earlier studies show strong relation between urban morphology and increasing air temperature within city centres. Urban structures absorb solar heat during the day and release it during the night. Densely built area tends to trap heat, which is released from urban structures into the urban environment, increasing urban air temperature compared to surrounding rural areas and causes UHI effect. UHI affects street level thermal comfort, health, environment quality, and may increase the urban energy demand.

“Currently, there is also lack of understanding of the inter-relationship between urban and building systems. Such understanding is crucial as studies have shown that the micro climates, which are very much governed by the urban systems could have major impact on the energy, thermal, and lighting performance of buildings.”

Keywords: cost-effective, eco-friendly, disaster resilient, design, construction

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population in cities, tremendous resources are required for the construction, and maintenance of these buildings. Design of these buildings become very crucial as the resources required in the subsequent operation and maintenance is highly dependent on the quality of such design (Macmillan, 2005). Over the years, there has been tremendous effort put in to design “Green Buildings,” with the key objective to make the buildings more cost effective, eco friendly and disaster resilient by minimizing the utilization of resources in the construction and maintenance of buildings. Building systems such as air conditioning and lighting are energy guzzlers, which can consume more than 60% of the energy consumption in a typical commercial building. They can also impact the indoor environmental quality. Thus, energy efficiency of the systems is crucial. Selection of materials, which can minimize the embodied energy and construction waste is also important.

**ADVANCES IN THE DESIGN AND CONSTRUCTION MAINTENANCE OF THE BUILDING**

The multifaceted relationship between microclimate and built environment is the key to promote sustainability within design and building practice. There is a vast body of knowledge and research studies about this matter, but to understand fully the microclimate impact on built environment is still a very challenging effort. The whole ecology system comprises many systems, which are too complex to be quantified and represented in numbers and models (Yeang, 1995). However, this incomplete and inadequate state of current knowledge about climate–urban relationship should not be the reason to be evasive towards preventive or corrective actions within the design process. Planners and engineers should view design process with a proper understanding on ecological aspects, where the concerns should be laid not just at present time, but also for the future. Over the years, researchers have attempted to develop techniques, models, simulation platforms, etc. for urban planners and architects to understand the impact of their designs on various environmental parameters. One key aspect that has shown tremendous progress is the study of the urban climate, which deals with issues such as UHI, urban airflow, air pollution, urban noise, daylighting, outdoor thermal comfort, etc. (Kang, 2002; Wong et al., 2003; Compagnon, 2004; Georgakis and Santamouris, 2004; Gulliver and Briggs, 2011; Yang et al., 2013). In recent years, modelling techniques to map out the urban climate (temperature, wind, solar radiation, daylighting) have been developed that help to guide the urban design (Matzarakis et al., 2010; Wong et al., 2011; Tominaga and Stathopoulos, 2013). Various mitigation measures such as the integration of greenery with the urban structures (Wong et al., 2003, 2009; Chen and Wong, 2005), application of cool roof materials (Santamouris et al., 2011; Akbari and Damon Matthews, 2012), improvement of the urban airflow, control of the anthropogenic heat (Sailor, 2010) in urban centers, etc., have been studied to great extent.

At the building level, there has been good progress in the modelling of the performance of buildings and the associate systems such as energy (Crawley et al., 2008), thermal (Hensen and Lamberts, 2012), lighting (Thanachareonkit et al., 2005), acoustic (Beradi, 2014), indoor air quality (Steeman et al., 2009), etc. with greater precision and certainty. With the advancement of information technology, greater utilization of sensors and control systems have been observed in buildings resulting in
better performance and energy efficiency in buildings. At the material level, nano-technology has been employed to develop building materials that can help to improve the performance of buildings such as improving the thermal and acoustical insulation, allowing more daylighting through glazing systems but reducing the entry of heat. The concept of Life Cycle Analysis (Dixit et al., 2010; Ramesh et al., 2010) has also been introduced that monitors the embodied body of resources utilized throughout the entire building life cycle. This has also resulted in better control of resources utilization during the design, planning and construction of buildings.

CURRENT CHALLENGES IN COST EFFECTIVE, DISASTER RESILIENT AND ECO-FRIENDLY DESIGN AND CONSTRUCTION

Despite the advances in the research and development in the building, there are still major challenges encountered. One key challenge is in the integration of such practices in the design process. Most designers still see such tasks as the responsibilities of the environmental consultants rather than part and parcel of their design tasks. Thus, it is essential that more research should be conducted to seamlessly integrate such modelling approaches with the design process. With the advancement of Building Information Modelling (BIM) (Bynum et al., 2013; Volk et al., 2014), this will serve as an excellent platform for such integration to occur. It also allows a better integration of the different simulation models so that a better understanding of the relationship between these simulation models could be obtained. Currently, there is also lack of understanding of the inter-relationship between urban and building systems. Such understanding is crucial as studies have shown that the microclimates, which are very much governed by the urban systems could have major impact on the energy, thermal, and lighting performance of buildings. Currently, there are tremendous research works done at the urban level using Geographical Information System (GIS). The study of such inter-relationship between urban and building systems could be facilitated by a better integration between GIS and BIM.

CASE STUDY

Green construction of disaster resistant (earthquake resistant, flood resistant & cyclone resistant), cost effective and eco-friendly rural houses

Client Requirements

In the present case the client was Bihar State Disaster Management Authority, Govt of Bihar. The Client requirement was to construct two types of disaster resistant building –One type having plinth area-41.28 sqm and the other type having plinth area-20.64 sqm with minimum cost but aesthetic design. Since the site was located in an earthquake prone, flood prone and cyclone prone belt of State, expectation was to use such innovative materials which were cost effective and disaster resistant and eco-friendly in nature. Only six months time was given for construction of the houses.

Keeping in view the above requirements the building was designed and constructed adopting efficient design and using innovative, cost effective and eco-friendly material within 06 month. Hence it satisfied client requirements.

Brief Description of Project

All the 52 houses were constructed in Singhwara village of Bihar. The type-I structure consisted of 26 houses with plinth area of 41.28 sqm each and the type-II structure with plinth area of 20.64 sqm each for the balance 26 houses. The rectangular plan is divided in two rooms of unequal area. The house has an attached veranda on
the longer front (Figure 1). This is a traditionally multi-purpose work space used by occupants.

Structure type-I

The structure is made of bamboo columns and beams, generally tied together with recycled ropes from zippers (an industrial by-product found in plenty in the area). The bamboo structure is supporting the roof cladding made of Banana Fibre – reinforced fly ash cement mortar composite sheets. This material is known to have an extremely poor thermal insulation capacity; therefore it is coupled with an internal layer of straw for better insulation.

The walling system consists of a frame of bamboo (a mesh of horizontal and vertical elements) filled with thatch, split bamboo canes or woven strips. This layer is then covered with 3 inches of mud plaster finished with a layer of cement plaster on the outer face as it is more durable and resistant to the monsoon rains and simple mud plaster on the inner side. Mud plaster is the cheapest and most available solution. The perforated pattern on the upper belt was made to facilitate the air flow and penetration of sunlight in the loft. The bamboo loft also works as an insulating false ceiling for the interiors below.

The salient features of structure type-I include:

- These Single-story houses have foundation of FaL-G Block;
- These houses are made of a bamboo structural frame and roofing, bamboo mat walls;
- Houses were plastered with Mud mortar inside and with FaL-G mortar outside;
- High volume fly ash Concrete was used for PCC in foundation;
- Plinth Area single House: 41.28 sqm;
- Cost of the Building: Rs 35000/-; and
- CFL Bulb and renewable energy sources like Solar PV and Solar Lights were used.

Tables 1 to 4 provide various comparisons of structure type-I with respect to cost for construction materials, energy consumption for electrical appliances, carbon emission for construction materials & electrical appliances, respectively.
Table 1-Comparison of cost for construction materials for Structure type-I

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity(No)</th>
<th>Unit</th>
<th>Rate(INR)</th>
<th>Cost(INR)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clay brick</td>
<td>3500</td>
<td>No</td>
<td>7.0</td>
<td>24500</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Fly ash brick</td>
<td>3500</td>
<td>No</td>
<td>3.5</td>
<td>12250</td>
<td>50% less</td>
</tr>
<tr>
<td>3.</td>
<td>OPC</td>
<td>20</td>
<td>Bag</td>
<td>240</td>
<td>4800</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>PPC</td>
<td>20</td>
<td>Bag</td>
<td>170</td>
<td>3400</td>
<td>29.0% less</td>
</tr>
</tbody>
</table>

Source: Quantity of construction materials has been worked out and rates are taken from current scheduled rates of PWD-2017.

Table 2-Comparison of energy consumption for electrical appliances/Month

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity(No)</th>
<th>Installation Cost(INR)</th>
<th>Electricity Cost (INR)</th>
<th>Total Cost (INR)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tube Light</td>
<td>4</td>
<td>5500</td>
<td>6500</td>
<td>12000</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CFL Light</td>
<td>4</td>
<td>2500</td>
<td>2500</td>
<td>5000</td>
<td>58.30% less</td>
</tr>
</tbody>
</table>

Source: Cost of electricity as per Bihar State Electric Board (BSEB) tariff 2017

Table 3-Comparison of carbon emission for construction materials

<table>
<thead>
<tr>
<th>S No</th>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>KgCO₂/per unit</th>
<th>Total Kg CO₂</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clay brick</td>
<td>3500</td>
<td>No</td>
<td>0.59</td>
<td>2065.00</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Fly ash brick</td>
<td>3500</td>
<td>No</td>
<td>0.11</td>
<td>385.00</td>
<td>81.36% less</td>
</tr>
<tr>
<td>3.</td>
<td>OPC</td>
<td>20</td>
<td>Bag</td>
<td>0.89</td>
<td>17.8</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>PPC</td>
<td>20</td>
<td>Bag</td>
<td>0.60</td>
<td>12.0</td>
<td>32.6% less</td>
</tr>
</tbody>
</table>

Table 4-Comparison of carbon emission for electrical appliances

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity(No)</th>
<th>Total power Kwh</th>
<th>Tonne CO₂/ Kwh</th>
<th>Total CO₂ tonne</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tube Light</td>
<td>4.0</td>
<td>1507</td>
<td>0.0005883</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CFL Light</td>
<td>4.0</td>
<td>561</td>
<td>0.0005883</td>
<td>0.33</td>
<td>63.0% less</td>
</tr>
</tbody>
</table>

Source: Department of Energy’s Energy Information Administration. Electricity sources emit 1.297 lbs CO₂ per kWh (0.0005883 metric tons CO₂ per Kwh)

Structure type-II

The structure is made of Fly ash Brick Pillars and beams. Reinforcement having L shape at all corners and of Flyash Brick Pillar is inserted in foundation and Beam up to 450 mm ensures proper tie-up of beam and column and maximize the box action of building. The bamboo structure is supporting the roof cladding made of Banana Fibre –reinforced fly ash
cement mortar composite sheets. This material is known to have an extremely poor thermal insulation capacity; therefore, it is coupled with an internal layer of straw for better insulation.

The walling system consists of Fly ash brick with fly ash mortar 1:4. This wall is then covered with flyash cement plaster on both face as it is more durable and resistant to the monsoon rains. The perforated pattern on the upper belt was made to facilitate the air flow and penetration of sunlight in the loft. The bamboo loft also works as an insulating false ceiling for the interiors below.

The salient features of structure type-II are:
- These Single story houses have foundation of FaL-G Block;
- These houses are made of bamboo roofing, Fly ash Brick walls;
- Houses were plastered with FaL-G mortar;
- High volume fly ash Concrete was used for PCC in foundation and pocket in Fly ash Brick Pillar;
- Plinth Area single House: 41.28 sqm;
- Cost of the Building: Rs 62000/-; and
- CFL Bulb and renewable energy sources like Solar PV and Solar Lights were used.

Tables 5 to 8 provide various comparisons of structure type-II with respect to cost for construction materials, energy consumption for electrical appliances, carbon emission for construction materials & electrical appliances, respectively.

Table 5: Comparison of cost for construction materials for Structure type-II

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity (No)</th>
<th>Unit</th>
<th>Rate(INR)</th>
<th>Cost(INR)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clay brick</td>
<td>10500</td>
<td>No</td>
<td>7.0</td>
<td>73500</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Fly ash brick</td>
<td>10500</td>
<td>No</td>
<td>3.5</td>
<td>36750</td>
<td>50% less</td>
</tr>
<tr>
<td>3.</td>
<td>OPC</td>
<td>62</td>
<td>Bag</td>
<td>240</td>
<td>14880</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>PPC</td>
<td>62</td>
<td>Bag</td>
<td>170</td>
<td>10540</td>
<td>29.0% less</td>
</tr>
</tbody>
</table>

Source: Quantity of construction materials has been worked out and rates are taken from current scheduled rates of PWD-2017.

Table 6: Comparison of energy consumption for electrical appliances/Month

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity (No)</th>
<th>Installation Cost(INR)</th>
<th>Electricity Cost (INR)</th>
<th>Total Cost (INR)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tube Light</td>
<td>4</td>
<td>5500</td>
<td>6500</td>
<td>12000</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CFL Light</td>
<td>4</td>
<td>2500</td>
<td>2500</td>
<td>5000</td>
<td>58.33% less</td>
</tr>
</tbody>
</table>

Source: Cost of electricity as per Bihar State Electric Board (BSEB) tariff 2017
Table 7: Comparison of carbon emission for construction materials

<table>
<thead>
<tr>
<th>S No</th>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>KgCO₂/per unit</th>
<th>Total Kg CO₂</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clay brick</td>
<td>10500</td>
<td>No</td>
<td>0.59</td>
<td>6195.00</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Fly ash brick</td>
<td>10500</td>
<td>No</td>
<td>0.11</td>
<td>1155.00</td>
<td>81.36% less</td>
</tr>
<tr>
<td>3.</td>
<td>OPC</td>
<td>62</td>
<td>Bag</td>
<td>0.89</td>
<td>660.38</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>PPC</td>
<td>62</td>
<td>Bag</td>
<td>0.60</td>
<td>445.2</td>
<td>32.58% less</td>
</tr>
<tr>
<td>5.</td>
<td>Steel</td>
<td>.0089</td>
<td>Tonne</td>
<td>1.987</td>
<td>18.00</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Recycled steel</td>
<td>.0089</td>
<td>Tonne</td>
<td>0.357</td>
<td>4.00</td>
<td>78.0% less</td>
</tr>
</tbody>
</table>

Table 8: Comparison of carbon emission for electrical appliances

<table>
<thead>
<tr>
<th>SNo</th>
<th>Item</th>
<th>Quantity</th>
<th>Total Power Kwh</th>
<th>Tonne CO₂/Kwh</th>
<th>Total CO₂ Tonne</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tube Light</td>
<td>4.0</td>
<td>1507</td>
<td>0.0005883</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CFL Light</td>
<td>4.0</td>
<td>561</td>
<td>0.0005883</td>
<td>0.33</td>
<td>63.0% less</td>
</tr>
</tbody>
</table>

Source: Department of Energy’s Energy Information Administration. Electricity sources emit 1.297 lbs CO₂ per kWh (0.0005883 metric tons CO₂ per Kwh)

**Novelty of this Project**

The novelty of this project which can be suitably replicated in the urban areas as well include the following:

- Made with Simple, Low cost locally available materials, tools and skills material;
- Resistant to natural hazards;
- Environmentally Sustainable and Energy Efficient;
- Socially, aesthetically and culturally appropriate to the context;
- Flexible for future upgrading and extensions;
- Easy to maintain; and
- Easy to disconnect, reuse and recycle in its parts.

**FUTURE DIRECTIONS**

It is envisaged that in the near future, there would be a development of a universal and integrated model that could embed the entire urban and building models. As such, it allows the seamless integration between these two scales of models. This will also facilitate the development of the boundary conditions generated by the urban model that could be easily utilized by the building model for the simulations. For example, simulations could be conducted to understand the wind and temperature distribution at the urban level and such data could be seamlessly utilized by the individual building model for the detail simulations of the wind or temperature condition inside the building. Another key development would be the integration of the sensors with the urban model for master planning purpose and for creation of smart cities. Such data at the urban level would then be propagated to the building level for better understanding of the impact on energy, building performance, etc. At the building level, better integration of sensor data and performance simulations could be achieved and thus
results in better energy efficiency and performance of buildings. There should also be more integration of user behaviour with the performance simulations.

**CONCLUSION**

Currently, the research in sustainable design and construction tends to be very fragmented. It is essential that a more holistic approach should be developed to better understand the relationship between urban, building, building systems, and material. It is also essential that such understanding should be propagated throughout the building delivery process from inception to design to construction, operation, and maintenance of the built environment.

**REFERENCES**


HUDCO Celebrated International Women’s Day

HUDCO celebrated International Women’s Day on 8th March, 2022 with an interaction of the Management with women employees of HUDCO. Sri M Nagaraj, Director (Corporate Planning), Sri D Guhan, Director (Finance) and Shri Ajay Mishra, Chief Vigilance Officer addressed the women employees and expressed their views on the immense contribution of women employees towards overall growth of HUDCO. Further, a workshop on ‘Balance your Emotions-Manage Stress and Have Control or your Own life’ was also organised for women employees, so that they can learn techniques to manage different forms of stress like physical, mental (emotional) and behavioural, in their day-to-day life.
UNION BUDGET 2022-23
PUSH FOR INCLUSIVE HOUSING AND INFRASTRUCTURE DEVELOPMENT

DR. AKSHAYA KUMAR SEN

Affordable housing and inclusive urban development have been the two key priority areas of action of the Government of India since independence, which got more traction in the recent years. This paper provides a snapshot of the key measures announced in the Union Budget 2022-23 with respect to housing, infrastructure and urban development and their implications for inclusive housing, infrastructure and urban development.

INTRODUCTION

The Union Budget 2022-23 seeks to lay foundation & give blueprint of economy over ‘Amrit Kal’ of next 25 years - from India @ 75 to India @ 100. Emphasizing the need for boosting capital expenditure (both public and private investment) to spur and sustain high economic growth through sustained investment in housing and infrastructure sector including health services, the Union Budget 2022-23 focuses on four priorities for accelerating the growth as well as creating jobs: (i) PM Gati Shakti Master Plan; (ii) Inclusive Development; (iii) Productivity enhancement and investment, sunrise opportunities, energy transition and climate action; and (iv) financing of investments. The key takeaways of the Union Budget 2022-23 for inclusive housing and infrastructure development are as follows:

HOUSING

The Union Budget 2022-23 focuses of making people socially, economically and financially inclusive. This inclusivity is designed to be achieved through provision of affordable housing for all socio-economic groups with appropriate mechanisms for financial inclusion and developing housing complexes where at least some of its units are affordable by a range of economic groups. Under Pradhan Matri Awas Yojana (PMAY)-Urban, an affordable housing project is one, where at least 35% of the total housing units are for economically weaker sections (EWS) category, having carpet area of 30sqm. Towards, promotion of inclusive housing, the Union Budget 2022-23 has made the following key provisions:

Key words: Union Budget, Inclusive Housing, Infrastructure, urban Development.

Dr. Akshaya Kumar Sen (aksen@hudco.org) is Joint General Manager(Economics) & Fellow, HUDCO’s HSMI, New Delhi

“The measures announced in the Union Budget 2022-23 for inclusive housing, infrastructure and urban development domain are expected to accelerate the pace of economic growth in the pandemic-ravaged year as well as create job opportunities to the millions.”
• **Increased allocation for housing under PMAY:** The Pradhan Matri Awas Yojana (PMAY) focuses on inclusive housing, which is not exclusive to any particular social or economic group, especially the urban poor and homeless. Towards this, this year’s Union Budget proposes to identify 80 lakh households for the affordable household scheme under the PMAY-HfA both in rural and urban areas for which Rs.48,000 crore has been allocated. This will give a big boost to the development of affordable and inclusive housing market in India. The allocation would also help in leveraging more resource from the private sector including through PPP mode, which will further help in affordable housing push in India.

• **Digitisation of land records:** Recognizing the fact that efficient use of land resources is a strong imperative for inclusive development, the Union Budget 2022-23 encourages states to adopt Unique Land Parcel Identification Number to facilitate IT-based management of records. The facility for transliteration of land records across any of the Schedule VIII languages is also planned to be rolled out. The linkage of National Generic Document Registration System (NGDRS) with the ‘One-Nation One-Registration Software’ will be promoted as an option for uniform registration process and “anywhere registration of deeds & documents. The Government’s push for digitalization of land records is expected to infuse the much needed transparency in the land record management which would also help in addressing some of the deep-rooted problems in the housing sector.

• **Construction related approvals:** The central government will work with the state governments to reduce the time required for all land and construction related approvals for promoting affordable housing for the middle income, low income and the economically weaker sections in the urban areas.

### INFRASTRUCTURE

Economic Growth through Infrastructure Investment has been a key priority of the Government of India. The Union Budget 2022-23 focuses on public investment to modernize infrastructure over the medium term, leveraging tech platform of ‘Gati Shakti’ via a multi-modal approach for inclusive infrastructure development. Achieving inclusivity ensures that development benefits are equally distributed and shared by all people, communities. The key announcements on infrastructure front in the Union Budget 2022-23 are as follows:

• The scope of PM Gati shakti Master Plan will encompass the seven engines of economic transformation through planning, innovative financing and use of technology for speedier implementation. New rail products in the form of ‘One Station – One Product’, 400 next-gen Vande Bharat trains and 100 PM Gati Shakti cargo terminals over the next three years provides integration of NIP with Gati Shakti and is likely to prove crucial in employment generation as the transport network is rich in terms of backward and forward linkages with the rest of the economy.

• **Other key targets under PM Gati Sakti Master Plan include:** Contract for Four multi-modal national parks; Rs.20,000 crore investment to be made in road sector; 25,000 km of national highway development in FY22-23.

• Increased allocation for Jal Jeevan Mission to fulfill the mandate of ‘Har Ghar Jal, Nal se Jal’ Mission, where Rs. 60,000 crore allocated for providing access to tap water to 3.8 crore households.

• Open platform for Healthcare Infrastructure services to be rolled out soon: An open platform for the National Digital Health
Ecosystem will be rolled out which will consist of digital registries of health providers and health facilities, unique health identity and universal access to health facilities.

- **Financing of Investment:** Many innovative financing mechanisms are proposed for raising resources including Sovereign Green Bonds for financing green infrastructure; NIIF; Blended financing (govt. share limited to 20%) for sunrise opportunities such as climate action, agri-tech, etc; Venture Capital Fund through regulatory framework; Private Equity; etc. in addition to public investment in order to crowd in the private investment. The outlay for public capital expenditure (capex) sharply increased by 35.4% over the last year, i.e. from Rs 4.54 lakh crore to Rs 7.50 lakh crore in 2022-23. The effective capital expenditure of the Central government is estimated at Rs. 10.68 lakh crore in 2022-23, about 4.1% of GDP. This will be a continuous enabler for leveraging public investment to raise private investment which is critical for filling in huge investment requirement for various infrastructure projects.

**URBAN DEVELOPMENT**

- **High Level Committee on Urban Development:** As nearly half of our population is likely to be living in urban areas by the time India reaches 100 years of Independence, there is a need to reimagine our cities into centres of sustainable living with opportunities for all. For orderly development of urban areas, a High Level Committee would be set up with urban planners, urban economists and institutions to make recommendations on urban sector policies, capacity building, planning, implementation and governance steer a paradigm change for sustainable urban development.

- The States would be supported for Urban Capacity Building activities with focus on Modernization of building bye-laws, Transit Oriented Development (ToD), Town Planning Schemes, Public transport including Mass Transit scheme, e-vehicles, and AMRUT Schemes.

- Five existing Academic Institutions in different regions will be designated as ‘Centres of Excellence’ to develop India-specific knowledge in urban planning and design and to deliver certified training in these areas. These Centres will be given an endowment fund of Rs 250 crore each.

**CONCLUSION**

The measures announced in the Union Budget 2022-23 for inclusive housing, infrastructure and urban development domain are expected to accelerate the pace of economic growth in the pandemic-ravaged year as well as create job opportunities to the millions. Employment for all is also another aspect of inclusive development. The huge investments earmarked in the Union Budget 2022-23 for housing and infrastructure projects are expected to create huge income and employment opportunities through the sector’s strong income and employment multipliers and inter-linkages with other industries. Further, the emphasis on urban development is very timely considering the fact that urban centres contribute more than 65% of GDP of the country. Further, focus on facilitating tier-two and tier-three cities to take on the mantle in the future, in addition to nurturing the megacities would enhance productivity, and agglomeration economies in the urban areas which will create more income and job opportunities for sustainable living conditions for all.

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PMAY- AN OPPORTUNITY TO BUILD BACK BETTER THROUGH GREEN, AFFORDABLE AND CLIMATE RESILIENT HOUSING IN INDIA

DR. SASWATA BANDYOPADHYAY

One of the significant challenges that has emerged with urbanization globally and in India, specifically, is to provide affordable housing in rapidly growing cities. According to various estimates, the demand for residential floor space will potentially grow from 15.3 billion sq.mt. in 2017-18 to 22-23 billion sq.mt. by 2030. This is significant, as a substantial segment of this new floor space (45%) is expected to cater to ‘affordable housing’ segment and much of this demand would be in the self-built or Do It Yourself segments. India’s national target for GHG Reductions by 2030 and Net Zero by 2070 are majorly dependent on Indian cities, especially on the built environment, where the role of beneficiary led affordable housing would continue to be a significant segment in the future. This paper argues that the transformative shift is required from present “top down” approach. India needs to develop “bottoms up” systems and processes to mainstream the aspects of green, affordable and resilient housing. Instead of our reliance on the green building metrics and models from the west, community driven systems and processes are the need of the hour and this is also our opportunity to Build Back Better and meet the targets of SDG 11 and 13.

INDIA’S URBANIZATION AND CLIMATE CHANGE

India is on the forefront of rapid urban transformations. In 2011, according to census of India, around 11% of global urban population lived in towns and cities in India. By 2036, the number of people living in urban areas are expected to double from 300 million to about 600, according to a report by NITI Aayog. The demand for affordable housing and urban services are also likely to rise in many folds. According to the Ministry of Housing and Urban Affairs (MoHUA), Government of India estimates, the housing shortage was estimated to be around 18.78 million in 2012. According to various estimates, the demand for residential floor space will potentially grow from 15.3 billion sq.mt. in 2017-18 to 22-23 billion sq.mt. by 2030. This is significant, as a substantial segment of this new floor space (45%) is expected to

Key Words: Affordable Housing, Climate Vulnerability, Green Technology, Resilience, Sustainable Development Goals

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cater to ‘affordable housing’ segment and much of this demand would be in the self-built or Do It Yourself segments.

With US $2.85 trillion GDP, India is one of the largest and fastest growing economies in the world. It is witnessing massive public investment, robust private consumption, and structural reforms leading to rapid growth. Construction in India is emerging as the third largest sector and expected to be accelerated by the demand from the housing sector, largely. Globally, the construction Industry contributes around 38 per cent of global greenhouse gases (GHGs), thereby, how India would deliver its massive demand for affordable housing in green and sustainable matter, would be the key for its commitments towards the GHG reduction by 2030.

At the same time, Indian cities have higher vulnerability to climate change due to the higher share of urban poverty and backlog of unmet basis services. Various future climate change scenarios such as RCP 4.5 and RCP 8.5 indicate that the major Indian cities are expected to have increased exposure to multi hazard and compound risks due to the climatic variabilities and change, under the moderate climate scenario during 2020-2039.

However, the present policies and practice towards building green, resilient, and affordable housing in India is mostly non-existent, except for a few sporadic solar rooftop housing projects. The present frameworks of green building assessments and certifications are generally focussed on high end segments and their overall outreach is limited to approximately about 5% of building stocks. These assessment tools are also agnostic towards the affordable housing segments presently.

**WHY GREEN, AFFORDABLE AND RESILIENT HOUSING?**

Launched in 2015, the Pradhan Mantri Awas Yojana (PMAY) -Urban is a flagship mission of Government of India. The mission addresses the issue of urban housing shortage among the various income categories including the slum dwellers. PMAY-Urban is also believed to be one of the largest mass housing schemes in the world, that made a transformative shift from its earlier focus on ‘slums’ to “housing for all”. The main components of PMAY-U are: i. In-situ slum redevelopment (ISSR); ii. Credit Linked Subsidy Scheme (CLSS); iii. Affordable Housing Partnership (AHP); and iv. Beneficiary led construction (BLC). According to the PMAY -U website, about 115.09 Lakhs have been sanctioned and 55.45 lakhs house are completed till February 2022.

To leverage the new technologies and materials, the MoHUA has also launched a Global Housing Technology Challenge (GHTC) in 2019, focusing on potential demonstrable and future technologies. Under the Accelerator Affordable Sustainable Housing Accelerators- India (ASHA-India) initiative, the Ministry has extended its support to potential future technologies that are not yet market ready (pre-prototype applicants) or to the technologies that are market ready (post prototype applicants) respectively. However, despite the massive outreach under the PMAY-U, the green, sustainable and resilience aspects of the affordable housing in terms of their GHG emissions, thermal comforts and nature-based solutions have not been explored so far.

The integration of the aspects of green and climate resilience aspects with affordable housing have multiple co-benefits, such as water conservation, reduction in CO2 emissions and enhancing safety against various climatic shocks and stresses. Thus, the affordable housing segment in India, has two important roles to play: i. reduction in GHGs and enhancing actions towards Net Zero; and ii. at the
same time, to keep inhabitants safe during the disasters. Hence, both “greening” and ‘climate proofing’ of the future affordable housing are the integral part of the India’s road map towards SDG 11 and SDG13.

INDIA COOLING ACTION PLAN (ICAP), 2019

Considering the India’s climate change outlook and rapidly spiralling heat stress, the Central Ministry of Environment, Forests and Climate Change (MoEFCC) has launched ICAP in 2019. The need for cooling is increasingly being considered as key to the health, wellbeing, and productivity. The India Cooling Action seeks to: (i) reduce cooling demand across sectors by 20% to 25% by 2037-38; (ii) reduce refrigerant demand by 25% to 30% by 2037-38; (iii) Reduce cooling energy requirements by 25% to 40% by 2037-38; (iv) recognize “cooling and related areas” as a thrust area of research under national S&T Programme; and (v) training and certification of 100,000 servicing sector technicians by 2022-23, synergizing with Skill India Mission. These actions will have significant climate benefits.

The urban poor have higher exposure to and vulnerability to heat stresses. ICAP, 2019 has specifically highlighted the need of government support and targeted programmes to enable thermal comforts for EWS and LIGs. One of the important interventions for enhancing thermal comforts is, cool roofs. According to various studies, cool roofs can keep indoor temperatures lower and can help decrease the dependence on air conditioners and also reflects sunlight and absorb less heat. Depending on the setting, cool roofs can help keep indoor temperatures lower by 2 to 5°C (3.6 to 9°F) as compared to traditional roofs. At least four cities in India, namely, Delhi, Ahmedabad, Surat and Hyderabad, have initiated through community partnerships. Initial results from these pilot initiatives are encouraging and require robust policy support to upscale them significantly.

GREEN, AFFORDABLE AND RESILIENT HOUSING –
Fragmented Policy Landscape and Assessment Frameworks

The overall policy landscape and implementation mechanism towards green, affordable, and resilient housing in India are highly fragmented. For the ICAP 2019, more than 15 national and state level departments and entities are identified as the “key stakeholders”. Involvement of at least 3 national ministries, namely, Ministry of Environment, Ministry of Power and Ministry of Housing and Urban affairs and their subordinate offices, making its implementation quite complex. In response to the emerging need of “cooling” in Indian cities, the Ministry of Housing and Urban affairs (MoHUA) have made an addendum to the Urban and Regional Development Plan Formulation Guidelines 2014, focussing on cool roofing for low-income housing.

In another initiative, the Indian Ministry of Power launched the Eco Niwas (www.econiwas.com) in December 2017, to raise awareness and make people interested in energy efficiency measures in buildings. The site also offered toolkits to analyze building energy performance through various basic and advanced assessment tools.

At the state level, some states like Delhi, Gujarat, Haryana, Punjab, Maharashtra, Tamil nadu, among others, have incorporated the green building elements such as Water harvesting, green cover, solar and waste management aspects in their Combined or Unified Building Development Control and Building regulations. Similarly, a few other states have also mandated Energy Conservation Building Code (ECBC) compliance.
However, these policy and regulatory instruments are largely focused on large or high end residential, commercial, and institutional assets and have limited outreach towards the housing for urban poor, who are at the receiving end of climatic shocks and stresses. The prevailing green building assessment and certification processes are also agnostic to the requirements of green and affordable housing in India. The affordable housing segment requires a paradigm shift in the present approach of green building certification as well as in our approach of sophisticated building energy modeling.

**PMAY – AN OPPORTUNITY TO BUILD BACK BETTER THROUGH GREEN AFFORDABLE AND RESILIENT HOUSING IN INDIA**

Considering India’s recent commitment of “Net Zero by 2070” and GHG reductions by 2030, the PMAY verticals, specifically the Beneficiary Led Construction and DIY type housing constructions are expected to have significant role to play. However, the fragmented policy and regulatory landscapes, institutional overlaps, and absence of appropriate assessment tools for low-income housing, together create a major barrier.

To reach to the “bottom of the housing pyramid”, India requires transformative changes from its present “top down” to “bottoms up” approach towards green, affordable, and resilient housing in India. The Pradhan Mantri Awas Yojana, thus, could be an important platform to bring about these transformative changes. As PMAY is intending to deliver over 20 million housing units over the next few years, the mission offers tremendous opportunity to develop a complete value chain of Green, Affordable and Resilient Housing in India through design, sustainable construction practices, regulations and enhancing actions towards climate resilience. Instead of our reliance on the green building metrics and models from the west, community driven systems and processes are the need of the hour and this also our opportunity to Build Back Better and meeting the targets of SDG 11 and 13.

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IMPORTANCE OF INCLUDING REVENUE ADMINISTRATION IN IMPLEMENTING INCLUSIVE HOUSING PROGRAMMES

MS. APARNA DAS
MS. ANINDITA MUKHERJEE

“The Land Rights to Slum Dwellers Act (LR Act) was enacted in 2017 to recognise the contribution of the urban poor, especially its slum dwellers in the city constituting about 25 percent of the urban dwellers, by empowering them with land rights and access to basic civic and social infrastructure. The Act, implemented through the Odisha Livable Habitat Mission (OLHM) also known as the JAGA Mission, aimed at giving land rights to the slum dwellers on ‘as is’ ‘where is’ basis.”

Key Words: Urban Land Tenure, Urban Land Title, Urban Planning Frameworks, Access to Institutional Credits, Urban Poor, Revenue Department, Tenure Insecurity, Land Rights

Prime Minister’s Awas Yojna (PMAY) - Urban (U) - a Centrally sponsored Mission mode program launched in the year 2015 - embarked on the ambitious journey of provisioning Housing for All by 2022. Seven years into the implementation, it emerges that almost 70 percent uptake of PMAY is for the Beneficiary-Led Construction (BLC). This was not the case in the initial days. Not having the ‘Right’ papers restricted uptake of the BLC implementation. Most states in the beginning insisted on Records of Rights (RoR) as the adequate evidence of ownership. The poor especially in small and medium towns, most often will not have RoRs. The urban poor mostly use their plots for self-use; so not enough incentive for them to get the RoRs which is administratively complex, expensive and time intensive. Many states addressed these barriers through process innovations and facilitated the urban poor to gain access to subsidy under BLC. This paper highlights the specific processes involved in Odisha for obtaining the ‘Right’ papers and innovations adopted by the State for regularising the land titles of the urban poor. These innovations facilitated the urban poor in the state of Odisha to access subsidy under BLC.

INTRODUCTION

The close link between tenure security and poverty reduction has been well recognised by institutions such as UN-Habitat among others. Globally, over the years, public institutions have made efforts to regularise slums and informal settlements through de jure intervention and land titling emerged as the popular measure. Such measures have been supported by various bi- and multi-lateral institutions focusing on enhanced tenure security and reducing poverty. Conferring security of tenure through legal measures has emerged as a critical constituent that enables access to decent shelter and basic civic amenities.

The United Nations estimates that much of the population increase in India between 2015 and 2030 will take place in urban areas, during
which it is estimated to add 165 million people to its urban base. Higher economic growth and a multitude of economic opportunities in cities is catalysing annual work-related migration of about 5-9 million people (Ministry of Finance, 2017-18), indicating much higher labour mobility than previously estimated. India’s urban expansion over the past two decades has already placed an enormous strain on land, housing supply, basic services and infrastructure (Das & Mukherjee, 2018). The situation is further aggravated by a low land-to-population ratio which has declined fourfold in comparison to 1960 making it the most land-scarce countries in the world (Kapur, Somanathan, & Subramanian, 2014).

The Indian economy is also undergoing a continuous structural transformation characterized by increased mobility and migration. As per Government of India statistics, the unorganised sector contributes almost 50 percent of the total GDP (Maitra, 2020). Nearly 80 percent of the people are employed informally i.e., they are not covered under any institutional labour laws (Niti Ayog, 2018). A large section of the informally employed workers, often the new entrants to the cities, start off by residing in poorly serviced informal settlements having ambiguous or no security of tenure. In addition to other vulnerabilities, they face continuous eviction and demolition threats, which puts them in an unending vicious cycle of poverty (Kotal, 2021). Such scenarios are more common in case of larger metropolises. In 7800 non-million smaller and medium towns, accounted for 66 percent of urban population (Census 2011), however, this scenario may not be true. In these smaller cities and towns, the poor often own a plot of land but not necessarily possess the ‘Right’ evidence to make their lawful claim on their land. They may have inherited the land parcel and continued doing land sub-divisions informally or are occupying public land for generations. The lawful claim on any piece of land is facilitated by the Revenue Administration through promulgation of Records of Rights (RoR) in the name of the occupier. The urban poor, however, tends to evade this complex processes, making the available land database redundant, and subjects land related transactions to litigations.

Acknowledging the fact that India’s urbanisation pattern and land relations in smaller and medium towns are distinctly different than that in the larger cities, it calls for different approaches to address the housing demand-supply gaps, especially among the urban poor. Given larger cities dominate the research paradigm, often the public policies are more responsive to these.

The government of India launched Pradhan Mantri Awas Yojana (PMAY) for the Urban (U) areas in 2015 to address the housing deficit among the urban poor. The scheme has two verticals each to support the demand and supply sides of housing:

1) In-situ slum redevelopment using land as a resource;
2) Credit linked subsidy scheme (CLSS);
3) Affordable housing in partnership; and
4) Beneficiary-led individual house construction/enhancement (BLC).

PMAY is a departure from its pre-dated housing policies—the scheme encouraged both the private developers as well as encouraged individual households to self-construct their houses subject to fulfilling certain prerequisites. Seven years
into the implementation, it emerged that informality, limited buoyancy in the real estate market, and unsold housing stocks deterred large-scale participation of private developers. Instead, BLC emerged as the most successful vertical, breaking the myth that urban poor do not own land in cities.

One of the critical inputs to access the support for housing development under BLC guidelines is the ‘adequate documentation’ or the ‘Right’ papers as evidence for the land ownership. The majority of the States initially interpreted them as Record of Right (RoR) that excluded many otherwise eligible beneficiaries. The success of BLC in smaller and medium towns reinforces the fact that poor in these cities do own land albeit lack the adequate documentation to make their claim. Many states addressed these barriers and simplified the processes to get the ‘Right’ papers. To date, out of 11 million houses approved under the mission, over 70% are approved under the BLC category (PMAY Data).

Against this backdrop, it emerges that the provision of housing, especially in smaller and medium towns, can be resolved by forging an effective partnership between the Revenue Administration and the Urban Local Bodies (ULBs). Taking Odisha as a case, this paper presents detailed documentation of the processes required to obtain RoR and its feasibility as the ‘must have’ documentary evidence for accessing housing subsidies. To localise the understanding two cities of Berhampur and Puri were selected in Odisha. This paper aims to document the learnings from Odisha for informing national and state-level schemes to facilitate addressing housing demand among the urban poor segment, especially the economically weaker sections.

**A REVIEW OF LAND MANAGEMENT SYSTEMS IN ODISHA**

India follows a dual land record keeping system (deed registration system and the land revenue system of RoR). The co-existence of this dual system makes maintenance of clear and/or updated land records cost intensive, inefficient to operate and complicated to maintain. The presumptive titling system without a robust updated spatial database subjects land related transactions to litigations thereby hindering the potential for raising resources. The situation is particularly complex among urban poor dwellers.

The land records in Odisha have a measure of complexity that is not present in any other similar-sized state.
This arises from the fact that history has resulted in the land administration and associated records in Odisha being rooted in a number of different systems.

- Certain portions of central Odisha came under the Bengal Presidency in British India and followed the Zamindari system as part of the Permanent Settlement;
- The south-western corner was part of Madras presidency and followed the Ryotwari system; and
- Most of the interior areas were part of Princely States that had their own variants.

The origins of the land management regime in Odisha can be traced back to the Bengal Land Revenue Regulation of 1793 instituted by the British East India Company. In the post-independence decades, however, the institutional structure of land administration in the state has evolved. The Revenue and Disaster Management Department (R&DMD) of Government of Odisha (GoO) controls the entire gamut of revenue administration. There are three Revenue Divisional Commissioners for Northern, Southern, and Central Divisions with headquarters at Sambalpur, Berhampur, and Cuttack, respectively (Figure 1).

Each division is responsible for the administration of ten districts. The collector is the Chief Officer-in-charge of revenue administration at the district level, besides being head of the criminal administration in the district. There are 30 districts and 58 sub-divisions in the State. Sub-Divisions are headed by Sub-Collectors and Sub-divisional Magistrates. Each Sub-Division has been divided into Tahasils headed by Tahasildars and there are 317 Tahasils in the State. For the purpose of revenue administration at the grassroot level, each Tahasil has been divided into Revenue Circles headed by Revenue Inspectors (Figure 2).

The four key functions of the Revenue Department are: (i) Acting as custodian of government land; (ii) Creation and maintenance of land records/cadastre; (iii) Management of land tenure; and (iv) Registration of land and property transactions (having direct implications on the implementation of housing programmes in the State).

Land records are maintained in two parts: (i) A series of maps showing the geometric and location attributes of the land parcels; and (ii)A

Figure 1: Location of Regional Divisional Commissioners in Odisha
Record of Rights (RoR) for each individual property that describes the ownership attributes of the land parcels. The attributes recorded in an RoR include: Name of each tenant/occupant; Class to which each tenant belongs; Situation and extent of the land; Type/use of land; Rent and charges payable by each proprietor/landlord, and tenant/occupant; Special conditions or incidents, if any, of the tenancy (restrictions in right); and Any right of way or other easement attached to the land. The land records are maintained at the sub-district level. There is no provision for separate management of land records for urban and rural areas, as in case of other parts of India.

Odisha Survey and Settlement Act 1958 governs survey and settlement for constituting land records (both textual record and cadastral maps). The three districts (now 10) of the Central Revenue Division were under the Bengal Presidency (Das & Sanan, 2021). These were first surveyed in the period 1836-43 under the supervision of District Collectors. During 1890-1900, more elaborate surveys were carried out in these districts, cadastral maps were made, and RoR copies given to the public. A revisional survey was conducted in these districts in 1925-30. After independence, another round of resurvey was done under a new Odisha Survey & Settlement Act,1958. In 26 Princely States, after their merger into the newly formed state, were also surveyed under the new Act. The southern part of the state, which was under Madras Presidency, was first surveyed in the 2nd half of the 19th century. The zamindars in this belt did not prepare RoRs. In Ryotwari areas, the village accountants prepared the RoRs, but these were not updated. After enactment of the new Act in 1958, most villages of this area were also resurveyed. These settlements have now continued for over 50 years. Apart from the original and revisional survey and settlement, 8,294 villages have been covered under the Consolidation Act and around 5,000 villages have been resurveyed under this Act after being covered under the Survey Act of 1958.

The registering of property transactions is also a key function of the State Revenue Department. When a land property transaction takes place, a deed document is prepared through which the two parties agree to the transfer of freehold ownership. These deed documents are registered with the Sub-Registrars’ office (under the Inspector General of Registration) as per the provisions of the Registration Act, 1908, and the Orissa Registration Rules, 1988. The stamp duty is paid as per the provisions of the Indian Stamp Act, 1899, and the Orissa Stamp Rules, 1952. It is important to note that the Registration office only registers land/property transactions. Once the deed
is registered, the buyer also must apply for mutation of the land record (RoR) in his/her name as per the details prescribed in the Orissa Mutation Manual, 1962.

Even though the Revenue Department is charged with the above functions the responsibility to implement the above functions remain widely fragmented, resulting in discrepancies. The department maintains records of land outside the city survey boundaries. The responsibility of maintaining land records within the city survey boundaries lies with the city survey superintendent. This is complicated because these survey boundaries are not necessarily coterminous with the boundaries of the ULBs.

**TYPOLOGIES OF LAND OWNERSHIP DOCUMENTS IN ODISHA**

To be eligible under the BLC scheme, the PMAY-U guideline provides for the following:

a) Belong to the economically weaker section category: defined as families earning INR 180,000 per annum in case of Odisha;

b) The applicant or any immediate family member thereof (spouse and unmarried children) do not possess any pucca house anywhere in India; and

c) Possess adequate documentation of the land occupied by the applicant and have a kutcha/semi pucca house.

Eligible families can avail a subsidy of INR 150,000 provided by the GoI, and an additional subsidy of INR 50,000 announced by the State Government. Based on the broad guidelines laid down under the PMAY by the MoHUA, States/Union Territories have the flexibility to modify the eligibility criteria, in consultation with the Ministry. In addition, various other documents eg. aadhar card, details of bank accounts, etc. were required to avail the benefits under the scheme. Government of Odisha, in the initial days of implementation of the Mission, interpreted RoR as the only proof of occupation of the plot for accessing BLC subsidies.

Subsequently, H&UDD relaxed the RoR requirement to include urban poor families living on ancestral land/having joint patta on submission of an affidavit from the Executive Magistrate declaring no-objection from other family members. Urban poor applicants having registered sale deeds were also included to avail the government subsidy, provided they submit an affidavit stating no dispute over the possession of the said property. Based on the field visits undertaken in the two cities of Odisha, viz., Behrampur and Puri, the following typologies of ownership documents were found:

**Registered freehold**

_Type of documents: RoR/Patta document on own name_

A patta/RoR issued by the State Revenue Department is a legal document that establishes formal land ownership in Odisha. The State Government legally ‘owns’ all land; the GoO is recorded as the primary landholder in the document. The RoR also specifies the location and dimensions of the land parcel, typology of land (‘kissam’), and freehold tenure (‘stithiban’) versus restricted tenure. To establish a registered freehold, an individual needs an RoR in his/her own name. It should reflect ‘stithiban’ tenure. The RoR can be obtained from the Tehsil Office in the concerned administrative district in a format prescribed by the Revenue Department. Additionally, a certified copy of the ROR may also be sought by applying through the digital platform of ‘Bhulekh’.
De Jure recognition of the legal incidents of Title

*Type of documents: Registered conveyance deeds such as sale Deed/ Partition Deed/Family Settlement/ Probate /Registered Gift Deed*

Sale, gift or partition of the land, tend to transfer right of ownership of the immovable property and are mandated to be registered. In addition, instruments that create, declare or assign, any right, title or interest of the value of one hundred rupees and upwards, in immovable properties, with few exceptions are mandated to be registered under section 17 of the Registration Act, 1908. The registered document captures the necessary details of the parties to the transaction, the interest transferred such as ownership in case of Sale, Gift or Partition or right to possession and enjoyment, in case of lease along with the amount to be paid. These deeds are validated by the concerned Sub-Registrar Office. It is an essential document required for further transactions of the property. However, the title documents, such as registered partition/sale/ conveyance deed, among others do not automatically result in a change in land records. The landowner has to apply for mutation of the RoR at the Tehsil Office under the Orissa Land Reforms Act, 1960 by filling Form-3 and attaching the registered deed as evidence.

**Intestate Succession**

*Type of documents: RoR in ancestor/husband’s name, Power of Attorney (PoA)*

Succession of the person dying without leaving a valid and enforceable will, is called Intestate Succession. This is primarily governed by personal laws applicable to the deceased for distribution of the assets and therefore the proportion of distribution varies based on codified or uncodified customary practices. Subsequently, this should be reflected in the revenue records. However, it was observed that due to failure to mutate the ownership in the revenue records, several households possessed imperfect title documents where RoR remain in the name of deceased ancestors/relatives. Frequently, there are also internal disputes within families regarding land inherited without recorded documentation. There are also cases where widows or wives of missing husbands, in the absence of legal documents (marriage certificate, wills, etc.), are not able to establish their rights over the land and are unable to claim government subsidies to improve/upgrade their houses. There are cases in the two cities where, instead of following the long and tedious land mutation process, family members have resorted to instruments such as Power of Attorneys (PoA) to transfer land to children/relatives.

**Conveyance of Land Parcels owned by JTT**

*Type of documents: RoR in the name of JTT/Matthas, current occupier in the settlement sheet*

The Jagannath Temple Trust (JTT) owns close to 30 per cent of all land in the city of Puri. Apart from these properties, the Revenue Department of the Trust also manages its ‘endowments’, which includes properties belonging to the temple or given to other institutions/people (like the ‘matthas’/‘sevayats’) for the performance of services, including that of offerings to the deity or for charity. There are cases where the RoR is in the name of the Mandir Parichalan Committee, JTT. However, the JTT lands are the most contested lands in the state, with multiple stakeholders including the Jagannath Temple Committee, Matthis, State Government, and the current occupier claiming stake on them. There are cases where a settlement sheet is enclosed with the RoR document which contains details of plots along with the names of current occupants, and the amount paid for it.
Purchase/Inheritance through informal transactions

Type of documents: Unregistered sale/partition deed

An unregistered sale deed can help establish the rights of the landholder as a semi-formal owner. It is a useful document to show the transaction between the parties and the nature of possession. However, it is an imperfect title and cannot be used in the court of law to claim any legal right over the land/property. Usually, the transaction is carried out on an INR 10 (USD 0.15) non-judicial stamp paper. The deed specifies the name of buyer and seller, description of property (plot number, its area, construction details), amount paid by the buyer, etc., but is not registered under the Registration Act, 1908.

Occupation of public/private land (not in conflict with environmental zones/planning reservations)

Type of documents: Possession/Occupancy certificate, holding tax receipt

Occupation implies exercising physical control of any land by an individual/household, but not having any legitimate evidence of conveyance (purchase/inheritance/lease, etc.). Most of these households are located on government land. Sometimes, local governments extend leases/provide possession certificates to these households. While they are not included for accessing housing subsidies, they are able to access basic services and infrastructure on payment of a holding tax. For the households that are connected to municipal infrastructure and pay the holding tax, the holding tax receipt can serve as a possession/occupancy proof.

In Puri, several households located on public land have legal water connections provided by the PHEO. Water bills issued by government departments are also evidentiary proofs that establish occupancy for a given time. The municipal tax receipt has the name of assesse, ward number and the tax amount paid by the user, which includes the annual charge imposed as holding tax, water tax, sanitation tax, street light tax, and drainage tax.

Occupation of land zoned for environmental protection/reserved for other uses

Type of document: possession/occupancy certificate, holding tax receipts

Slums/informal settlements that are located on environmentally sensitive/hazardous land/reserved land are considered to be the most vulnerable. Such households have the least amount of tenure security, and are threatened by natural disasters, disease, and other risks on account of the lack of access to infrastructure, and poor living conditions. At best, they possess some sort of identity proofs (Aadhar/Below Poverty Line (BPL) cards) that make them eligible for government subsidies through the public distribution system.

A process documentation is represented in Figure 3 based on the available land ownership typologies, interviews with revenue officials and local lawyers for acquiring the RoR.

Obtaining an RoR would entail a complex process requiring anywhere between 6 months to 2 years. From the field study, it has been observed that the relationship between the urban poor and the revenue administration is disproportionately unequal. Revenue administration is mostly dealing with de jure rights of the land and the urban poor finds it challenging to negotiate the maze of legalities. Unlike ULBs where Councillors play an important role as a connect between the municipal administration and the communities, revenue administrations do not have any such interfaces. The trust between the communities and revenue administration, to a large extent is missing. It is perceived that the primary
objective of the Tahsil Office is to act as the custodian of land and may be able to find various reasons to confiscate the parcel. Thus, most of the urban poor prefers to remain invisible in the domain of the revenue department.

ADDRESSING FAULT LINES OF LAND RECORD KEEPING: THE APPROACH OF ODISHA

The Land Rights to Slum Dwellers Act (LR Act) was enacted in 2017 to recognise the contribution of the urban poor, especially its slum dwellers in the city constituting about 25 percent of the urban dwellers, by empowering them with land rights and access to basic civic and social infrastructure. The Act, implemented through the Odisha Livable Habitat Mission (OLHM) also known as the JAGA Mission, aimed at giving land rights to the slum dwellers on ‘as is’ ‘where is’ basis. The OLHM has five components, namely, a) appraisals of slum settlements to understand the living conditions and issues with respect to the same; b) participatory planning to improve the habitats; c) improvement of basic services; d) protection and development of commons; and e) enhancement of social and economic infrastructure.

JAGA Mission employed modern technology such as use of drones for geo-fencing of the current slum boundaries to ensure high degree of accuracy and transparency coupled with field validation to create a more accurate documentation of land rights informed by existing revenue records. Thereafter, the drone images acquired were integrated with the satellite data and revenue data to create a spatial overview of slums. Household survey data collected through USHA (Urban Slum Household Area) Survey has also been added to create a convergent,
updated and multi-layered database to ensure informed decision making.

Communities remain at the centre of the initiative and the slum dwellers associations (SDAs) are encouraged to be formed at slum level. The SDAs are actively participating in the development and governance process, thus averting the possible socio-economic disruptions. The right blend of community participatory processes complemented by use of modern technologies (Drones, GIS, Web and Mobile Application, Cloud Computing etc.) makes the overall initiative transparent, accountable and enhanced the speed of implementation. Thus, potentially leading to addressing the many inequities experienced by the urban poor.

Additionally, through this process, the Government of Odisha was able to address, to a substantial extent, the complexities attached to title documentation, as enunciated in the previous section, thereby bringing a larger cohort of eligible households under the purview of BLC. The Land Rights Certificates (LRCs) distributed through this process acted as an ‘adequate’ ownership document to enable about 70,000 people to gain security of tenure and leverage BLC subsidy subsequently. The gains of this process are evident from the fact that 90% of the BLC sanctions were obtained post 2017. This further strengthens arguments put forward by scholars that slum dwellers in the smaller cities are not necessarily encroachers but often lack the ‘Right’ papers required to access such government welfare schemes.

**CONCLUSION**

Inclusiveness is crucial for effective sustainable urban development. Inclusiveness in cities is about promoting equity and is reflected in the way city dwellers are making claims on the city’s resources and are participating in the governance processes. One of the indicators that measures a city’s inclusive nature could be the way its citizens make claims on city’s land and housing informally. Even in smaller and medium cities where they own their piece of land still loose as they most often do not have the ‘right’ papers. As illustrated above this situation arises owing to administrative complexities and a strained relationship between Revenue Administration (RA) and the urban poor.

All housing policies and programmes including PMAY are conventionally anchored within the state housing departments and ULBs. In Odisha as well Housing and Urban Development Department (HUDD), GoO is leading the implementation of AWAAS -the state housing mission mode programme that are further led by urban local bodies at the local level. State and Municipalities oversee implementing these housing missions; however these institutions are not having much control over how land is owned in the cities. The ownership of the land and issues such as urban land records are under the mandate of the Revenue Administration.

To successfully implement housing policies and programmes, revenue department must be viewed as a facilitator and a key stakeholder in the implementation of such housing schemes/missions.

While implementing BLC, the ULBs identified lack of ‘right’ papers as one the main deterrents for the urban poor to access the subsidies offered under the housing mission. In the initial stages of implementation efforts were made to move away from RoR and settle for sale deeds complimented by affidavits however these interventions were time consuming and case specific. HUDD, through the enactment of the Land Rights to Slum Dwellers Act, 2017 issued leasehold tenure (patta) to all eligible households, in one sweeping decision. This superseded
the complex land mutation processes that the plot owners are supposed to undergo with the Revenue Administration. This is a welcome step to integrate the urban poor in the land and housing market. However, this effort still does not address the gaps in the engagement of the urban poor with the Revenue Administration. There is no mechanisms or interface through which the urban poor can engage with the Revenue Administration and make their ownership clear in the revenue records. The administrative processes remain cumbersome and the gap between the common citizen and the Revenue Administration remains as wide as ever. Such a large-scale land tenure programme, as rolled out by Odisha, should be complemented by sustained reforms in the revenue administration over the long term. The objective of the reform will be to bring RA closer to people while making the processes people friendly.

This paper also suggests that land ownership patterns in the small and medium towns are distinctly different from the larger metropolises. In smaller and medium towns urban poor may not be the encroachers but are falling out because of administrative deficiencies. This hypothesis requires further additional evidence for better understanding. As well illustrated in this paper, land among the poor is valued more for its “use value” rather than transactional value. The owner does not have compelling reasons to keep the de jure ownership papers updated. There is a need to institute a differential mechanism at the Revenue Administer that encourages the urban poor to update their land records. This will also facilitate maintaining the land records in a robust manner. Considering that modernization of urban land records is high on the national agenda, there is an opportunity that these efforts may contribute to untangling the ownership maze at least in the smaller and medium towns. Modernisation of Urban land records can be a way forward to resolve the housing needs of the urban poor.

As a way ahead, housing policies and programmes needs to recognise the difference in the ownership patterns in small and medium towns and large metropolises and design these accordingly. The focus of these programmes should be more towards resolving structural and administrative bottlenecks and institutional reforms.

REFERENCES


ADDRESSING HOUSING SHORTAGE AMONG URBAN POOR THROUGH BLC
LEARNINGS FROM IMPLEMENTATION

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“Along with the ease of implementation of BLC, resulting from the availability of land rights, this vertical also attained significant traction from the innovative approaches adopted by various state governments to expedite the disbursal of the BLC subsidy.”

Keywords: Slum Upgradation, land tenure, institutional financing, Beneficiary- Led Individual House Construction/Enhancement (BLC), PMAY (U), urban poor

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Pradhan Mantri Awas Yojana (PMAY-Urban) was launched in 2015 to address the housing requirements of the urban poor, having four verticals to channel its subsidies. Among them, Beneficiary- Led Individual House Construction (BLC) has emerged as the most successful, with a large proportion of housing being sanctioned under the same. To understand the process of BLC implementation and the innovative interventions by states, primary surveys were conducted across Odisha, Kerala and Tamil Nadu, accounting for 1 in every 10th BLC sanctions in the country. This paper aims to document the various aspects of BLC house construction associated with land, finance, and access to basic services. It further draws out learnings necessary for PMAY (U) that underscores the importance of BLC/self-built housing schemes to answer the critical demand-supply gap that is often widened by a dysfunctional real estate market, especially for the EWS. Finally, it identifies three primary enablers – access to land, holistic city planning, and access to institutional finances – to be leveraged for achieving the national ‘Housing for All’ agenda in the medium to long term.

BACKGROUND

Decent shelter and a healthy habitat ensure the safety and security of the urban poor and contribute to enhancing productivity (Habitat for Humanity, 2020). With continuing urbanisation, one of the key challenges faced by the cities today is the provision of a safe habitat and adequate housing at scale. The Government of India (GoI) has been assessing these problems for decades. It has formulated housing policies and programmes from time to time to benefit the urban poor by enabling them to dwell and live in healthier environments with basic civic facilities. Through Valmiki Ambedkar Awas Yojana (VAMBAY) launched in 2001 to Rajiv Awas Yojana (RAY) in 2009 and a host of different housing schemes during this period, successive governments made attempts to improve basic services, provide tenure security, upgrade existing infrastructure and create new housing units with a vision of creating a ‘Slum...
Free India’. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched in 2005 was a step towards urban development and was used as an incentive fund to bridge the investment gap in affordable housing through two sub-missions – Basic Services for Urban Poor (BSUP) and Integrated Housing and Slum Development Programme (IHSDP). However, these programmes failed to achieve the desired outcome for various reasons, including deficiency in preparation and appraisal of detailed projects, non-availability of land, escalation in costs, change in design and scope, ambiguity in defining tenability, different interpretations of “infrastructure for public purpose” etc. (Kundu, 2013).

To address the housing requirements of the urban poor, including slum dwellers, the Pradhan Mantri Awas Yojana (PMAY-Urban), or the mission of ‘Housing for All by 2022’, was launched by the Hon’ble Prime Minister in 2015. The current programme brought forth by the Government of India has four verticals to channelise its subsidies: a) In-Situ Slum Redevelopment (ISSR) using land as a resource; b) Credit Linked Subsidy Scheme (CLSS); c) Affordable Housing in Partnership (AHP); and d) Beneficiary-Led Individual House Construction/Enhancement (BLC) of individual houses. It is a multi-faceted program offering a variety of options and products to the wide socio-economic sections of the population, and the construction of new houses under PMAY-U has accelerated in recent years. It has sanctioned housing units about ten times and completed almost five times than the past programmes combined, as shown in Figure 1.

However, among the four verticals, it is observed that the BLC component of PMAY(U) has been the most successful, with almost 75 percent uptake across 35 states/UTs (Figure 2). The BLC vertical focuses on improving housing conditions of the urban poor by providing financial assistance to individual eligible families belonging to the EWS category to either construct new houses or expand existing houses, subject to owning a land parcel in the city. This vertical has made substantial progress because land provisioning remains the responsibility of the household (HH). The progress under other verticals has been relatively modest due to the lack of affordability among the poor, low level of private sector participation, and the reluctance of the private players to adhere to various stipulations, as envisaged under the PMAY-U (PMAY-U) (Kumar & Kundu, 2018). Although AHP emerged as the second most preferred vertical (27 per cent), experience has revealed that private sector investment in affordable housing was feasible only in centrally-located slums, where land prices were high. Private investments in the peripheral areas were unviable, as

Figure 1: Progress under different housing programmes

Figure 2: Progress under various PMAY verticals

1  https://mohua.gov.in/upload/uploadfiles/files/17(5).pdf
observed in the case of Ahmedabad (Mahadevia, Bhatia, & Bhatt, 2018).

This paper is based on the learnings from the states of Odisha, Kerala, and TN, conducted during 2018-19, to understand the BLC implementation processes and the beneficiaries’ experiences in leveraging the subsidy. This paper is structured into six sections. The first section provides the context for the study, followed by the objectives and methodology in the paper’s second section. The next three sections elaborate on the study’s key findings across the facilitation of land transfer for enabling BLC subsidy, access to institutional finance, and access to basic infrastructure. The last section of the paper culls the learnings from the findings for an overview of the key enablers for housing: land, planning, and financing.

LEARNINGS FROM BLC IMPLEMENTATION

Along with the ease of implementation of BLC, resulting from the availability of land rights, this vertical also attained significant traction from the innovative approaches adopted by various state governments to expedite the disbursal of the BLC subsidy. These innovations have enabled the states to facilitate house construction among the urban poor through the provision of land rights, increased subsidies, and financial assistance. A disaggregated analysis of BLC uptake across three Indian states – Odisha, Kerala, and Tamil Nadu (TN) – reveals that there is higher traction of BLC in smaller cities (Figure 3).

Against this background, to understand the process of BLC implementation and the innovative interventions by states that stimulated larger uptake, household surveys were conducted across three states: Odisha, Kerala, and Tamil Nadu, during 2018 -2019 by Scaling City Institutions for India (SCI FI) Initiative at Centre for Policy Research (CPR) in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), India. 250 HHs were taken up for survey in each state at 90 per cent of the confidence interval and 5 per cent margin of error. These were further distributed across three select cities; each arrived in consultation with the respective state governments. Stratified purposive sampling was followed to select HHs in each of the cities. The state-

Figure 3: City class-wise distribution of BLC houses sanctioned

Source: (Census 2011), MoHUA website
wise study locations were (Figure 4):

- Odisha: Dhenkanal, Gopalpur, and Behrampur
- Kerala: Thiruvananthapuram (Trivandrum), Kochi, and Mukkam
- TN: Chennai, Coimbatore, and Uthiramerur

The cities selected have specific characteristics (Table 1) concerning the scheme that helped analyse the performance across the different administrative structures of local governing bodies, different project progress status, and overlapping and non-overlapping schemes.

**Table 1: Profile of the studied cities**

<table>
<thead>
<tr>
<th>States</th>
<th>Dhenkanal</th>
<th>Gopalpur</th>
<th>Behrampur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odisha</td>
<td>Dhenkanal is a class II headquarters town and a municipality in the Dhenkanal district.</td>
<td>Coastal town and a NAC in Ganjam district.</td>
<td>A city and a municipal corporation in Ganjam district.</td>
</tr>
<tr>
<td></td>
<td>No. of wards - 23</td>
<td>No. of wards - 11</td>
<td>Total population (Census 2011) - 356,598 &amp; 74,720 HHs.</td>
</tr>
<tr>
<td></td>
<td>Total population (Census 2011) - 67,414</td>
<td>Total population (Census 2011) - 7,221 &amp; 1,480 HHs.</td>
<td>No of slums - 175</td>
</tr>
<tr>
<td></td>
<td>Slum population -7,821.</td>
<td>No of slums - 4</td>
<td>Slum population -91,813</td>
</tr>
<tr>
<td></td>
<td>No of slums - 43</td>
<td>LRC distribution in the city under Odisha Land Rights to Slum Dwellers Ordinance, 2017, stands complete.</td>
<td>Not covered under Odisha Land Rights to Slum Dwellers Ordinance, 2017</td>
</tr>
</tbody>
</table>
CASE STUDIES

<table>
<thead>
<tr>
<th>States</th>
<th>Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerala</td>
<td>Trivandrum</td>
</tr>
<tr>
<td></td>
<td>• Capital city and</td>
</tr>
<tr>
<td></td>
<td>Municipal Corporation in</td>
</tr>
<tr>
<td></td>
<td>Thiruvananthapuram</td>
</tr>
<tr>
<td></td>
<td>district.</td>
</tr>
<tr>
<td></td>
<td>• No. of wards - 100</td>
</tr>
<tr>
<td></td>
<td>• Total population</td>
</tr>
<tr>
<td></td>
<td>(Census 2011) 752,490 &amp;</td>
</tr>
<tr>
<td></td>
<td>191,446 HHs</td>
</tr>
<tr>
<td></td>
<td>• 100 wards</td>
</tr>
<tr>
<td></td>
<td>• No of slums - 82</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kochi</td>
</tr>
<tr>
<td></td>
<td>• Municipal Corporation in</td>
</tr>
<tr>
<td></td>
<td>Ernakulam district</td>
</tr>
<tr>
<td></td>
<td>• Population (Census 2011)</td>
</tr>
<tr>
<td></td>
<td>• The slum population</td>
</tr>
<tr>
<td></td>
<td>constitutes only 0.86</td>
</tr>
<tr>
<td></td>
<td>percent of the population.</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mukkam</td>
</tr>
<tr>
<td></td>
<td>• Municipality town in</td>
</tr>
<tr>
<td></td>
<td>Kozhikode district</td>
</tr>
<tr>
<td></td>
<td>• Population (Census 2011)</td>
</tr>
<tr>
<td>Tamil</td>
<td>Chennai</td>
</tr>
<tr>
<td>Nadu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Capital city and</td>
</tr>
<tr>
<td></td>
<td>municipal corporation</td>
</tr>
<tr>
<td></td>
<td>• The state’s largest</td>
</tr>
<tr>
<td></td>
<td>city in area and</td>
</tr>
<tr>
<td></td>
<td>population as well</td>
</tr>
<tr>
<td></td>
<td>• Total population</td>
</tr>
<tr>
<td></td>
<td>(Census 2011) 7,088,000</td>
</tr>
<tr>
<td></td>
<td>• A total of 29 per cent</td>
</tr>
<tr>
<td></td>
<td>of Chennai’s population</td>
</tr>
<tr>
<td></td>
<td>resided in slums as of</td>
</tr>
<tr>
<td></td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coimbatore</td>
</tr>
<tr>
<td></td>
<td>• Coimbatore is the</td>
</tr>
<tr>
<td></td>
<td>second-largest city in</td>
</tr>
<tr>
<td></td>
<td>Tamil Nadu</td>
</tr>
<tr>
<td></td>
<td>• Administered by the</td>
</tr>
<tr>
<td></td>
<td>Coimbatore Municipal</td>
</tr>
<tr>
<td></td>
<td>Corporation</td>
</tr>
<tr>
<td></td>
<td>• Total population</td>
</tr>
<tr>
<td></td>
<td>(Census 2011) 1,584,719</td>
</tr>
<tr>
<td></td>
<td>• No of slums - 319</td>
</tr>
<tr>
<td></td>
<td>• Slum HHs-46650</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uthiramerur</td>
</tr>
<tr>
<td></td>
<td>• Panchayat town in</td>
</tr>
<tr>
<td></td>
<td>Kancheepuram district</td>
</tr>
<tr>
<td></td>
<td>• Population of 25,194</td>
</tr>
<tr>
<td></td>
<td>• The town is divided</td>
</tr>
<tr>
<td></td>
<td>into 18 wards</td>
</tr>
</tbody>
</table>

Limitation: Owing to the focus of the study on BLC beneficiaries, the sampling was designed based on specific inclusion criteria. This prevented the study from delving into the category with neither land nor BLC, which remained excluded. Additionally, the responses of the HHs in stating the nature of the settlement (slum/unauthorised colony/authorised colony/resettlement colony) in which they reside may not be entirely reliable, given the complexity of administrative classification. Therefore, the inferences were drawn for the study based on the opinions/responses expressed by the respondents, at times on behalf of the BLC beneficiary in the household.

Key findings emerging from the analysis of the implementation practices of BLC in three states: Odisha, Kerala, and TN, are highlighted below:

**Facilitated land transfers enabled improved access to BLC subsidies**

As per the PMAY-Urban guideline, submission of land ownership documents is the critical first step for availing the BLC subsidy. However, slum dwellers in the smaller cities continued falling out of the purview of the scheme due to the lack of appropriate land ownership documents. States which had provided the slum dwellers with patta in the past appeared to be the forerunners in the scheme implementation. The state such as Tamil Nadu, which had a history of providing land at no cost for the poor to construct houses in the past, could approve the highest number of applications under the BLC as of 2018 (Figure 5). Under this scheme, free pattas were given to individuals...
who earn less than INR 30,000 in rural areas and below INR 50,000 in urban areas annually.

The state of Kerala initiated its land transfer facilitation for urban development, including that for the urban poor, in 2007. It began land acquisition processes in the urban fringes with public and private initiatives providing appropriate statutory support. The state recognised that there were over 330,000 families who were landless and houseless, and the government attempted to provide land for the landless to take up housing initiatives.

The state of Kerala has also been planning to extend subsidies to people to buy land through state support under LIFE (Livelihood Inclusion Financial Empowerment) Mission initiated in 2012, in its third phase. In Kerala, nearly 73 per cent of the respondents had inherited the land, of which only one was not a BLC beneficiary (Figure 6). Another 20 per cent bought the land. Only a handful, i.e., 7 per cent, got the land from the government in the recent past. This indicates that land transfer facilitation in the past had been effective in Kerala for availing BLC subsidies (Das, et al., 2020).

Given that proof of land ownership is a prerequisite for availing the subsidy, some states went ahead with programmes and schemes to provide land ownership or streamline the land ownership documents to facilitate the same, like in Odisha. In the case of Odisha, progress in the scheme was noticeably delayed because of a lack of land rights. Thus, the Odisha government resorted to granting land rights transfers to expedite the BLC process. In Odisha, it is seen that while bigger cities could leverage the subsidy because of land ownership, smaller cities like Dhenkanal

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**Figure 5: Comparison of BLC Implementation across States:**

<table>
<thead>
<tr>
<th>State</th>
<th>Approved</th>
<th>Work order Issued</th>
<th>Grounded/In Progress</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Foundation</td>
<td>Lintel</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>366,165</td>
<td>284,529</td>
<td>121,625</td>
<td>17,901</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>302,859</td>
<td>-</td>
<td>100,780</td>
<td>34,730</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>176,108</td>
<td>31,401</td>
<td>12,864</td>
<td>-</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>284,284</td>
<td>-</td>
<td>115,300</td>
<td>1,009</td>
</tr>
<tr>
<td>Bihar</td>
<td>124,856</td>
<td>50,322</td>
<td>19,745</td>
<td>13,034</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>91,241</td>
<td>-</td>
<td>14,289</td>
<td>7,762</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>16552</td>
<td></td>
<td>331</td>
<td>43</td>
</tr>
<tr>
<td>Gujarat</td>
<td>19,421</td>
<td>19,180</td>
<td>232</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: CSMC, 2018 as presented in (Das, et al., 2018)

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**Figure 6: Land ownership pattern in Kerala**

**Figure 7: City-wise BLC-LRC beneficiaries in Odisha**
and Gopalpur could only benefit after the government decided to provide Land Right Certificates (LRCs) to the slum dwellers (Box 1). As per Figure 7, it was observed that in Gopalpur, among the beneficiaries who had received LRC, 97 per cent of them had applied for BLC. In Dhenkanal, however, it is seen that only 4 percent of the total LRC recipients had applied for BLC. This can be explained by the fact that in Dhenkanal, the LRC distribution has just begun. The field survey also revealed the willingness among the beneficiaries to apply for BLC and the requirement of reapplication in some cases, as the applications had initially been rejected because of the lack of land ownership evidence (Das, et al., 2020).

Further, in smaller cities, the slum dwellers are not necessarily encroachers (Das & Mukherjee, 2018). However, as various unserved rural pockets get in-situ urbanised, many informal settlers reside on their own land with/without services, in dilapidated housing conditions, and without adequate documentation. Moreover, given that India’s land and property records are in a dismal state, slum-dwellers do not possess valid legal documents due to procedural bottlenecks, thus keeping many otherwise eligible beneficiaries outside the purview of the scheme. Therefore, if the process of land transfer is not streamlined for the slum dwellers, they will keep falling out of the purview of these housing schemes, which in turn has the potential to hinder achieving the target of housing for all in the states as well as for the national government as a whole.

**Disproportionate reliance on informal borrowings to finance construction**

BLC beneficiaries had to borrow to finance their house construction, albeit they borrowed from informal sources in most cases. Only Odisha had a relatively lower level of borrowings, at 49 per cent. The remaining half of the beneficiaries in the states complemented the subsidies with their income and savings. Interestingly, in the majority of the cases across the states, households relied on multiple sources of borrowing instead of one, whether a combination of formal and informal or a combination of multiple informal sources. It is well known that informal credit markets often display patterns and features that are not commonly found in informal structures. These include the advancement of loans based on oral agreements rather than written contracts, with limited to no collateral, long-term exclusive relationships, and repeat lending with significant inter-linkages with other markets such as material, labour, transportation, etc. However, such informality is often associated with significantly high-interest rates because of the high risk associated with this sort of lending. BLC beneficiaries reported not borrowing from the banks due to excessive documentary and collateral requirements, perceived high-interest rates, and inability to pay the
equated monthly instalments over the loan term. Relatives/friends – with whom trust-based lending/repeat lending is easier – emerged as the major source of informal borrowings among the BLC beneficiaries (Figure 8). Moreover, while the majority in Kerala reported zero interest rates when borrowing from relatives/friends, in Odisha, charging interest on such loans remained high (Figure 9).

The urban poor, often employed in the informal sector, do not possess documented income proofs and therefore remain unable to borrow from formal financial institutions, which perceive the urban poor as a high-risk, unbankable segment. Interestingly, the poorer BLC beneficiaries reported a higher dependence on informal borrowing than their better-off counterparts.

Cost escalations generally demand urgent funds. Informal loans usually fulfill such urgent demand for funds as they enable easy and timely access to finances compared to formal sources. On the other hand, accessing formal institutional credits involves significant documentation, making it time-consuming.

Additionally, the unavailability of public subsidy upfront resulted in many approved but uninitiated houses, owing not only to the unavailability of funds but also to the limited faith in receiving the public subsidy after the demolition of the existing house. This has emerged as one of the critical impediments in BLC house construction. States like Kerala have gone around this provision by releasing the state share of the subsidy immediately after signing the agreement between the ULB and the beneficiary, and the verification of the vacant site is done. Odisha also revised the programme structure and facilitated the release of the first instalment of state share immediately after the excavation, initiated with the beneficiary contribution. On the other hand, TN releases the first instalments only after completing the foundation with the beneficiary’s share. While, on the one hand, facilitated large-scale grounding of houses in Kerala and Odisha (85 percent of sanctioned) in TN, it resulted in 24 percent of sanctioned as non-started houses.

**Unavailability of basic civic infrastructure access in newly constructed houses**

The PMAY-Urban programme guideline directs the ULBs to ensure that individual houses under BLC have adequate provision for basic civic infrastructure such as water, sanitation, sewerage, road, electricity, etc. Further, all houses built or expanded under the Mission shall have a toilet facility. Accordingly, the programme guideline defines an EWS house as ‘an all-weather single unit or a unit in a multi-storeyed superstructure having carpet area of up to 30 sq. m. with adequate basic civic services and infrastructure services.
like toilet, water, electricity, etc.’. The study reveals newly built houses with limited access to basic civic infrastructure.

As per Figure 10, access to metered electricity is high in all three states. 90 per cent of houses had metered electricity in Odisha, while the access was at 83 per cent in Kerala and Tamil Nadu. The primary source of water supply showed inter-state variations. Kerala exhibited a high share of water within premises, mainly from two sources-piped (30 per cent) and a borewell with a storage tank (23 per cent). In Odisha, 30 per cent of the beneficiaries have piped water within premises, while in Tamil Nadu, handpump is the major source of water within premises with a share of 21 per cent, followed by piped water (11 per cent). The share of beneficiaries with water outside the premises is much larger in the case of Odisha and Tamil Nadu. In both the states, reliance on public tap is high, 57 per cent in Tamil Nadu and 40 per cent in Odisha. On the other hand, in Kerala, an open well is the major water source outside the premises on which 70 per cent of the beneficiaries rely.

70 per cent of the BLC houses in Kerala did not have any solid waste service in place, while it is about 16 percent in the case of Odisha. The door-to-door collection was scarce, with only 20 percent of BLC houses in Odisha and 13 per cent in Kerala reporting Door-to-Door solid waste collection. 64 percent of the beneficiaries in Odisha dumped their solid waste at a nearby collection point or vacant land. Around 80 percent of the beneficiaries in each state had access to a pucca road. However, 7 percent of the beneficiaries in Tamil Nadu reported having no road in front of their BLC houses. More than 80 percent HHs in Kerala have no drains, while 12 percent have pucca-covered drains and 5 percent have pucca uncovered drains. On the other hand, 46 percent of the HHs in Odisha have uncovered pucca drains, 38 percent have no drains and 13 percent have pucca-covered drains.

Further, the share of HHs with access to three basic services viz. piped water, metered electricity and pucca road was 24 per cent in Odisha where as it was 21 percent.
per cent in Kerala and 7 per cent in Tamil Nadu (Figure 11). The study highlights that amenities like water supply and electricity, which require HHs to approach the authorities, are still relatively accessible, but the extent of public infrastructure is deficient because of the lack of appropriate habitat planning. States have not been able to provide adequate access to all the households with basic services despite efforts to converge with the Atal Mission for Rejuvenation and Urban Transformation (AMRUT); and even with the help of reforms for earmarking ULB share for laying infrastructure. Inadequate focus on holistic spatial planning and ensuring access to basic civic infrastructure as part of PMAY (U) could potentially put the opportunity for habitat improvement at risk. The housing for all plan of action (HfAPoA) mandated under PMAY-Urban does not provide for spatial planning and also ignores holistic city-level planning. This results in a house-only approach rather than neighbourhood habitat development. Further, the absence of any financial contribution from the central government towards improving the last-mile basic civic infrastructure for the newly built houses makes it a non-essential item for the states. Given that smaller cities are the primary recipients of these newly built houses, their limited capacity to raise additional finances for infrastructure improvement may result in improved houses, but without the necessary infrastructure access. The unavailability of city-level planning tools may further entrench this gap.

**WAY FORWARD**

Affordable housing is taking center stage internationally and on the national agenda. With housing recognised as a basic need, governments at every level discuss ways and means to provide this service to every citizen, particularly the urban poor. Housing has three key enablers: access to land, holistic city planning, and access to institutional finance (Figure 12). These are crucial aspects that the

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Box 1: Slum upgradation and delisting under JAGA Mission in Odisha

With the launch of the Odisha Land Rights to Slum Dwellers Act and Jaga Mission during 2017-18, the government recognised the collective responsibility of improving the quality of life of the slum dwellers by ensuring integrated and planned growth of the cities with adequate infrastructure and services. While in the first phase of the Jaga mission, the government was committed to securing land rights for the urban poor, in its second phase, it prioritised ‘Slum Upgradation and Delisting’ through the creation of necessary basic civic infrastructures like access to water supply, pucca roads, pucca stormwater drainage, street lights, access to toilet facilities and in-house electricity along with the community Centre called ‘Parichaya,’ creation of open space and child-friendly parks and bringing the tenable slums at par with the rest of the city.
government needs to focus on to accomplish the vision of Housing for All.

The BLC vertical under PMAY-Urban has emerged as the most successful among the four verticals in the last five years since the launch of the scheme. It is evident that the success of this vertical is based on the existence of land ownership among the urban poor, especially in smaller cities. Recognising the relevance of land ownership in disseminating the subsidy, states are dovetailing their land-related schemes and providing the urban poor with land ownership to enable them to access the BLC subsidy. Consequently, the convergence of land titles (e.g. Box 1) with the BLC-PMAY subsidy is a crucial enabler for states to leverage the subsidy and has scope for incorporation in the national guideline for PMAY. However, in many metropolitan areas and Class I cities, the land is unaffordable for the urban poor, owing to extremely high real estate rates. Further, ownership-based housing may not be a preference for these sections due to the unaffordability of land and housing and mobility and migratory practices. Moreover, the excessive focus on house ownership excludes many from accessing safe and sanitary affordable housing in such a scenario. Therefore, the PMAY must account for a range of tenurial options, including rental housing, to address this situation.

Despite subsidies from the local and the state government, there is a considerable financial share to be borne by the beneficiaries for house construction, which they may have to mobilise through lifelong savings or borrowings; in most cases, the latter is utilised for this purpose. Despite measures adopted by the states to institutionalise credit for construction, high dependence on informal sources persists. The high-interest rates for informal borrowing deter potential beneficiaries from availing of the BLC scheme and have the potential to push beneficiaries who take recourse to it into a vicious cycle of debt and poverty. In such a scenario, the convergence of PMAY-Urban with available housing finance schemes for the urban poor must be addressed in the broader policy guideline.

Moreover, while the construction of new houses under PMAY-Urban has accelerated in recent years, limited attention has been given to neighbourhood-level habitat development. The deficient focus on holistic spatial planning results in the construction of houses without the allied basic infrastructure, thus negatively impacting the lives and livelihood of the recipients. Apart from the lack of emphasis on a habitat approach in the PMAY-Urban scheme, the limited financial capacity of the governing agencies of smaller cities deters them from investing in basic infrastructure improvements for the beneficiaries in their jurisdiction. Therefore, unless supplemented with holistic city planning, mere house construction to provide housing for all will create unsustainable and non-resilient cities. While the PMAY-Urban guideline directs the ULBs to ensure that individual houses constructed under BLC have adequate provision for basic infrastructure (including water, sanitation, sewerage,
road, electricity, etc.), the realisation of this objective has been limited. Although the convergence of PMAY-Urban with AMRUT and SBM has been expedited in some states, there remains considerable scope for improvement. Despite the strides during the first five years of SBM, the construction of BLC houses without adequate sanitation facilities will prove to be a setback for the country as a whole. Infrastructure improvement is especially required in the country’s slums and squatter settlements, which continue to be marked by unsanitary conditions and overcrowding. A dwelling unit without access to basic allied infrastructure would not only trigger adverse socio-economic impacts for the beneficiaries but would also hinder the broader objective of their integration into the cityscape. Additionally, the focus on standalone housing under BLC has perpetually excluded slums and squatter settlements from availing of the subsidy due to precarious land tenure status. Further, the slump in the real estate sector has discouraged the scope for private sector investment in these settlements, reinforcing the role of the public sector in such investments.

Systematic and holistic city planning approaches are more likely to improve the lives of the urban poor than the piecemeal response. Going forward, the BLC vertical has the potential to be redesigned to allow the upgrading of urban poor settlements, including slums, to ensure the overall development of such settlements. The urban poor settlements like slums, squatters, etc., should be accorded due recognition by making them an integral part of city planning and the development process to build sustainable and inclusive cities.

---

**REFERENCES**


CITYWIDE SLUM REHABILITATION STRATEGIES FOR THE URBAN POOR IN KOLHAPUR

AR. PRATIMA JOSHI
AR. ISHA JOSHI

Kolhapur is a tier-2 in Maharashtra and is spread over 7685 Sq.m. with a population density of 3,876,001. (368-kolhapur.html 1). With increasing urbanisation, a growing demand for housing within the Kolhapur city has led to formation of slum pockets spread across the city. There are 57 slums in the city with a population of 59,971 having no security of tenure. (https://shelter-associates.org 2) Through the research project undertaken Shelter Associates(SA) in collaboration with Pramiti foundation and funded by ATE CF aimed to provide a framework for implementing social housing projects across 44 slums on the government land.

SA follows three core principles for sensitive planning: (1) the importance of a data driven process; (2) the importance of a holistic approach at the citywide level; and (3) the importance of an inclusive multi stakeholder approach. SA had prepared a spatial database for all 57 informal settlements in the city that was leveraged to identify the vulnerable settlements on government land in order to prioritise and focus resources for their redevelopment. The solutions for these settlements were developed through rapid design development

Keywords: Slum Upgradation, land tenure, institutional financing, Beneficiary- Led Individual House Construction/Enhancement (BLC), PMAY (U), urban poor

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“Shelter Associates intervened at the behest of the community with multi-stakeholders, for an inclusive approach that would ensure a balance of the top-down and bottom-up approach. Throughout the project all the stakeholders were involved in each step of the process, ensuring participation, feedback from all concerned parties.”

BACKGROUND

Shelter Associates (SA) had undertaken a research project within the Kolhapur Municipal Corporation(KMC) that aimed at leveraging a data driven, inclusive approach to develop holistic solutions for social housing. The research project aimed at providing a framework for implementing social housing projects across 44 slums on the government land.

The research project follows the core principles of (1) data driven approach (2) holistic citywide approach and (3) inclusive multi stakeholder approach towards planning. Furthermore, SA aimed to highlight the on-ground scenario for affordable housing and gauge the hurdles faced during implementation. The article highlights the findings from the research project that provides an insight to the top down approach of social housing projects resulting in lack of judicious utilisation of land and inclusivity of the urban poor.
and dialogue with concerned stakeholders such as potential beneficiaries, Pradhan Mantri Awas Yojana (PMAY) department and concerned Urban Local Body (ULB) officials. During data collection and iteration of solutions for the vulnerable settlements structured interviews were undertaken with PMAY officials, local authorities, developers, and beneficiaries to identify the current scenario for housing. It helped identify hurdles encountered during implementation and gave an insight to the top down approach towards affordable housing schemes that lacked an inclusive approach and judicious utilisation of land.

**METHODOLOGY FOR PROPOSING SOCIAL HOUSING SOLUTIONS**

SA's core principles advocate the preparation of a citywide database that can be leveraged to develop holistic solutions for the informal settlement. Slum level data is methodically collected, meticulously organised, and presented using a coordinating base map. This ensures that an accurate profile of the surveyed area, whether a city, a neighbourhood, or an individual slum, is generated. With an up-to-date and accurate profile valid theories of cause and effect can be composed where the cause would be the proposed intervention and the effect would be the desired outcome to provide security of tenure. A citywide database provides a detailed understanding of (1) Land Ownership (2) Dwelling Densities (3) Land Reservation (4) Land Rates (5) Tenable and Untenable Slums (6) Potential Extra Housing Stock. The information collated and analysed provides a holistic view of the city that can be leveraged for judicious planning of land use.

The inclusive approach for the project ensures that through (1) socio-economic surveys, (2) group discussions and dialogue with the community the aspirations of the urban poor and their expectations from a housing scheme are taken into consideration while proposing solutions. In order to gauge data on slum demographics such as family size, occupation, financial condition (such as income, expenditure, and loans), tenancy arrangement, plot ownership, proof of land ownership, willingness to participate in a housing programme family level data for all mapped dwellings was collected.

The different stakeholders involved were (1) the different departments within the ULB (including the TP department, slum rehabilitation department, and all land records departments) (2) the community. This approach established a level of familiarity with the concerned officials that proved imperative for smooth implementation stages of the project.

The information generated through data collection and surveys to identify vulnerable slums was leveraged, in order to propose solutions that ensure judicious use of land. The vulnerability matrix was prepared by placing settlements in rows and pre-decided parameters pertinent to vulnerability in columns. Within this matrix scores of 1 to 4 were awarded to each category for each settlement. The total of all the scores then provided a final vulnerability score. The score 1 indicated least vulnerability while the score 4 indicated highest vulnerability. The vulnerability matrix enabled the available resources to be focussed on the most vulnerable slums. Solutions are first proposed for the most vulnerable slums that ensure they are first considered for rehabilitation.

This stage included (1) understanding methods of
rehabilitation (2) carrying out rapid design development to propose solutions.

**FIVE WAYS IDENTIFIED FOR REDEVELOPMENT OF A SLUM**

1. **In-situ Rehabilitation:** In case of a tenable high density slum with no possibility of any extra housing stock the slum is considered for in-situ rehabilitation.

2. **Complete redevelopment:** as it ensures equitable distribution and judicious use of land to ensure holistic development.

3. **Part redevelopment:** However in cases where the slum cannot be completely rehabilitated due to multiple reasons such as issues with land ownership, land reservation, etc then part redevelopment has been proposed.

4. **Relocation to an open plot:** In the case of untenable slums, due to factors such as reservation, topographic challenges, etc., and without receiving pocket or any alternative plots reserved for slum rehabilitation, relocation can be proposed either on an open plot of land or nearby slums with extra housing stock proposed.

5. **Creating extra housing stock / relocation of untenable slums:** In cases where the dwelling density was lower then the slum has the potential to accommodate additional dwellings. Extra housing stock can be generated thus making the slums receiving pockets for other untenable slums.

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*Figure 1: Ways of Redevelopment*
The importance of the 2-2.5km distance for the relocation of untenable slums:

As observed from past experiences, residents have a mobility range wherein all required facilities were available within 2-2.5km be it their social requirements, places of worship, place of education, place of occupation or healthcare facilities. In order to ensure that the lifestyle will not be disrupted by relocating residents of vulnerable slums on untenable land to locations where their required facilities are not available, relocation strategies are limited to 2-2.5km.

Thus tenable slums within 2-2.5km of the vulnerable slums on untenable land were identified as potential receiving pockets and feasibility studies were conducted of each potential receiving pocket to determine maximum housing capacity. In instances where no tenable slums with extra house potential were within 2-2.5km, open plots were to be considered as potential receiving pockets for absorbing the untenable slums.

This information was presented on a citywide plan to enable housing relocation strategies to be formulated where the residents of vulnerable slums on untenable land are accommodated on tenable slums, within 2-2.5km, where proposed housing projects can be implemented. Rapid design development was a critical stage to ensure that the projects envisaged/ideas developed for probable solutions were viable. Once the slums that had potential for redevelopment were identified, it was necessary to undertake rapid design development to understand the exact extent of housing stock that can be accommodated.

Figure 2: Identifying 2km radius around vulnerable slums
SOLUTION 01: KAMGAR CHAWL : IN-SITU REHABILITATION:

Kamgar Chawl, a slum located in Administrative Ward 02, had a dwelling density of 431 dwelling units/hectare. The slum occupied an area that had inadequate infrastructure and the residents suffered from poor sanitation facilities, unhygienic living conditions, narrow roads, inadequate parking, etc. The slum was identified for in-situ holistic redevelopment that would ensure a well-planned mid-rise high density redevelopment.

SOLUTION 02: RELOCATING KANDALGAO TO TENABLE SLUM

According to the Development Plan (DP), Kandalgao had multiple reservations in different parts of the slum such as open space, public-semi public, road widening. As a result, the slum was completely untenable and would soon have to relocate to an alternative plot of land.

Process of proposing solutions for Kandalgao:

A 2km radius around Kandalgao was marked and slums within the area were noted. The dwelling densities and extra housing stock potential for each slum was noted. The slums that were potential receiving pockets were identified on the basis of parameters such as (1) Dwelling Densities and extra housing stock (2) reservation (3) on-ground complexities.

Development of Vare Vasahat as a receiving pocket to absorb Kandalgao:

Kandalgao a slum located in Administrative Ward 03, had a vulnerability index of 22. The slum was under P-SP, Open Space and road widening reservation. The slum being untenable, the residents would have to relocate in near future. Informal discussions were undertaken with a few community members.
while the socio-economic survey was taken and SA gleaned that people were aware of their predicament. They showed willingness to relocate to alternate plots of land. SA then followed the 2km approach to search for alternate tenable land areas. An approach that ensures resourceful utilisation of government land was advocated. As a result solutions were conceptualised such that existing low density tenable slums absorbed the untenable slums to create extra housing stock. Tenable slums with extra housing stock potential within the 2km from Kandalgao were identified.

**DESCRIPTION OF OPTION 01:**

The land area, dwelling density and location make Vare Vasahat an ideal scenario for complete redevelopment. Some salient features of the first option are

1. Mid-rise High density settlement (Stilt + 4)
Figure 5: Proposed Solution for Vare Vasahat

Option A: Stilt + 4
An Ideal Scenario for Redevelopment:
Housing Stock created: 432
Dwellings accommodated from Kandalgao: 182

with adequate space for parking.
2. Optimum utilisation of government land
3. Conforming to town planning rules and regulations
4. Design with adequate natural light and ventilation
5. Ensures that community spirits are forged

In order to have a deeper understanding of the on-ground condition to ensure that the solution proposed is viable, structured interviews of Town Planning Officials and local residents were undertaken.

In Vare Vasahat property cards have been issued to 25% dwellings that are scattered across the slum. The land was divided into State Government, Local Government. During the surveys SA came across instances wherein a few slum dwellers who resided in the locality since the times of Shahu Maharaj had been awarded property cards. As property cards were awarded to a few dwellings it had resulted in pockets of private ownership scattered throughout the slum. It was difficult to understand the exact number of slum dwellers that had been issued a property card, as the ULB did not hold aggregated data for each slum. In Vare Vasahat, residents have not participated in the PMAY due to the tedious process of seeking permissions, developing plots of land after following all town-planning norms.
The collated data on land ownership was used to develop alternative solutions for redevelopment.

**Option B:**
It is proposed that a layout consisting of G+1 row houses and Stilt + 4 construction. In this case the beneficiaries have been awarded a property card and are relocated to plots of land (as per area on the property card) after dividing the site in 2 parts as shown.

**Option C:**
The second option was developed in the event that the beneficiaries refuse to leave their current place of dwelling which has been awarded a property card. In such a scenario, leveraging on spatial mapping, data collected and the information received through surveys, SA identified the slum area that had no private ownership and marked the boundary. The rehabilitation proposed included the residents within the marked boundary and residents relocated Kandalgao settlement.

Along with a detailed understanding of land ownership, discussions were undertaken with beneficiaries who have taken part in a housing scheme and site visits of current housing schemes to understand the hurdles faced during implementation. The factors that highlighted the gap between beneficiary aspirations, needs and the resulting accommodation are

1. Following Town Planning rules and regulations:
Pockets of private land ownership were scattered across the city. As property cards had been allotted to only a few dwellings, construction as per town planning norms were followed by only those who had taken benefits from the scheme. Furthermore the setback

![Figure 6: Property Cards allotted in Vare Vasahat](image-url)
rules and regulations, resulted in built up spaces that were inadequate for adequate size of dwellings and resulted in front open spaces flanked by adjacent built up areas. It created a tethered road with adjacent nebulous open spaces that had no significant purpose. The reduced built-up areas resulted in a kutch-pucca transformation rather than a holistic development. The following was a case study of a beneficiary who has availed benefit from the PMAY under the BLC category. Due to lack of awareness around the TP rules to be followed, the residents have left a 15Ft setback instead of the required setback.
2. Lack of inclusivity of slum dwellers

Kolhapur had sanctioned 4887 houses under the 2 verticals of AHP and BLC of the Pradhan Mantri Awas Yojana since 2016. (3 PMAY_City_wise_for_web.pdf). In spite of the many housing schemes for the EWS, MIG, and LIG sections of the society most slum dwellers had not been able to participate in them. Case studies and interviews were conducted to understand on ground scenarios for (1) Projects in Affordable Housing in Partnership (AHP) vertical of PMAY (2) Beneficiary Led Construction (BLC) in PMAY

1. AHP projects visited were (1) Swapnapurti (2) Lokanagri

Swapnapurti proved to be more affordable as the price range was comparatively lower. Loknagari had a more varied mix of consumers as it accommodated affordable housing along with consumers from the open market thus blurring boundaries of economic differences. It was observed that in both affordable housing projects, beneficiaries from informal settlements were not able to avail benefits from the scheme due to lack of financial capabilities.

1. Interviews with beneficiaries who have taken part in Beneficiary Led Construction under PMAY

In order to gauge the process of availing benefits from

Figure 11: Loknagari

Figure 12: Analysis of findings from BLC interviews
The following gives a brief description of the findings from the site visits and interviews.

**Table 1: Comparative analysis of Swapnapurti and Lokanagari**

<table>
<thead>
<tr>
<th>Project</th>
<th>Swapnapurti</th>
<th>Loknagari</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal by</td>
<td>PMAY</td>
<td>Ramsina Group</td>
</tr>
<tr>
<td>Developers</td>
<td>Udayraj developers</td>
<td>Ramsina Group</td>
</tr>
<tr>
<td>Site Area</td>
<td>0.72 acre</td>
<td>1.5 acres</td>
</tr>
<tr>
<td>F.S.I</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Type</td>
<td>EWS + CLS</td>
<td>EWS + CLS + Open market</td>
</tr>
<tr>
<td>Flat Units</td>
<td>Total - 213 Dwellings</td>
<td>Total - 250 Dwellings</td>
</tr>
<tr>
<td></td>
<td>2BHK - 25</td>
<td>2BHK - 118</td>
</tr>
<tr>
<td></td>
<td>1BHK - 188</td>
<td>1BHK - 132</td>
</tr>
<tr>
<td></td>
<td>All dwellings allotted for PMAY</td>
<td>50% of the total dwellings allotted for PMAY</td>
</tr>
<tr>
<td></td>
<td>55% EWS (1BHK PMAY) : 118 Dwellings</td>
<td>2 BHK - 29 and 1BHK - 132.</td>
</tr>
<tr>
<td>Type of flats</td>
<td>1 BHK : 26 sqm (RERA carpet)</td>
<td>2BHK : 48.82sqm RERA carpet</td>
</tr>
<tr>
<td></td>
<td>2BHK : 50 sqm (RERA carpet)</td>
<td>1BHK : 29.32 sqm RERA carpet</td>
</tr>
<tr>
<td></td>
<td>* Note: After Unified bylaws, the proposal was</td>
<td></td>
</tr>
<tr>
<td></td>
<td>revised as per increased FSI, Height relaxation,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>setback relaxations and 6th floor was added. 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BHK was converted to 2 BHK as there was existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>demand for 2BHK.</td>
<td></td>
</tr>
<tr>
<td>Amenities</td>
<td>4 lifts with backup</td>
<td>6 lifts, 2 floor parking</td>
</tr>
<tr>
<td></td>
<td>Amenities: Parking - 2 Levels</td>
<td>Amenities: Play Area, Garden, Open library</td>
</tr>
<tr>
<td>Access and Location</td>
<td>Not well connected by public transport. Facilities not at a very walkable distance</td>
<td>Very well connected with public transport. All kinds of facilities are present within 1 Km.</td>
</tr>
<tr>
<td>Rate</td>
<td>₹ 16 lakhs</td>
<td>₹ 19.6 lakhs</td>
</tr>
<tr>
<td></td>
<td>(Extra 1.5 lakhs to be paid for 4 wheeler parking)</td>
<td></td>
</tr>
<tr>
<td>Case Study Details</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Commencement year</td>
<td>2019</td>
<td></td>
</tr>
<tr>
<td>Possession year</td>
<td>June 2022</td>
<td></td>
</tr>
<tr>
<td>Subsidy received</td>
<td>No subsidy received till date</td>
<td></td>
</tr>
<tr>
<td>Construction till date</td>
<td>6 floors</td>
<td></td>
</tr>
<tr>
<td>Customer type</td>
<td>Daily wage earners with an income range 10,000 – 12,000. Only 2 slum dwellers have availed of the scheme</td>
<td></td>
</tr>
<tr>
<td>Number of PMAY flats sold till 26/08/2021</td>
<td>95 out of 213</td>
<td></td>
</tr>
</tbody>
</table>

BLC and Ramai, structured interviews were conducted with beneficiaries residing in Ambedkar Nagar and Awachit Nagar. The interviews gave an insight on implementation, financial condition, subsidy received, plot area and ownership, ongoing stages of construction, time taken for completion of the project, delays etc.

In Ambedkar Nagar, a majority of the families had taken part in the scheme in the year 2014 (44%), and the rest in the years 2015, 2016, 2017. It was observed that beneficiaries who had enrolled in the year 2018 or later had not received the last instalment.

Through interviews with residents of Ambedkar Nagar, it was revealed that 75% dwellings had been issued property cards for the pre-allotted plots of land. From the total population, 9.9% people had taken part in the RAMAI Awas Yojana and 2.32% from PMAY. People had constructed permanent dwellings by taking benefits from the above schemes and loans from national banks or micro-finance institutions.

A survey of 8 beneficiaries who have taken benefits from the PMAY scheme was undertaken and analysed on the basis of factors such as setbacks followed, whether construction was as per approved layout, amount of subsidy received and remaining, etc,

**Inferences:**

From the structured interviews, site visits and discussions with concerned officials, the following issues have been inferred:

1. **Loss of judicious use of land due to scattered land ownership:**

   Land Ownership policies: Due to the haphazard issue of property cards it was observed that land occupied by settlements like Vare Vasahat and Ambedkar Nagar had resulted in sub-optimum use of government land sharing.

   Inadequate data: The data held by ULB had discrepancies in the land ownership, land demarcation and property cards issued. Furthermore the plot area as occupied by the residents did not conform to the property cards issued. This has resulted in loss of opportunity for taking informed decisions for
complete redevelopment.

2. Issues due to lack of holistic development:

Beneficiaries who had been awarded a property card had to follow all concerned governing norms for constructing a permanent structure. The small percent of residents who had been awarded a property card developed the plots as per the town planning norms which has resulted in a kutcha-pucca transformation rather than complete redevelopment.

Living Conditions:
Irrespective of land ownership all plots have a common access lane, road side entrance, and even a common wall built during construction of the house. The residents lived in similar infrastructural facilities and common amenities and there had been little difference in the living conditions of the residents.

3. Issues with financial disbursement

The process of land transfer being tedious and lengthy, many residents were unable to comply with all terms and conditions for ensuring the transfer of land rights. Many were unable to pay all previous dues or were unable to take necessary follow-ups with the governing officials. Furthermore, in the opinion of many residents, taking part in a ‘Awas Yojana’ is lengthy and time consuming. They face many hurdles in securing the required permissions and getting a plan approved from the Town Planning department. (under BLC). Furthermore there have been tremendous delays under BLC - PMAY. Many residents have received instalments of inconsistent amounts, while others have not received any subsidy.

4. Lack of an inclusive planning approach:

The ongoing Affordable Housing in Partnership (AHP) projects in the city have a top-down approach of development where the projects have been developed at the edge of the city, away from the reach of slum dwellers. The large gap between financial capabilities and the selling costs shows the top-down, non inclusive design approach thus leaving the urban poor out of the affordable housing market.

The inferences from the research project highlight the need for SA’s citywide approach to social housing that leverages on the data collected to propose holistic solutions for the urban poor. The benefits of an inclusive approach to social housing is described through the case study of Bondre Nagar.

Introduction to Bondre Nagar:

In 2015, Shelter Associates undertook a One Home One Toilet initiative to facilitate home toilets to slum residents on a cost sharing basis. During the implementation of the initiative in Bondre Nagar a good rapport was established with the families through mobilisation and awareness activities. In 2016, a pilot project of slum rehabilitation was proposed for Bondre Nagar in Kolhapur by the ULB under the Pradhan Mantri Awas Yojana (PMAY). It proposed generation of extra housing stock to become the saleable component of the project by relocating residents to multi-storeyed high-rise construction. The design was developed with a top-down approach wherein the requirements, and aspirations of people were not taken into consideration. Most families in Bondre Nagar were farm labourers who were uncomfortable living in a high-rise building and the community rejected the proposal.
Shelter Associates intervened at the behest of the community with a multi-stakeholder, for an inclusive approach that would ensure a balance of the top-down and bottom-up approach. Throughout the project all the stakeholders were involved in each step of the process, ensuring participation, feedback from the all concerned parties. This project set an example of sanitation delivery that catalysed social housing facilitation due to the foundation of spatial data. Along with it, socio-economic surveys and mobilisation activities undertaken gave a clarity of the on-ground reality and have thus driven decisions, benefiting all stakeholders.

Undertaking various mobilisation activities, the community was engaged in an inclusive process of designing. From taking door-to-door discussions to engaging the residents in a to-scale mock-up plan, SA has given a clear understanding of the space and its functionality. SA has incorporated people’s requirements in the design at every stage of development. The people have actively participated in the design process and made collective decisions for the good of the community. The low-rise, high-density form consists of G+1 structures planned so as to provide a central courtyard, adequate light and ventilation and has the approval of all concerned stakeholders.

Design as proposed by the PMAY

The design by the ULB was developed without undertaking an official Mojani. When SA applied for a Mojani to mark the exact boundary of the plot, the new boundary showed that the plot area had reduced due to road widening and the plot had shrunk further as some houses were beyond the plot boundary on private land. It enforced the need for complete redevelopment that would conform to town planning regulations.

People’s efforts:
The project has been unique in the proactiveness shown

Figure 13: Proposed plan by PMAY

Figure 14: Reduced plot area and dwellings affected

Design proposal

Figure 15: Proposed site plan

Figure 16: Cluster plan by PMAY
by people of Bondre Nagar. The people have formed a co-operative society and shown readiness to take a loan. They have taken responsibility for their transit accommodation.

Way forward:
In September 2021 the Project proposal was submitted to the State government for approvals and after continuous efforts, an important milestone of land transfer in the name of the beneficiaries has been achieved. Once approvals from the State and Central government are secured the construction of the project will commence. The Bondre Nagar slum rehabilitation project is on track to become a precedent for other rehabilitation projects. It has the potential to give an impetus to the citywide action plan and transform the lives of the urban poor for the better. The vulnerable settlements identified through the research project can leverage the learnings from Bondre Nagar.

CONCLUSION
The current housing scenario highlights the existing condition and implications of the identified issues that are detrimental to holistic development for the urban poor. It enforces the need for citywide approach to social housing that leverages on the data collected to propose holistic solutions for the urban poor. The article provides a detailed on-ground scenario for affordable housing in the city of Kolhapur and highlights the issues (1) Loss of judicious use of land (2) Issues due to lack of holistic development (3) Lack of an inclusive planning approach. The lack of comprehensive data available with the ULB makes it difficult to take a holistic view of the entire urban area. This can lead to piecemeal slum rehabilitation projects which represent a suboptimal use of the limited resources, such as tenable land, and fail to leverage an economy of scale. It can also lead to hesitancy by the ULB in undertaking slum redevelopment projects due to complexities and conflicts that may arise during planning. The top-down and non-inclusive approach implemented is ineffective and slum rehabilitation projects are often conceived from a remote position without any understanding of the context within which they are situated.

SA advocates a balance of the top-down and the bottom-up approach; facilitators of slum rehabilitation projects should be working at all scales concurrently to adopt an informed and neutral position. Informed decisions based on the principles of (1) data driven (2) inclusive approach (3) holistic development facilitate impactful projects where the interests of the stakeholders have been balanced.

The citywide approach will ensure optimum utilisation of government land and an inclusive planning approach beneficial for all concerned stakeholders. The proposed solutions have the potential to be replicated in similar 2-tier and 3-tier cities willing to implement social housing programs.

REFERENCES
(368-kolhapur.html) : Census data for land area and population
https://shelter-associates.org : Shelter Associates Website presenting spatial data at citywide level
HOUSING SOLUTIONS FOR LOW INCOME SETTLEMENTS
CASE OF UNAUTHORIZED COLONIES IN DELHI

DR. RUCHITA GUPTA
MS. ANWESHA CHANDRA

"Due to lack of resources and technical know-how, the dwellings that are constructed are unsafe. Government of the local body should set-up Housing Dispensaries at a certain population level. Such dispensaries will provide technical knowhow about construction practices, masonry etc. and would also have plumbers, electricians, structural engineers and architects for helping the residents."

Key-words: Low income settlements, Unauthorized colonies, Housing typologies, construction techniques, building materials

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The term low income settlements broadly refers to all kind of settlements which lack basic amenities and infrastructure to support its inhabitants and are marked by low or no security of tenure and unhealthy living conditions. The paper provides an overview of the evolution of unauthorized settlements and policy timelines that have impacted the living and housing conditions of the residents in Delhi. Through undertaking a study in four unauthorized colonies spread across North, South, East and West of Delhi, this paper focuses on analyzing these colonies at the settlement and the household level to identify the issues that plague the residents and highlights the heterogeneity and resourcefulness exhibited by them in their daily survival. It provides possible solutions that can be adopted to improve the current scenario.

INTRODUCTION

Countries across the world are experiencing rapid urbanization with about 55.3 percent of the population (or 4.1 billion people) living in urban areas at present. By 2050, it is projected that 68 percent or about two-thirds of the world’s population will be living in urban areas (United Nations, 2019). It has also been observed that in the recent decades the pace of urbanization has been faster in developing countries, especially in the Asian and African countries as compared to those in the developed world.

With a vision towards sustainable development, cities are working towards managing their urban growth to be in tandem with the Sustainable Development Goals, especially SDG-11 which aims at making cities and human settlements more inclusive, safe, resilient and sustainable. However there are challenging urban issues that accompany urbanization like inequality, climate change, informality, insecurity, and the unsustainable forms of urban expansion (UN Habitat, 2016). One of the major issues among these is the increased residency in slums and informal settlements. An estimated 25 percent of the world’s urban population live in informal
settlements, with 213 million informal settlement residents being added to the global population since 1990 (Avis, 2016). The extent of irregular housing varies from country to country, comprising 20 to 80 percent of urban growth and affecting 15 to 70 percent of the urban population of developing countries. Such problems are more acute in the larger metropolitan areas (Durand-Lasserve and Clerc, 1996).

India is one of the fastest growing economies in Asia with an urbanisation rate of about 31.2 percent as per the 2011 census. However, due to lack of access to decent and affordable housing one in every six urban Indian lives in slums and they constitute around 17.4 percent of total urban population of the country (National Building Organization, 2015).

Delhi, being the capital city and the second largest urban agglomeration after Mumbai, attracts millions of migrants everyday who come in search of job and better livelihood. The population of Delhi has grown exponentially in the past decades far outstripping the infrastructure and housing that the city can provide. Its urban population has registered a sharp increase from 2.36 million in 1961 to 16.33 million in 2011, growing at an average annual rate of 3.95 per cent. The level of urbanisation increased from 88.72 per cent to 97.50 per cent during this period. As per 2011 census Delhi’s population grew by about 21.20 percent over a period of ten years from 2001-2011. Today Delhi’s population stands at 19 million spread over an area of 1483 sq. km. However the city has failed to provide decent, affordable and legal housing to this vast populace.

The Delhi Development Authority (DDA) established in 1957 was in charge of the city’s development as a whole including provision of public housing at an affordable rate but it has not been able to meet the rising demand for affordable housing. Since 1969, the DDA has constructed 413,883 flats, building an average of 8,622 flats per year. The number of houses built by it in the last 48 years is a little more than the number of people added to Delhi’s population each year (Gupta, 2017). In contrast, Delhi’s population has increased by 1.56 crore with an average annual rate of 3.26 lakh people in the same period. Hence, lack of adequate developed land at affordable prices to different categories of residents and continuous in-flow of migrants over the years have resulted in the emergence of unplanned/informal settlements in the city which are in complete defiance of planning regulations and legislations. The Informal settlements (or unauthorised colonies) are residential areas where the inhabitants often have no security of tenure, neighbourhoods usually lack basic services and infrastructure, and the housing may not comply with the existing planning and building regulations, and are mostly located in geographically and environmentally sensitive areas (UN Habitat, 2015).

UNDERSTANDING THE SETTLEMENT AND ITS MAGNITUDE

The Delhi Urban Shelter Improvement Board (DUSIB) recognizes unauthorized Colonies as one of the several informal/unplanned settlements in Delhi as evident from Table 1. About one-third of Delhi lives in sub-standard housing, which includes 695 slums and JJ Clusters, 1797 unauthorised colonies, old dilapidated areas and 362 villages (Economic Survey of Delhi 2021-22). These areas often lack safe, adequate housing and basic services and infrastructure. According to the projections of Master Plan of Delhi-2021 (MPD-2021), Delhi needs 24 lakh new housing units by the year 2021. Of these, 54 percent are required for the economically weaker sections (EWS) and lower income groups (LIG).
DDA defines unauthorized colonies as developments that comprise contiguous areas where no permission from the concerned agency has been obtained for approval of layout plan/building plan (The Gazette of India Extraordinary Part II Section-1 Sub section 2b, 2019). Unauthorized colonies consist of illegally sub-divided plots, non-conforming land use and development control rules and unapproved building bye-laws. The land may be privately owned, or under notification for expropriation by the government, or urban fringe agricultural land or common land of a village engulfed by city growth (Banerjee, 2002). It is estimated that around 40 lakh people or 25 percent of Delhi’s population reside in unauthorized colonies.

The genesis of unauthorized colonies in Delhi can be traced back to the pre-independence era when private players started sub-dividing tracts of land on the East bank of river Yamuna to re-sell to lower income groups. Even before the first Master Plan of Delhi which came in 1962 there were 110 unauthorized colonies, housing around 2 lakh people and accounted for about 9 percent of the city’s population. A fourth of these colonies were located in East Delhi (Gupta, 1992; Dupont, 2005).

In 1956 there were 110 unauthorized colonies and with time their numbers increased. During 1960s the colonies started to grow on available agricultural land around urban villages and ‘lal dora’ areas as extensions or around the city periphery into

### Table 1: Distribution of Unplanned Dwelling Units and Population in Delhi

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhuggi Jhompri Basti (JJ Basti)</td>
<td>775 JJ Basti Population 17 lakh</td>
<td>Encroached on public land (State government: 30% Central Government 70%).</td>
</tr>
<tr>
<td>Resettlement Colonies</td>
<td>Colonies 82 (45+37) Plots 267,859 Population not specified</td>
<td>Incorporated within the expanded city with good shelter consolidation without adequate services</td>
</tr>
<tr>
<td>Unauthorised Colonies</td>
<td>Colonies 1797 Population about 40 lakh</td>
<td>Illegal colonies in violation of Master Plans, no clear land title</td>
</tr>
<tr>
<td>Notified Slum Areas (Katras)</td>
<td>Katras 2,423 Population 20 lakh</td>
<td>Notified under Slum Areas (Improvement and Clearance) Act, 1956. Residents are staying on a perpetual license basis.</td>
</tr>
<tr>
<td>Urban Village</td>
<td>Urban Village 135 (227 rural villages not yet notified as urban) Population not specified</td>
<td>Notified under Delhi Municipal Corporation Act, 1957</td>
</tr>
<tr>
<td>Homeless and Pavement Dwellers</td>
<td>16,000 persons</td>
<td>-</td>
</tr>
</tbody>
</table>

*Source: Economic Survey of Delhi 2021-22*
the rural hinterland. Some of the colonies were located close to the refugee resettlements, taking advantage of existing infrastructure and lax government control over land on humanitarian grounds, while others were located along major access routes, for easier commuting to workplaces (Dupont, 2005). In 1961 the government introduced a scheme for large scale acquisition and development of land in Delhi of around 30,000 acres. However due to slow and lengthy process only 10,000 acres could be developed by 1978. Moreover, there was a huge shortage of housing especially for the lower income group. Inadequacy in land development coupled with shortage of housing units aggravated the proliferation of unauthorized colonies on agricultural land where the land prices were low to begin with. Since major chunks of land were notified for acquisition by DDA, to evade lengthy procedures of land acquisition and coping with inadequate compensation, it was more profitable to subdivide plots and transfer the land notified for acquisition on General Power of Attorney to prospective buyers looking for affordable shelter. In order to ban such practices, the Delhi Lands (Restrictions on Transfer) Act was enforced in June 1972 (Dupont, 2005). Yet, transfers of notified land continued through other arrangements such as gifting away the plot (Banerjee, 1994).

In most cases the ‘colonizers’ were the developers and property dealers who would buy agricultural land from local farmers. They would then subdivide it and sell the smaller plots at cheaper rates to new buyers. The new buyers would make temporary makeshift structures to occupy the land. Meanwhile road networks and boundary walls were built by the developer and illegal electricity was also arranged for. Overtime the colony got improvised. Sewers and drains were mostly non-existent and by the time city officials become aware of the existence of such a colony, it acted as a thriving sub system with families living and going about their daily lives. Eviction no longer remained an option under humanitarian grounds and gradually the colony got regularized. Figure 1 shows the growth of unauthorised colonies in Delhi over the years.

In 2008 based on Government of NCT of Delhi’s directive of ‘Regulation for Regularization of Unauthorized colonies’, 1639 colonies applied for regularization based on certain parameters and cut off dates, out of which 1218 colonies received “Provisional Regularisation Certificates” (PRCs). Further, in September 2012, a GNCTD order found 895 of them to be eligible for regularization of which 312 colonies that were on private land were considered to be de facto regularized whereas the remaining 583 colonies that were partly or wholly on public land would be regularised after the cost of land on which they stood had been recovered by the Delhi Government (Sheikh and Banda, 2014).

Figure 1: Growth of Unauthorized colonies in Delhi

Some of the generic characteristics of these settlements include incremental nature of housing, with limited access to infrastructure facilities like water supply, sewer and electricity distribution. The plots have 100 percent ground coverage and built from all sides with the exception of the front/access road which is the only means of light and ventilation. The settlements are characterised by a narrow network of roads whose width varies between 5m (that serve as thoroughfare through the colony) to 2m (that serve as access to residences) which are shaded by balcony or bathroom projections that extend beyond the building line.

Unauthorized colonies are different from its other unplanned counterparts in terms of legality in the sense that the transfer of land/property takes place under General Power of Attorney (GPA) which, though quasi legal, is neither recognized as a legal document in the transfer of immovable property nor does it serve as a proof of ownership. Transfer of property is not registered by the Sub-Registrar due to the ambiguity over ownership and misuse of agricultural land. This implies that the buyers of such properties are not eligible to avail loans from the financial institutions and have to either depend on their own resources or borrow from their social network or private moneylenders.

**OBSERVING FOUR UNAUTHORIZED COLONIES IN DELHI**

A study was undertaken to understand the evolution of such illegal colonies to decode the underlying historic, cultural and physical patterns and explore the incremental nature of housing which is a reflection of their changing needs and ever changing family sizes. The study also focuses on the health effects due to the lack of light and ventilation, dampness and termite infestation and the level of infrastructure provision in these colonies through four case studies in Delhi. The study was part of a research project funded by the Design Innovation Centre (DIC), School of Planning and Architecture, Delhi which aimed at developing innovative housing solutions for low income settlements. The four colonies described in this paper were chosen from 312 unauthorised colonies that are on private land and were de facto regularised in 2012. Distribution of the 312 unauthorised colonies on private land across Delhi show a higher concentration in the western part (Table 2) due to the presence of large number of factories and migrant workers inhabiting that part of the city.

**Table 2: Distribution of unauthorized colonies on private land in Delhi**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of unauthorized colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>11</td>
</tr>
<tr>
<td>North-East</td>
<td>41</td>
</tr>
<tr>
<td>North-West</td>
<td>22</td>
</tr>
<tr>
<td>South</td>
<td>41</td>
</tr>
<tr>
<td>South-West</td>
<td>51</td>
</tr>
<tr>
<td>East</td>
<td>9</td>
</tr>
<tr>
<td>West</td>
<td>137</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
</tr>
</tbody>
</table>

Source: Unauthorized colonies cell, GNCTD

The four selected colonies were (1) I.G. Camp, Vikaspuri (West Delhi); (2) Nai Basti, Okhla (South Delhi); (3) Rajbir Colony, Gharoli (East Delhi); and (4) Chandan Vihar, Burari (North Delhi). Their locations are marked in Figure 2.

**Figure 2: Location of selected colonies**

Note: 1) IG Camp (West Delhi), 2) Nai Basti (South Delhi) 3) Rajbir Colony (East Delhi), 4) Chandan Vihar (North Delhi).
Detailed surveys on the housing conditions, interviews with the residents, local pradhan and RWA heads were carried out along with qualitative observations and morphological analysis to arrive at distinctions and general patterns that emerge out of all the case studies.

I.G. Camp, Vikaspuri – West Delhi: I.G. Camp is spread over 9 acres along a dried up storm water drain (Sukhi Nahar/Nalah) which is used for dumping waste (Figure 3). Its origin can be traced back to 1990s when people working in the nearby industries settled here. The colony is a modest and impoverished settlement with a little over 3000 residents. Most of residents either work as construction labourers and in factories in the nearby areas or are employed in homebased enterprises with monthly salaries/incomes ranging between Rs.5000-8000. Although the colony was provisionally regularised in 2012 and waterlines were laid in 2018 but piped water is not available and the residents use ground-water through privately installed bore-wells. The settlement has no sewer lines and paved roads.

![Figure 3: Layout of I.G. Camp](image)

Source: Author

![Figure 4: Living Conditions in I.G. Camp](image)
The settlement is characterized by predominantly two-storeyed self-built dwellings packed together on tiny plots of 25-30 sq yards (20-25 sqm) with only 7-10 per cent plots reaching up to 42sqm (50 gaj) in size. Access to the settlement is restricted to either by foot or two-wheeler due to the absence of paved roads. The approach road is lined with factory godowns, redundant/locked-up store-houses, wilderness and garbage. Due to poor accessibility and lack of street lighting, women don’t venture out in the evening.

Nai Basti, Okhla – South Delhi: This 7.5 acre settlement is situated in one of the thriving areas of South Delhi along the Kalindi Kunj road (Figure 6) and has good connectivity resulting in a high density fabric with four-storeyed builder floor apartments and high property prices. The settlement illegally occupies recreational (City/ District Park/ Community Park) land use as per the Zonal Development Plan, Zone F of MPD, 2021. Its origin can be traced back to 1978 with only 558 plots which have now grown to 2500 with poor infrastructure like lack of sewer connection, open drains and sand contaminated bore well water which makes the residents dependent on bottled water. Majority of the residents are employed in private sector while some have their own business/shops.

The typical 41.5 sq.m. and 166 sq.m. unit floor plans shown in Figure 7 depict the use of shaft for light and ventilation. For larger plot sizes of 166 sq.m. the plot depth varies between 17 and 20m allowing front and back access to light and ventilation.

Rajbir Colony, Gharoli – East Delhi: It is located opposite Ghazipur land fill site along
the Ghazipur drain (Figure 8). The only mode of public conveyance is e-rickshaws. The colony came into existence in 1976 when a coloniser bought land from the farmers and sold plots of 41-83 sq.m. (50-100 Gaj) at low prices (Rs.150/Gaj; currently the same plots fetch Rs.25000/Gaj). People of different income categories like from labourers, auto-rickshaw drivers, and businessmen reside in this colony.

The settlement consists of G+2 and G+4 structures. The plots are mostly of 41 sq.m and 83 sq.m. However, 10-15 percent of the plots are smaller (around 21 sq.m.) which could be due to subdivision of larger plots. Figure 9 depicts a typical G+4 structure.

The smell from the Ghazipur landfill site prevents new migrants from settling here resulting in low rentals (Rs.2000-5000 per month). Although the sewer network was laid in 2001, it is non-functional and the residents depend on septic tanks. Water supply from Delhi Jal Board is intermittent with water availability limited to 2-3 hours in the morning and evening. Proximity to the landfill site have an adverse effect on the health of residents.

Chandan Vihar, Burari – North Delhi: Chandan Vihar is a 34 acre settlement located in north Delhi (Figure 10). The colony evolved in 1999 when
agricultural plots were subdivided by colonisers into plots ranging between 41-83 sq.m. (or 50-100 sq yard) and were sold at Rs.1000/Gaj. More than 70 percent of the structures are three storeyed with upper floors rented out. Due to its proximity to Delhi University it caters to students as a cheap residential option. The thriving rental market has encouraged construction activities while the women run a thriving business supplying meals to the students.

The settlement lies in the silty, clay and sandy loam soil region due to which structures built during the 1990’s have sunk 2-3 feet into the ground. Often road construction/paving activities results in buildings to sink further. In order to prevent flooding, the residents have either filled their ground floor or constructed retaining walls up to the level of the road. Sewer lines were constructed by the residents from their own resources. Source of water is groundwater which is extracted through borewells and the water quality is usually brackish and contaminated due to poor quality of sewer lines.

GENERAL CHARACTERISTICS

Although the surveyed settlements have a diverse character, there are commonalities between them in terms of the housing pattern, typology and infrastructure. A comparative picture of the surveyed settlements is presented in Table 3.

Plot Sizes & Housing Typology: Most plot sizes range between 41-83 sq.m. The larger plots generally undergo subdivision either due to division in the family or if the owner decides to sell a portion of the plot. The variations in plot sizes (width x depth) observed in the surveyed settlements is shown in table 4. The most common plot dimensions pertain to variation B.
Table 4: Variation in plot sizes as observed in the surveyed settlements

<table>
<thead>
<tr>
<th>PLOT SIZES</th>
<th>25 sqm (30 Gaj)</th>
<th>41 sqm (50gaj)</th>
<th>62 sqm (75 Gaj)</th>
<th>83 sqm (100Gaj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation-A (dimension in feet)</td>
<td>10’x27’</td>
<td>12’x36’</td>
<td>16’x41’</td>
<td>25’x36’</td>
</tr>
<tr>
<td>Variation-B (dimension in feet)</td>
<td>12’x21’</td>
<td>15’x30’</td>
<td>20’x33’</td>
<td>27’x32’</td>
</tr>
<tr>
<td>Variation-C (dimension in feet)</td>
<td>14’x18’</td>
<td>20’x22</td>
<td>23’x29</td>
<td>30’x30’</td>
</tr>
</tbody>
</table>

Source: Author

In the absence of setbacks and full ground coverage the only source of ventilation and light is from the front façade in the smaller plots (25 sqm) (Figure 11). In the bigger plots (41 sqm and above) the ventilation is also through a small shaft (2ft x 2ft) (Figure 7) but no natural light permeates through it.

House Design & Density: A typical plot of 25 sqm with two rooms usually caters to a family of 7-8 people. The bedrooms are pushed to the back of the plot which receives neither light nor ventilation while the front part is used as entrance and also has a separate staircase to access upper floors, especially if these are rented out. On the upper floors the toilets are constructed on the balcony projecting over the ground floor overlooking the road due to the convenience of connecting to the water line that runs along the abutting road. Kitchens are stacked with big utensils/drums to store water due to inadequate water supply. Houses are dark and cramped, yet the residents display a proud sense of ownership.

Construction Technique & Building Material: Houses on smaller plots (25 sqm) are mostly self-built G+2 structures. Originally a single unit with bedroom, living-space and kitchen is expanded vertically with the growing needs of the family. The external walls are 10” thick (225mm) and are often left un-plastered. The 5” (125mm) thick internal walls are supported by girder beams which in turn
support the filler slab for the upper floors. However, houses on bigger plots (41 sqm and above) are usually constructed as builder floors with column-beam structures on raft foundation. Absence of setbacks results in outer walls that are twice as thick as what is necessary to bear the load. These structures can at best be described as matchboxes stacked together that support each other structurally.

**Access to Upper Floors:** The upper floors are accessed through a staircase which is usually in the front of the building (Figure 12). In some cases the upper floor is accessed through a brick staircase placed in the middle segment of the plot that terminates into a masonry enclosure. The kitchen is generally tucked under the staircase to optimize space usage. Light weight rooftop rooms on the upper floors are often accessed via ladder in cases where a masonry roof does not exist. The steep staircases are very narrow (around 2 feet) and marked by high risers (250-300mm) without safety measure like railings.

**Social Space & Roads:** There are no community and social spaces like parks for children and the elderly. Children play on the streets while women gather around the entrance of houses to interact with each other (Figure 13). While the men gather under a tree or a chowk (square).

Three out of four colonies surveyed followed a hierarchy of sorts where major roads running through the settlement are 6m wide for thorough-fare. The access lanes leading up to the dwellings are 3-4m wide. In some areas there was a 1-1.5m wide back-lane that allowed the houses to have a rear window and possibility of natural light in the rear rooms.

**Water & Sanitation:** In the surveyed settlement the water pipelines were either laid by the government or by residents themselves. But due regular water supply residents had to depend on groundwater (bore-wells) or tankers.

In the absence of sewer lines, residents have to construct a septic tank/cess pit which are to be cleaned by honey-suckers regularly (3-4 years) and the liquid waste often overflows into the drains. As these cess-pits are not properly constructed they are a source of ground-water contamination. Open drains used for dumping garbage are a common phenomenon observed across the surveyed settlement.

**WAY FORWARD**
Poor housing conditions like lack of natural light and ventilation and dampness, cramped and dark living spaces, inadequate water availability, and unhygienic living conditions have an inadvertent adverse effect on the health of the residents.

High Density and large sized
families cramped in small space leads to violation of space per person and make it impossible to design as per everyone’s needs. Unwillingness to part with their land often rules out the solution of redevelopment on a land sharing model which otherwise would have proved beneficial with better standards of living and also an optimal solution to the problem. We have explored possible options that allows better access to sunlight in the dwellings. Some of these are:

- **Light collection Units:** It was observed that to allow entry of light and ventilation in the dwellings a shaft is used for rooms and bathrooms that are positioned towards the backside of the house. A number of case studies were examined and experiments were conducted in the studio using a 1:20 scale model of G+4 structure with a shaft size of 1.8mx1.2m and coated with different reflective materials to study the intensity of light that reaches each floor on the principle of total internal reflection. A significant increase in lux levels was noticed with the use of materials such as mirror, reflective paints and aluminium sheets on the shaft walls. Computer simulations, shaft profile, winter and summer sun, shading devices and building orientation were also examined for the optimal efficiency. The highest level of light intensity was observed using mirror followed by aluminium and reflective paints. It can be suggested that such innovative treatment of the shaft wall can lead to higher intensity of light access and better utilization of light wells.

- **Cluster level light wells:** We propose a cluster model wherein the shafts can be taken to the back/rear side of the dwelling as shown in Figure 14. This way each plot would have to leave a space for shaft of 1m x 2m size at the rear end of their plot as a setback and use the rest of the space as area for services. If four plots leave such setback there would be a common shaft which is 2m in width and 4m in length and will allow ample amount of light to enter the dwellings from the backside. Moreover this open space can also be used as a common courtyard and a community space that can be maintained collectively by residents. Such a model can be implemented through enforcing certain set of rules especially formulated for the unauthorized colonies to ensure minimum standard of living.

Further, there is also a need for a ‘Housing Manual’ that can include lessons from experts on masonry details, ventilators, wall thickness, good construction practices, joinery details and other architectural solutions that...
can be beneficial to residents in such settlements. Such manuals should be made easily accessible to everyone.

**Housing Dispensaries:**
Due to lack of resources and technical know-how, the dwellings that are constructed are unsafe. Government of the local body should set-up Housing Dispensaries at a certain population level. Such dispensaries will provide technical knowhow about construction practices, masonry etc. and would also have plumbers, electricians, structural engineers and architects for helping the residents. These dispensaries should be mandated as facilities for certain number of population in the planning standards.

**REFERENCES**

Delhi Development Authority (2012), Regulations and Regularizations of Unauthorized colonies in Delhi, June.


Gupta, Ruchita (2017), “Transformation of Housing Typologies in organic and
Unplanned Settlements” Shelter, 18(2).


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**CITYNET Training Programme on “Sustainable Infrastructure Development and Management”, 12th -13th January, 2022**

CITYNET is the largest association of urban stakeholders committed to sustainable development in the Asia Pacific region and HUDCO is the lead Institution for CITYNET India National Chapter. In this regard, HUDCO’s HSMI conducted CITYNET Training Programme on “Sustainable Infrastructure Development and Management” from 12th to 13th January, 2022, in which 37 participants from Urban Local Bodies, Housing Boards and Development Authorities of various states attended the programme. The programme was inaugurated by Dr. D Subrahmanyam, Sr. Executive Director and Shri Surendra Singhai, General Manager(Projects), HUDCO’s HSMI. The programme was coordinated by Dr. Sukanya Ghosh, General Manager(Projects) and Senior Fellow, HUDCO’s HSMI.

Through this training programme, participants were provided with a sound understanding of concepts and issues of urban infrastructural services, within the framework of Sustainable Development Goals, New Urban Agenda and shared some best practices and innovative ideas. Mr. D. Guhan, Director Finance, HUDCO was the chief guest in the valedictory session and addressed the participants in the presence of Dr. D Subrahmanyam, Sr. Executive Director and Shri Surendra Singhai, General Manager(Projects), HUDCO’s HSMI.

The programme was inaugurated by Dr. D Subrahmanyam, Sr. Executive Director, HUDCO’s HSMI. The programme was coordinated by Dr. Sukanya Ghosh, General Manager(Projects) and Senior Fellow, HUDCO’s HSMI.
PRADHAN MANTRI AWAS YOJANA (PMAY)-URBAN: GLIMPSES OF PROGRAMMES & PROGRESS

“In situ” Slum Redevelopment
- Using land as a resource
- With private participation
- Extra FSI/TDR/FAR if required to make projects financially viable

Affordable Housing through Credit Linked Subsidy
A. Interest subsidy for EWS and LIG:
- EWS: Annual Household Income up to Rs.3,00,000 and house sizes upto 30 sq.m.
- LIG: Annual Household Income from Rs.3,00,001 to Rs.6,00,000 and house sizes upto 60 sq.m.
B. Interest subsidy for MIG:
- MIG I: Annual Household Income from Rs.6,00,001 to Rs.12,00,000 and house sizes upto 150 sq.m.
- MIG II: Annual Household Income from Rs.12,00,001 and 18,00,000 and house sizes upto 200 sq.m.

Affordable Housing in Partnership
- With private sector or public sector including Parastatal agencies
- Central Assistance per EWS house in affordable housing projects where 35% of constructed houses are for EWS category

Subsidy for Beneficiary-Led Individual house Construction or Enhancement
- For individuals of EWS category requiring individual house
- State to prepare a separate project for such beneficiaries
- No isolated/splintered beneficiary to be covered

GLOBAL HOUSING TECHNOLOGY CHALLENGE INDIA
### Overall Sanctions for 1.23 crore Houses

<table>
<thead>
<tr>
<th></th>
<th>Demand</th>
<th>Sanctioned</th>
<th>Grounded</th>
<th>Completed/Delivered</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>112.24</td>
<td>122.69</td>
<td>97.02</td>
<td>58.01</td>
</tr>
</tbody>
</table>

### Construction of Houses (Nos in lakh)

<table>
<thead>
<tr>
<th></th>
<th>Committed</th>
<th>Released</th>
<th>Expenditure</th>
<th>UC Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2,03,427</td>
<td>1,18,020</td>
<td>1,09,111</td>
<td>1,08,700</td>
</tr>
</tbody>
</table>

### Financial Progress (₹ in Cr)

![Graph showing financial progress]

- Committed: 2,03,427
- Released: 1,18,020
- Expenditure: 1,09,111
- UC Received: 1,08,700

### Houses in verticals (Nos in Lakh)

- S - Sanctioned: 23.97 lakh
- G - Grounded: 122.69 lakh
- C - Completed: 8.31 lakh

### Investment Approved (Rs in lakh Cr)

- Beneficiary: 1.89
- State: 1.99
- Centre: 2.09
- Total: 5.97
- ₹ 55,095 Cr

### Beneficiaries under CLSS (in lakh)

- S: 23.97
- G: 122.69
- C: 8.31

### Interest Subsidy under CLSS (Rs in Cr)

- ₹ 55,095 Cr

#### 16 lakh houses are being constructed using New Technologies

- Gujarat, Ahmedabad, ISSR
- Odisha, Daspalla, BLC
- Rajasthan, Kota, AHP3

Source: PMAY Dash Board, [www.pmay-urban.gov.in](http://www.pmay-urban.gov.in), accessed on 18th April, 2022
GENERAL GUIDELINES:
CHECKLIST FOR SUBMISSIONS OF ARTICLES

The following checklist should be used when preparing an article for submission. Please be sure to follow the specifications exactly and completely to ensure that your article is reviewed in a timely manner and any delays avoided along in the publishing process should your article be accepted for publication.

1. The paper should be created using a word-processing program (such as Microsoft Word) and should be between 3,000 and 5,000 words in length. The file may be in .docx or .doc format.

2. The paper is typewritten, double-spaced, and formatted to print on 8.5” x 11” (or A4) size paper. It is written in the third person in a clear style, free of jargon.

3. The first page of the article includes the following:
   i. the paper’s title and
   ii. an approximately 200-word abstract that emphasizes the paper’s contribution to the field and its practical architectural/ planning social/ economic implications.
   iii. the name(s), position(s), professional or academic affiliation(s), and email address(es) of the author(s), as well as the full postal address of the corresponding author;

4. The body of the paper should include the following:
   i. an introduction to the subject,
   ii. background information,
   iii. discussion of procedure,
   iv. results,
   v. conclusions,
   vi. implications for practice and advancement of research,
   vii. references,
   viii. acknowledgments (optional; if funding for the research was received from non-personal sources, the sources must be identified in this section), and
   ix. an autobiographical sketch.

5. Please ensure that:
   i. References are complete, have been arranged alphabetically by author surname and checked for accuracy.
   ii. Reference citations in the text are referred to by author name and year. If there are more than two authors, the name of the first author followed by “et al.” has been used.
   iii. References contain the following information, in the order shown: names of all contributing authors (last name followed by first initial), date of publication, title of article, names of editors (edited books only), title of journal or book, volume and issue numbers (journals only), location and name of publishing company (books only), and inclusive pages (journals and articles in edited books).

6. Figures/ pictures/ graphs submitted are:
   a. Large enough to be readable when reduced to fit the journal page size (approximately 5.25” x 8.25”).
   b. A brief caption is provided for each figure/ picture/ graph.
   c. The figure is cited in the text.
   d. Please ensure that scanned images are of a high resolution to ensure good quality printing (not less than 640 x 480)
   e. All tables are included either in the original manuscript file or as a separate Microsoft Word document and have been checked to ensure that they can be easily reproduced on the journal page size approximately 5.25” x 8.25”).
   a. A brief caption is provided for each table.
   b. The table is cited in the text.

7. If your paper is accepted for publication, you will be provided with information on where to send the hard copies of any figures if required.

8. The manuscript and any table/picture files should be sent via email to hsmishelter@hudco.org. ONLY original works neither published nor under review elsewhere will be considered.
HUDCO - Promoting housing for EWS and LIG category

- HUNNY - HUDCO Nav Nagar Yojana for developing sustainable habitats
- HUDCO’s Rent-to-Own Scheme
- Senior Citizens’ Homes
- Programme Assistance to State / ULBs for development of housing and urban infrastructure

HUDCO - Leading the way

As India’s premier techno-financial institution and a Mini-Ratna-1 Company, with the mandate of ‘Profitability with Social Justice’, HUDCO is leading the way in pioneering Sustainable Habitat for the EWS, enabling holistic urban development, facilitating inclusive economic growth & realizing an ambitious target of one million houses per annum.