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Ministry of Housing and Urban Affairs
Government of India

आज़ादी का अमृत महोत्सव

HOUSING FOR ALL

Transforming Lives in Urban India

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Ministry of Housing & Urban Affairs
Government of India

First published in India in 2022 by
Ministry of Housing and Urban Affairs, Government of India & I.K. International Pvt. Ltd.

ISBN - 978-81-957342-0-7
978-93-90620-32-6

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Printed by Krishan Makhijani for I.K. International Publishing House Pvt. Ltd., 4435-36/7, Ansari Road, Daryaganj, New Delhi-110002 at Rekha Printers Pvt. Ltd., Okhla Industrial Area, Phase II, New Delhi-110 020.

To the PMAY-U beneficiaries for their resilience, hope and trust in the power of their dreams.

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Message

Narendra Modi

Prime Minister of India

Shanti Devi, Varanasi, Uttar Pradesh

सत्यमेव जयते

प्रधान मंत्री
Prime Minister

MESSAGE

It is indeed reassuring to learn about the publication of the book – 'Housing for All: Transforming Lives in Urban India'. This initiative that encompasses the journey, the experiences and impact of Pradhan Mantri Awas Yojana (Urban) – PMAY (U) is commendable.

Home is one of the most basic requirements for all. A house is not just about four walls, not just about brick and mortar, but is the nucleus of happiness, warmth, affection, security and dignity of people. It provides a better quality of life to the people, enabling them to not just see, but fulfil their dreams as well.

An own house is a memorable moment for every individual. It is not without reason that we have a traditional ritual of 'Grih Pravesh' - entering the home in our culture.

Our Government adopted a mission mode approach to achieve the goal of 'Housing for All'. Through steadfast efforts, we are constantly working towards strengthening the housing sector with a focus on technology and skill development.

One of the largest affordable housing schemes in the world, PMAY (U) completes seven years of service to the nation. An interplay between various factors includes vesting the implementation power in the hands of State/UT government.

An effective strategy adopted for implementation and monitoring and constant generation of funds, our beneficiaries, banks, other financial institutions and the private sector have contributed significantly to the success of PMAY (U).

The linkages of the housing sector with several others sectors contribute substantially to the economy in many ways. The investment made by the Government in the sector, has led to creation of new jobs and investment opportunities.

It is heartening to hear incredible life transforming stories from PMAY (U) beneficiaries during my interactions with them. The happiness on their faces says it all, of how it has enhanced the quality of life. It is the contribution of the beneficiaries that has made PMAY (U) scheme a success.

Gratitude to all the stakeholders who have helped chronicle the PMAY (U). The contributions from experts in the public, social, education and housing sectors afford a deeper insight into the programme.

I am sure that this book will be a perfect read on how the goal was set and how it was attained through people's participation. May the publication inspire the readers and help them make this world a much better place to live in.

(Narendra Modi)

New Delhi
आश्विन 17, शक संवत् 1944
09th October, 2022

Conceiving Housing For All

Venkaiah Naidu

Housing for All

As I look back on my experiences as a Minister in the Union Council of Ministers during 1999-2002 and during 2014-2017, I am filled with a deep sense of satisfaction when I recollect the launching of two ambitious, path breaking initiatives – the "Pradhan Mantri Gram Sadak Yojana" that sought to link all villages through a network of rural roads and "Housing for All – Pradhan Mantri Awas Yojana (Urban)" that aims to provide permanent housing to all families in urban areas.

Both these schemes are dear to me. The rural road connectivity is of great importance because of my firm belief that road connectivity in rural areas has manifold multiplier effects on rural economy and has a great impact on equitable national development. The provision of affordable housing for urban poor is equally important because it improves the quality of human lives and contributes to the planned orderly development of cities and towns.

Drawing upon nearly four decades of my rich experience in public life including my innings as a legislator and a Parliamentarian, I felt privileged that I could lead the process of designing these two programmes with active encouragement and blessings of two of India's most visionary Prime Ministers – Late Shri Atal Bihari Vajpayee ji and Shri Narendra Bhai Modi ji.

Of course, the road to these innovative programmes was not easy. Not only did I have to use all my persuasive abilities to convince my cabinet colleagues especially regarding the rural connectivity programme but also to institute a robust, participatory implementation mechanism.

My past experience made me realize that the successful implementation of any mission requires partnering with the States, Union Territories and cities and establishing networks of other stakeholders. I always believed that planning from the bottom is crucial to achieving the desired outcomes.

The NDA government, under the leadership of PM Modi, made significant changes in the affordable housing sector. Major initiatives were launched in transport and housing sectors for urban development in India. The revolutionary scheme of 'Housing for All', was one of the most ambitious programmes, possibly the largest public housing project anywhere in the world. The objective was to provide a permanent structure unlike the thatched and semi-permanent structures that were constructed under earlier programmes. And these houses had to have all the basic facilities including toilets, piped water supply, electricity, kitchen and other amenities. Hon'ble Prime Minister Shri Narendra Modi ji wanted the programme to be quite comprehensive with universal coverage. We realized that under the earlier programme of JNNURM, the construction of only 13,82,768 houses was approved, meeting a mere 10% of the required housing needs of the country. There was a huge deficit to be covered.

To achieve this ambitious goal, it was essential for the Central and State governments to work in unison and close coordination. It was equally important to bring on board the urban local bodies, financial institutions, the private sector, civil society partners and NGOs.

I was really pleased at the enthusiastic response from all partners with States and Union Territories not only committing to the goal of the programme, but also starting off the implementation process in right earnest, providing basic amenities like better roads, transport facilities, sanitation and drinking water. They also linked up other programmes aimed at poverty elimination and skill development.

This convergence of Housing for All Mission with other government programmes to benefit the urban poor was one of the key elements of the new programme's transformative approach. In addition, adoption of modern, innovative and green technologies as well as materials made this an exciting project that nurtured creativity and pointed to new directions in construction technology.

As the success of any Central scheme rests on the implementation mechanism at State and UT level, the Ministry had a constant dialogue with the States/UTs through regional workshops, periodical reviews and consultation meetings.

I had visited most of the States across the length and breadth of the country to review the progress of various programmes and seek feedback for further fine-tuning the implementation of different schemes. The Mission Directors of other missions being implemented by the Urban Development Ministry– AMRUT, PMAY- U, SMART City and Swachh Bharat used to accompany me for these review meetings. The workshops provided us a good opportunity to share and learn from each other's experience on the implementation of the mission.

During the course of these reviews, I was encouraged by the vast number of ideas, resources and committed implementation support that different stakeholders brought to the table. Constant monitoring, facilitative guidance and timely funding ensured that the project proceeded at the planned pace and the quality of output was of a high order. During my visits, I could have a first-hand feel of the programme implementation and the innovative practices being adopted in different parts of our country.

I wanted our construction workforce to be well-trained in modern building techniques, noting the huge employment potential in the sector. "Unskilled manpower in this sector must become skilled manpower," was my firm belief. I also highlighted and advocated the importance of using 'green materials' while noting that the production of traditional construction materials like brick, wood, cement, steel and sand is energy-intensive.

As Minister of Housing and Urban Affairs, I emphasized the importance of promoting nature-friendly homes by increasing the use of locally available materials or

"green materials", "Reduce, Reuse and Recycle", I would point out, should be the mantra of civil engineers and architects and urged them to utilize the by-products of other industries such as fly ash from power plants. Thus, to promote green and environment-friendly, disaster-resistant technologies and layouts suitable for different areas of the country, Technology Sub-Mission (TSM) was launched by Ministry of Housing and Urban Affairs (MoHUA).

Andhra Pradesh actively collaborated with MoHUA for TSM. The journey started when disaster-resistant housing was taken up with alternative construction technologies for Hud Hud cyclone victims in Srikakulam, Vizianagaram and Visakhapatnam districts. Also, a model colony of 40 houses was constructed in Nellore district in collaboration with Building Materials and Technology Promotion Council (BMTPC). Subsequently, Demonstration Housing Projects were implemented by using emerging technologies at Bhubaneswar, Bihar Shariff, Hyderabad and Lucknow. There were a lot of good practices to learn from and so many interesting experiments to document. The good word had to be spread to ensure replication of good practices and forums like the Vibrant Gujarat Global Summit 2017, the theme of which was 'Sustainable Economic and Social Development, were utilized to show case the programme.

The programme received a big boost from the policy initiatives announced by the Hon'ble Prime Minister, especially his announcements on interest rebates for housing loans and the lowering of interest rates by banks. The facilitative environment was further enriched by the 'Credit Linked Subsidy Scheme' (CLSS) launched to fulfil the dream of the average Indian middle-class family of owning a house. Through interest subsidy, it not only provided relief to India's middle class but also gave a much-needed boost to the real estate sector. This, in turn, generated employment.

During my tenure, in order to bring transparency and accountability in the real estate sector and to protect the interests of home buyers, we established a speedy mechanism to redress disputes. I piloted the Real Estate (Regulation and Development) bill, blessed by PM Modi and had held wide ranging discussions with various stakeholders. The Real Estate (Regulation and Development)[RERA] Act, 2016 was passed by the Parliament in March 2016.

I am also of the firm belief that international collaborations in different areas are essential to fast-track the desired outcomes. During the inaugural session of Asia Pacific Ministerial Conference on Housing and Urban Development in 2016 at Goa, I called for collaborative efforts among member countries. Under the new Urban Agenda, it was important to work together through sharing of knowledge and best practices to make cities liveable, sustainable, inclusive and disaster-resilient human settlements.

My message to the nations was: Housing is the key component of human civilization. Hence, cities must adopt reforms and embrace New ways of governance such as e-governance in ensuring transparency and accountability, while promoting sustainable

cities with 'Housing for All'. The paradigm shift envisaged in urban governance must make every citizen enjoy the fruits of development.

The vastly successful programme gained global recognition and I was indeed delighted when India was elected as president of 26th governing council of The United Nations Human Settlements Programme (UN–Habitat), the United Nations agency for human settlements and sustainable urban development in 2017.

Presiding over this inter-governmental decision-making body and steering the discussions at Nairobi in May 2017, was a memorable experience for me. It was a testimony to our country's commitment to advance the twin goals of the Habitat Agenda – adequate shelter for all and the development of sustainable human settlements in an urbanising world.

As the Minister of Housing and Urban Affairs, I feel privileged to have been able to serve my fellow citizens through programmes like 'Housing for All' and catalyse the much needed urban renaissance through several citizen-friendly reforms and practices.

I am extremely happy to note that the pro-active Minister Shri Hardeep Puri ji has been taking forward all these initiatives ably assisted by the dynamic team of officers led by Secretary and the Mission Director, working relentlessly to realize the 'Housing for All'. I wish the Minister, MoS and the entire team all the very best in this sacred mission of improving the quality of life of people, especially the urban poor, through quality housing facility and provision of other essential civic amenities.

Introduction

Manoj Joshi

Pratima Singh with her daughter beside their house in Puri, Odisha

"A house is not merely about four walls, it is a centre of happiness and dignity for people"

- Hon'ble Prime Minister while interacting with Pradhan Mantri Awas Yojana beneficiaries across the country in June 2018 through video bridge.

The journey of Pradhan Mantri Awas Yojana-Urban (PMAY-U) has been an ever-evolving fascinating story that deserves to be shared. In the joint sitting of the Parliament on 9th June 2014, former Hon'ble President of India Shri Pranab Mukherjee emphasised that his Government is conscious of the fact that the urban infrastructure of the country is under severe stress. He said that his Government perceives urbanisation as an opportunity rather than a challenge and thus, he set before the Government a huge task to provide every family with a pucca house with water connection, toilet facilities, 24X7 electricity supply.

Taking cue from this statement, Hon'ble Prime Minister Shri Narendra Modi gave the clarion call of **'Housing for All'** , stressing on the fact that there is a need to think and work in terms of a quantum jump, moving away from incremental approaches and thus, bringing transformation to the overall housing sector in the country. Subsequently, Ministry of Housing and Urban Affairs (MoHUA) rolled out Pradhan Mantri Awas Yojana (Urban) which, was launched by Hon'ble Prime Minister on 25th June 2015.

Today, after seven years of implementation of PMAY-U, slamming all the misanthropes, it can be affirmed that the Mission is well poised to complete the target within the set period. Under the visionary leadership of Hon'ble Prime Minister, the collective efforts of the Central Government, States/UTs and Municipal Bodies and cooperation from the beneficiaries have led to the total sanction of more than 12.2 million houses, grounding (in different stages of construction) of more than 10.2 million; out of which more than 6.2 million have been completed and delivered to beneficiaries. PMAY-U has reached more than 50 million individual citizens, transforming their lives and bringing them into formal sector housing.

Adopting the principles of participatory development, the implementation structure of PMAY-U moved away from a "one size fits all" approach. It is built on cafeteria approach, wherein a beneficiary can choose one out of four verticals for either acquiring or building a house under the Mission depending on their need and circumstances. The beneficiaries were placed on the centre-stage, accepted them as capable actors who just needed a catalyst to fulfil their housing need. The Government deliberately assigned itself the role of this catalyst, wherein MoHUA facilitated State/UT Governments, the banking sector, the private sector and the beneficiaries themselves to achieve this huge task.

On the other end of the spectrum, there was a need for structural changes in the affordable housing sector of the country. From the very inception, it was envisaged that the role of the Government would be that of a catalyst and capability enhancer, treating beneficiaries as capable actors to decide where and what kind of house is best suited for their needs.

Measures and initiatives under the Mission focused on creating a conducive environment for the affordable housing sector which promotes self-regulation, growth, prosperity and augmenting the supply of affordable housing in the country.

The past seven years have been a journey of experiences and innovations. Resonating the ethos of cooperative federalism, the structure of the Mission delegated the responsibility of implementation on respective governments of States/UTs. Earlier under Jawaharlal Nehru National Urban Renewal Mission (JnNURM), all projects were appraised and approved in the Ministry in Delhi, leading to slowing the pace of implementation and incomprehensive assessment of on-ground conditions. The Mission moved away from it, MoHUA entrusted respective States/UT Governments responsibility for identifying beneficiaries, ensuring provisions of infrastructure and dovetailing PMAY-U with their on-going housing programmes. This major step of delegating responsibility and trusting the capabilities and capacities yielded favourable results. In the 10 years of UPA government only 800 thousand houses were completed whereas today we have completed and delivered more than 6.2 million houses under PMAY-U.

The Mission has remained close to the heart of Hon'ble Prime Minister. Right from the inception, he has taken keen interest in the structuring, progress and implementation of the Mission. In fact, the logo of PMAY-U was designed by Hon'ble Prime Minister himself. He has regularly iterated his thoughts to address the challenges faced by the Mission through the Pro-Active Governance and Timely Implementation (PRAGATI) meetings. The PMO has regularly monitored the health and progress which has led to inter-ministerial collaborations for overcoming various hurdles in the affordable housing sector. Further, he was the beacon of light for us when we conceived the idea of Global Housing Technology Challenge-India (GHTC-India). Not just at the implementation end, Hon'ble Prime Minister has interacted with the beneficiaries on regular basis, he has inspired them with his presence in 'grih-pravesh' functions of PMAY-U housing.

While the Hon'ble Prime Minister gave the vision of Housing for All, the conception of the Mission was carried out by Shri Venkaiah Naidu, the then Minister for Housing and Urban Poverty Alleviation (MoHUPA). It was under his leadership that the Mission got a structurally sound and stable foundation. He toured the country extensively along with the officials from the Ministry to understand the on-ground challenges, undertake delegations and build capacity for implementation of the Mission. His eye for the details and consistent efforts ensured that the nuances were identified and sorted at the very inception of the Mission. This Book encapsulates his thoughts and vision.

The baton was then passed to the current Minister of Housing and Urban Affairs, Shri Hardeep S Puri. Mission has evolved into its current form under his leadership. He constantly pushed and encouraged us to respond to the arising challenges during the course of implementation and innovate suitably. It was under his leadership that we were able to strengthen the regulatory framework and got the cabinet approval on the Model Tenancy Act (MTA) which would all act as a boon for the growth of affordable housing sector. Shri Puri

has a keen interest in sustainable urban development which is highlighted in his special interest in the Light House Projects (LHPs) and the use of construction technology under the Mission.

The Book

'Housing for All – Transforming Lives In Urban India' was conceptualised to encapsulate the journey of PMAY-U, something which many would not know. The team wanted to share the experiences of coming all this way and becoming one of the world's largest urban housing programmes. Also, it would serve as a learning document for those who want to know more about the housing sector. This book is a one-stop guide for all the beginners as well as the experts of this domain. It is a collaborative effort of various dignitaries, practitioners and academicians who took out time to share their side of the stories on the history of housing and the sector as a whole. For convenience of the readers, the book has been divided in seven sections, wherein each section constitutes of chapters from respective domain experts.

The first section is **"Affordable Housing in New Urban India"**. Urbanisation is one of the key aspects of the economic development of any country. India, which continues to be the world's economic growth driver, is facing various challenges. For a sustainable urban transformation, access to adequate housing is one of the key indicators for the holistic development of any urban area. This section discusses the Mission's transformative efforts and ambitious experiment in demand-driven organic urbanism, which resonates strongly with the outcomes of prior housing schemes and standard spatial planning approaches.

The second section is **"PMAY-U: The Mission"**. The section discusses the experiences and innovations undertaken during the course of implementation of the Mission. It illustrates the steps taken to ensure effectiveness and transparency, the roles of various stakeholders in ensuring and assisting beneficiaries in obtaining a home in a hassle-free manner. It further highlights the role of the Government in achieving housing affordability. The section also draws upon the significant impact the Mission has had on the lives of women beneficiaries along with the multi- dimensional impact it has had on other vulnerable sections of the society. It highlights the varied approaches undertaken for stakeholders' participation and social mobilisation.

The third section is **"Perspectives in Housing".** This section of the Book beautifully explains the perspective of the housing and how it has evolved through the corridors of history with illustrative chapters written by the domain experts. It illustrates the evolution of houses and explain the plethora of traditional and vernacular houses that India inherits, the history of the housing sector in India as it has advanced to meet the changing demands, a growing economic base and a vibrant private sector, demand-driven design of BLC vertical of PMAY-U, which underlines a change from spatial planning approach adopted by earlier housing schemes to an organic 'self-organising city approach and contribution of PMAY-U in relation to incremental housing segment. This part also discusses

an inductive analysis to explain housing and its link to population growth, migration, and the informal sector, as well as attempting to illustrate the notion of adequate housing via various worldwide case studies. It describes how PMAY-U contributes to Sustainable Development Goals (SDGs) by providing services, basic utilities, and integrating various programmes in the form of Angikaar Campaign, into PMAY-U houses, resulting in the construction of adequate dwelling units.

The fourth section is **"Construction Technology".** One of the major characteristics of sustainable urban development is ensuring the liveability and desirability of the urban environment. In order to meet the pace of implementation and the target within the given time frame, Ministry applied many technological interventions and innovative building techniques integrated with the scheme for quick, efficient, and sustainable construction. This section discusses technology interventions and how they aid in the efficient execution of these interventions.

The fifth section is **"Impact on Economy and Financial Inclusion"**. Mission has had a multiplier impact on the growth of construction sector and overall economy by creating direct and indirect job opportunities. On the other hand, the banking and financial sector has a critical role to play in ensuring that the Mission runs smoothly. The contributions of such techno-financial entities in implementing PMAY-U, particularly in the CLSS and AHP verticals, have been explained in this section. The chapters cover a variety of interesting subjects, including the significance of the construction sector in revitalising the country's present economy, as well as introduction of various financial institutions, such as HUDCO, HDFC, and SBI, and their engagement in various phases of the Mission.

The sixth section is **"Role of Private Sector"**. It elaborates on the important role played by the private sector in enhancing the supply of affordable housing and the role played by them in the implementation of the Mission. These chapters talk about various topics ranging from the contribution of the private sector in creating affordable housings at various locations to the reforms introduced to formalise the real estate sector. It also illustrates the role private sector plays in the envisaging the sustainable real estate sector for the future.

The seventh section is **"State's Participation"**. The most vital reason for the successful implementation of PMAY-U was the collaboration and 'Team India' approach between the respective Governments of States/UTs with the Central Government. This section describes the initiatives taken by the best performing States for the successful implementation of PMAY-U. The chapters, written by the respective Hon'ble Chief Ministers, discuss implementation of success stories and how they feel proud of their accomplishments in delivering happiness to their citizens.

The team sincerely thanks each of the authors, who have contributed in the rich discourse of this Book. I hope that the readers enjoy the incredible journey of Pradhan Mantri Awas Yojana (Urban) conveyed through this.

PART ONE
Affordable Housing in New Urban India

Transformational Role of Leadership in Urban Development : A Paradigm Shift

Hardeep S. Puri

Kalpanaben Alpeshkumar Purohit, Palanpur, Gujarat

I am glad to be participating in the release of this book that encapsulates the remarkable and transformational journey of the Pradhan Mantri Awas Yojana-Urban (PMAY-U), sometimes also referred to as the 'Housing for All' Mission. This book captures not just the phenomenal achievements within the PMAY-U scheme but also the capacity of the Indian administration, industry, private partners, civil society and academia to collaborate from the ground up in successfully executing one of the largest urban housing programmes in the world.

At the time of writing, more than 12.2 million houses have been sanctioned under the mission, of which almost 10.2 million houses have already been grounded and 6.2 million houses have also been delivered to the beneficiaries. Assessed on any scale of measurement, these numbers are extraordinary; they become mind-boggling when we compare the progress made under PMAY-U since it began in 2015 with the ten years of the previous regime when only around 800 thousand houses were built.

Visionary leadership behind the paradigm shift in governance

In my view, the biggest reason behind this drastic transformation is the bold and decisive leadership that has underpinned the PMAY-U programme, much like many other development initiatives undertaken by the Government of India since 2014. The revolution that we are witnessing today began when the Modi Government assumed office and brought with it a paradigm shift in development and governance. 'Paradigm shift' is a phrase that is used far too often, and in today's discourse has probably lost the gravity of meaning it was originally supposed to convey. What Prime Minister Modi has been able to accomplish is actually befitting of the term 'paradigm shift': he has replaced incremental change by monumental change; he has supplanted short-term, vote-garnering measures with farsighted vision and action.

The most effective leaders are those who are able to communicate their vision lucidly and inspire in others a sense of shared belonging and collective ambition. For a citizenry that was tired of the ineffectual cocktail of slogans and subsidies, PM Modi's message of Indians trusting in their capacities to build their future provided a breath of fresh air. By empowering Indian citizens, especially women, he liberated the subverted mindset of the Indian citizen who continually depended on sops while giving succour to the aspirational mind of young India which wanted a brighter, prosperous future for itself.

Subtle in its manifestation but seminal in its impact, the Modi Government has reimagined the way Indian citizens view their own lives. That, along with the assets created and reforms effected, is one of the most pleasing manifestations of this transformation. The PM's vision has resulted in a growing body of work that buttresses the new-found optimism within every Indian citizen: be it toilets, housing, water supply, education, healthcare, defence, innovation, or manufacturing, every facet of social life and economic activity has undergone a fundamental change.

Indians see in him a fellow traveller who has shared their lived experiences and succeeded. They see a leader who is uncharmed by the trappings of power and retains his integrity and humility. It is not at all surprising that Indians would repose their faith in a leader who laid out a clear and sensible vision; produced a holistic blueprint to realise that vision; ensured that governance was consistently reformed to implement that vision; and monitored to precisely align that vision with the evolving world order. This is why PMAY-U succeeded. It immediately became apparent that this programme would not just provide four walls to an urban dweller, but instead equip her with the dignity that she had long desired.

A 'New Urban India' under the Modi Government

Since I was invited to join the Council of Ministers in September 2017 and placed in the Ministry of Housing and Urban Affairs, I have had the unique privilege of being actively associated with the Prime Minister's vision for multi-faceted urban rejuvenation. In many ways, the integrated nature of these urban interventions is a microcosm of India's development ambitions.

The Modi Government recognised that India's urban agenda will be integral in its pursuit of economic progress, social equality and environmental sustainability. Whether it is reducing poverty and income inequality; developing universal access to health, education and technology; increasing livelihoods through industry and innovation; or optimising our energy consumption, rejuvenated urban areas will be crucial drivers in achieving these goals. At this inflection point for India where our response to myriad socio-political challenges will determine the country's overall growth for decades to come, we need robust and innovative urban solutions, and that is what has been delivered.

The need for a new urban India was self-evident for decades before 2014. For long, urbanisation in India was treated not as an accelerator but as a by-product of economic growth. This belied the empirical evidence that cities, when “done” right, not only provided livelihood opportunities but also promoted social inclusion, cultural expression and ecological sustainability. Even as our urban areas contributed to almost two-thirds of the country's economic output and were facing rapid urbanisation that threatened to derail the economic growth, it was unfortunate that limited cognisance was taken for decades, and in particular, in the ten years preceding 2014 that were characterised by neglect and stunted implementation of urban schemes.

With the Modi Government assuming office in May 2014, a concrete shift in the policy orientation for urban development was among the top priorities. Accordingly, a novel strategy was devised of a pyramid of urban development to suit the needs of individual cities guided by the Gandhian principles of Sarvodaya and self-sufficiency. We had the Swachh Bharat Mission – Urban (SBM-U) where all the urban areas aimed to achieve the basic tenets of cleanliness and hygiene. Building on top of this, we had PMAY-U which targeted to increase housing stock in the urban areas of the country. Above these two foundational needs was the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) where 500

cities with population of more than 100 thousand each developed sustainable water and sewerage systems, and other civic amenities. And lastly, for the 100 leading cities of India that needed to enhance their technological infrastructure to manage civic services, the Smart Cities Mission (SCM) was conceptualised.

Through these overarching programmes, the sevenfold increase in total expenditure on urban development between the Modi Government years and the previous dispensation is in itself a story to tell of India's realignment towards good governance. In undertaking such comprehensive, planned urbanisation, India transitioned from a reluctant urbanising nation to an enthusiastic one.

The singular success of PMAY-U lies in its unique implementation

Within the success story of India's urbanisation programme, the journey of PMAY-U stands out as an exemplar in showcasing the multi-dimensional benefits that can be generated by holistic planning and partnerships, cooperative federalism, capable implementation, and robust monitoring and evaluation.

PMAY-U has perhaps the most expansive scope of any urban mission in India. The challenge of catering to the housing needs of urban India where over 870 million Indians are expected to reside by 2050 was always going to be humungous. Since its inception, PMAY-U has operated under the ethos of inclusivity, providing equal opportunities to own housing, irrespective of gender, caste, creed or religion. In fact, it is a matter of great satisfaction that PMAY-U started a movement to directly recognise and empower women beneficiaries by ensuring that females of every household were either given ownership or joint-ownership.

While the primary focus under PMAY-U continues to be to provide affordable housing, it was also essential that incremental housing was given the requisite impetus through dedicated verticals within the 'Housing for All' mission. Having served in various diplomatic missions during my tenure as a civil servant, I have always believed that mass housing needs to be a cross-cultural enterprise. My experiences in Japan and Brazil which have some of the world's best affordable housing programmes as well as best practices from Latin America and Western Europe have served as a prism to reinforce my belief that technology-driven, indigenously sourced and cost-effective housing succeeds much more than a 'one size fits all' model that removes the local context from the equation.

Unlike earlier Government-funded housing schemes, PMAY-U included the Middle-Income Group (MIG) alongside the EWS and LIG categories to enable making housing accessible and affordable for a large chunk of India's population by providing a carefully curated system of tax subsidies, interest subvention, affordable housing loans, and Direct Benefit Transfers (DBT).

Simultaneously, through landmark legislation such as the Real Estate (Regulation and Development) Act, 2016 (RERA) and many fiscal reforms, this Government encouraged

investment in real estate from across the value chain, especially in the affordable housing segment. The numbers speak for themselves: according to a study conducted by the National Institute of Public Finance and Policy, investment under PMAY-U may have created more than 24.5 million jobs in total, of which 6.9 million jobs would be direct and 17.6 million jobs would be indirect. It is estimated that more than 74.5 million metric tonnes of cement and about 16.9 million metric tonnes of steel will be consumed in construction of all houses sanctioned under PMAY-U, thus giving a massive fillip to the construction industry and almost 100 other allied industries. Even during the worst periods of the pandemic when the construction industry took a hit, PMAY-U was vital in providing employment and reigniting the economy.

The programme's robust and streamlined implementation has been one of the root causes for its success. The implementation of PMAY-U has embedded cooperative federalism completely, resulting in the Central Government delegating powers to States / UTs for project formulation, appraisal and approval. I also believe that PMAY-U has played a pivotal role in ending the reputation of Government schemes being tardy, inefficient and leaky.

Through innovative measures such as geotagging which allows for real-time monitoring of the physical progress—and therefore, a concomitant release of funds—and precisely captured household-level information, we have greatly enhanced our evaluation capacities. Similarly, through the Public Financial Management System (PFMS), we have reduced dependencies and delays in fund disbursal. Lastly, and most importantly, through the Direct Benefit Transfer (DBT) modality, we have ousted the middlemen from the process altogether. Additionally, we are accurately able to link every beneficiary with their house through the process of Aadhar verification – the middle component of the JAM triumvirate that will help defeat poverty by optimising Government actions.

Affordable housing as a vital element in India's urban agenda

Growth in housing brings with it great dividends. Urban economies owe a substantial portion of their rise to housing construction as it creates employment and huge output as well as signalling an influx of resources and concentration of economic activity. The tax holiday in the segment was extended till March 2022 in order to boost the development of Affordable Housing projects. Further, to promote Affordable Rental Housing for urban migrants/poor in India, income tax exemption was given for notified affordable rental housing projects.

These fiscal measures continue to exhibit the pro-poor priorities of the Modi Government, a trait that was brought to prominence during the pandemic by the launch of the Affordable Rental Housing Complexes (ARHCs) scheme under PMAY-U intended. Intended to address the urban housing needs of migrant workers and the urban poor. The ARHC scheme was a major policy push to secure livelihood opportunities for a large part of the urban workforce that is usually excluded from urban planning decisions while also

curtailing unplanned growth.

PMAY-U has also proven to be a technologically advanced initiative. Under the guidance of the Hon'ble Prime Minister who has constantly advocated incorporating construction technology advancements and innovation in service delivery, PMAY-U introduced pioneering measures such as the Global Housing Technology Challenge – India (GHTC – India) which promoted new, green and indigenous technologies at a large scale in the country. Ushering India into a new dawn of construction technology, PM Modi laid the foundation of six Light House Projects (LHPs) across the country on 1 January 2021 to showcase six new-age and alternate global technologies in the construction sector.

The mainstreaming of these technologies will also help India reduce its carbon footprint and contribute directly to India's targets under the Sustainable Development Goals (SDGs). More specifically, the Mission has imbibed SDG 1 (No Poverty); SDG 5 (Gender Equality); SDG 6 (Clean Water and Sanitation); SDG 11 (Sustainable Cities and Communities); and SDG 13 (Climate Action) into its foundational tenets through the pillars of economic empowerment; inclusive and equitable benefits; technology-driven solutions; and low-carbon and green construction. Equally importantly, PMAY-U also furthers India's commitment to the New Urban Agenda, wherein India is contributing towards the need for equitable, respectable and adequate housing, basic services, and livelihood opportunities in line with its global call for sustainable human settlements.

I am certain that these measures are promoting an inclusive and sustainable way of urban infrastructure development that can be a vital axis for an 'Aatmanirbhar Bharat'. The Modi Government recognises that the provision of housing in India is an accurate indicator for the speed of its urban transformation. Beyond the academically agreed benefits of urban housing and its multiplier effects on the economy which have been intrinsically incorporated in the programme. PMAY-U more pertinently depicts the simple reality of the PM's desire to provide dignity to every urban dweller in India. A dignified living enables new opportunities, which, in turn, leads to empowerment. '*Sabka Saath, Sabka Vikas, Sabka Vishwas, Sabka Prayas*' is not just a mantra or a slogan, it is an article of faith for Prime Minister Modi and his team.

In a nutshell, I believe the programme's success comes down to a thriving marriage of robust policy planning, able and efficient administration, integrated use of technology, and citizen-centric decision-making that has constantly kept this reality in the foreground. When we began, the task to bring every Indian under the fold of happiness through a home seemed herculean. This has been a transformation that truly epitomises the Indian dream. What better gift to all those selfless Indians who sacrificed their lives for our freedom from British rule that in the 75th year of our independence more than 12.2 million houses have been sanctioned by the Government of India. As I write the chapter, the Mission has been extended till 31st December 2024 for completing the construction of already sanctioned 12.2 million houses till 31st March 2022.

Sustainable Urbanisation: Housing as a Key Driver

Amitabh Kant

AHP Project at West Godavari, Andhra Pradesh

Introduction

Urbanization is a key driver of GDP growth, employment generation and has an overall multiplier effect on the economy. India is urbanizing at a rapid pace, and some estimates suggest that India is poised to double its urban population by 2050. This would lead to a massive demand for housing, trunk infrastructure, office and retail spaces as well as connectivity, which forms the backbone of urbanization. Instead of looking at rapid urbanization and the associated stress on urban infrastructure as a challenge, it should be seen as a huge opportunity to drive the evolution of meticulously planned, well-connected cities which incorporate the principles of dense and compact development as opposed to the evolution of outward sprawling cities. Housing must not just be affordable, but also accessible through well planned transportation infrastructure, encapsulating the principles of Transit Oriented Development (TOD). The proximity of housing to workplaces and industrial clusters is a particularly important aspect as agglomeration in economies plays an important role in boosting productivity.

The economic development of any country is based on certain key attributes such as industrialisation, investment in human resources, research capabilities and urbanisation. India, as a growth driver of the global economy, is undergoing similar changes. India's GDP is expected to grow to $10 trillion by 2030, making it one of the world's largest economic systems. Historically, however, India has been a reluctant urbaniser. The country would see more urbanisation in the coming 50 years than in the past 5,000 years. Indian cities are engines of growth, job creation, improved productivity and higher wages. Every minute, 30 Indians migrate to cities in search of jobs. This huge influx is creating stress on already overstressed urban infrastructure. If cities are engines of growth, urban infrastructure is the backbone – ensuring that cities grow, become liveable, and sustainable.

India is aiming for sustainable urbanization, a model wherein the needs and aspirations of people are synergized with the economic development of the country, housing being a key lever towards achieving this objective. However, as India undertakes perhaps the most ambitious housing scheme in the world, a key challenge would be to balance this with the judicious use of available resources. Considering the population density of the country, India needs a compact development model with well-planned and accessible public transportation, smart waste management system and innovative and sustainable urbanisation. India needs to study and implement global best practices such as Singapore's waste-water recycling system, Curitiba's efficient BRTS system, Yukon waste segregation at the household level, Japanese model of Transit Oriented Development and so on. Transformation through disruptive technology interventions is the need of the hour. Our Smart Cities must be driven by data and the very best of Artificial Intelligence (AI) and Machine Learning (ML) algorithms. Urban planners and administrators must optimize and streamline resources and bring in efficiency across the housing and urban spectrum, including laying of trunk infrastructure, planning of transit oriented development and deploying value capture finance tools, besides others. It is pertinent to have internationally standardized technologies in the creation of new 'smart sustainable cities' that will reduce the

environmental footprint of cities, increase their appeal, and safeguard quality of life – all without any adverse effects on the efficiency of utilities.

India's urbanisation process has to be extremely innovative as well as sustainable. In contrast to massive urbanisation in the western world, which did not fully take into account people and effects on climate change, planners in India have a massive opportunity to develop innovative and sustainable smart cities. When America and Europe urbanized, cities were designed for cars and not for people. Smart City planners should be motivated by a desire to create a development model that is people-centric and strives to improve the living standards. The country has a unique opportunity to create a sustainable urbanization model based on public transportation and transit oriented development. The investment in urban infrastructure is also a key tool for generating employment with significant forward and backward linkages. India must invest in urban infrastructure including urban housing, mobility, municipal waste management and water. In order to address the challenges posed by rapid urbanization and in order to bolster economic activity and meet the aspirations of the people, the Government of India has taken an inclusive, holistic and proactive approach towards urban development. This has been done through the introduction of massive flagship missions to transform India's urban landscape.

Emergence of Census Towns

The emergence of census towns contributing over 30% of the net increase in urban population is the chief characteristic of India's urbanization story. It re-emphasizes the nature of transformation taking place in rural areas. The share of population of census towns in total urban population has increased from 7.3% in 2001 to 14.4%. Almost 83% census towns do not have master plans to guide their spatial growth. The urban economic activity is growing rapidly in these towns but there is no local government responsible and accountable for urban infrastructure development or urban service delivery. These census towns continue to be governed as villages and unfortunately do not have an urban local body. The opportunities of planned scientific development will get lost if these towns keep growing without spatial plans. Haphazard growth, unplanned construction and ad-hoc provisioning of infrastructure will put them at major risk of negative externalities of urbanization.

Shaping-up Compact Development

It is a well-known fact that cities are the combinations of different complex infrastructural systems, and these systems are inter-connected with each other to facilitate the functioning of the city. Therefore, it is important to harmonise each of the systems so that integrated city planning can be achieved. Since World War II, urban sprawl – or the fast population development of low-density suburbs – has been by far the most prevalent trend in urbanisation. Global experts, including Newman & Kenworthy, Kahn, Squires, Cieslewicz have all criticised it from an environmental standpoint because such sprawling implies a high level of land consumption, which is particularly problematic in the case of fertile agricultural

land and automobile dependence. As a result, the compact city concept has often been pushed as a way to control urban sprawl by town planners and urban experts. The concept of compact planning is predominantly linked to cities which are less dependent on private transport and highly accessible. This is particularly important from an Indian perspective since transport is one of the major carbon emitting sectors, with emissions having almost tripled since 1990. Compact cities are considered to be sustainable by virtue of their ability to reduce the overall carbon footprint and encourage judicious use of land. Since urban land is almost always scarce, more so in Asia, planned land use and introducing mix land use is of particular significance. This allows for different activities to be conducted, while also reducing trip durations. Hence, by lowering the role of the vehicle and increasing the number of journeys done on foot, by bicycle, or by public transportation, it has been suggested that densification of the built environment will halt urban expansion and restrict both resource and energy use (Fouchier, 1997; Newman & Kenworthy, 1999; Holden, 2004). The compact city model, which is defined by relatively high residential density and mixed land uses, the regeneration of brownfield sites, the raising of existing building heights, functional mixing, the joint development of public transportation systems and new settlements, and so on, is based on such planning principles. In terms of population, the compact city attempts to expand the population of cities by constructing additional houses on undeveloped sites inside the urban structure.

Housing – A Key Driver

As the pace of urbanisation increases, India is faced with a complex and demanding task of accommodating the people moving from rural to urban areas. However, the slow speed of construction and high interest rates offer major challenges in accommodating the people shifting to cities. In order to accomplish the vision of 'Housing for All', the ambitious and visionary Pradhan Mantri Awas Yojana (Urban) was launched. In addition to the direct effect that this may have on the economy, a multiplier effects across sectors is envisaged – from the sourcing of raw materials to boosting employment opportunities, direct and indirect. The Prime Minister envisaged the usage of state-of-the-art technology in construction, with learnings and applications from across the globe, for the completion of more than 12.2 million houses. The goal here is to seek inspiration from the pioneers and make developers and builders in India some of the best in the world. Therefore, this scheme is not just for the rapid construction of houses, but also about allowing our industry to learn from global best practices and become self-sufficient and self-reliant in the long term.

The challenge for India is not only to find disruptive technologies and constructive solution by bringing size, speed & scale in housing, but also the allied and trunk infrastructure. Traditional methods of construction and the time span of construction increases the rate of interest, which results in raising the cost of housing for the urban poor. Therefore, it would only be appropriate to state that it is not the cost of construction, but the rate of interest which makes housing unaffordable. For India's transition towards sustainable & modular affordable housing solutions, as well as technologically leapfrogging with artificial intelligence and machine learning in house building, technological infusions in the

construction sector are essential. Promoting these innovations will play a major role in positively redefining urban development and would help improve the quality of life for the coming generations. The next decade is bound to witness this disruptive transformation, and we must utilise technology to usher in a favourable policy environment.

It is interesting to note that urban housing poses a unique challenge of simultaneous surplus and deficit. While there is existing housing stock, there also exists unattended demand that needs to be met. For the purpose of unleashing rental housing market to match demand and supply, the Union Government has already approved **Model Tenancy Act (MTA)** for adoption by States and UTs. The MTA seeks to balance the interests and rights of both landlord and tenant in an accountable and transparent manner and prescribe a speedy dispute resolution mechanism. It will enable unlocking vacant premises for rental purposes. It is further expected to bring close to a crore vacant houses in the country into the rental market, creating a vibrant and sustainable housing market, allowing citizens to make an informed choice. The avenues for rental management companies will automatically flourish, and such firms can professionally manage and rent out properties on behalf of the owners.

Conclusion

Clearly, we are cognisant of the structural challenges when it comes to creating quality urban infrastructure. However, our cities and states will have to take a lead in urban development and must champion this cause. The decentralised governance structure in India promotes ethos of cooperative federalism, and we must leverage this to promote housing for all. In addition to tackling sectoral issues, we also need to tackle cross-sectoral issues such as attracting private sector capital, setting up a structured public private partnership framework, and strengthening municipal governance and finances. We must learn from models such as Transfer of Development Rights (TDR), Intelligent Transport Systems (ITS) and Concentric City models. We need to emulate such models and pioneer newer, tailored models of urban development. These, coupled with improved land laws and land pooling, streamlined building and planning norms, and increased ease of doing business will holistically address the issue of urban infrastructure. Urbanization is not only a consequence of faster growth but also an instrument of promoting rapid development. India will see more than 500 million people going urban in next five decades. This provides an opportunity to build better and build more sustainably.

Transforming Urban Landscape through Flagship Urban Missions

Durga Shanker Mishra

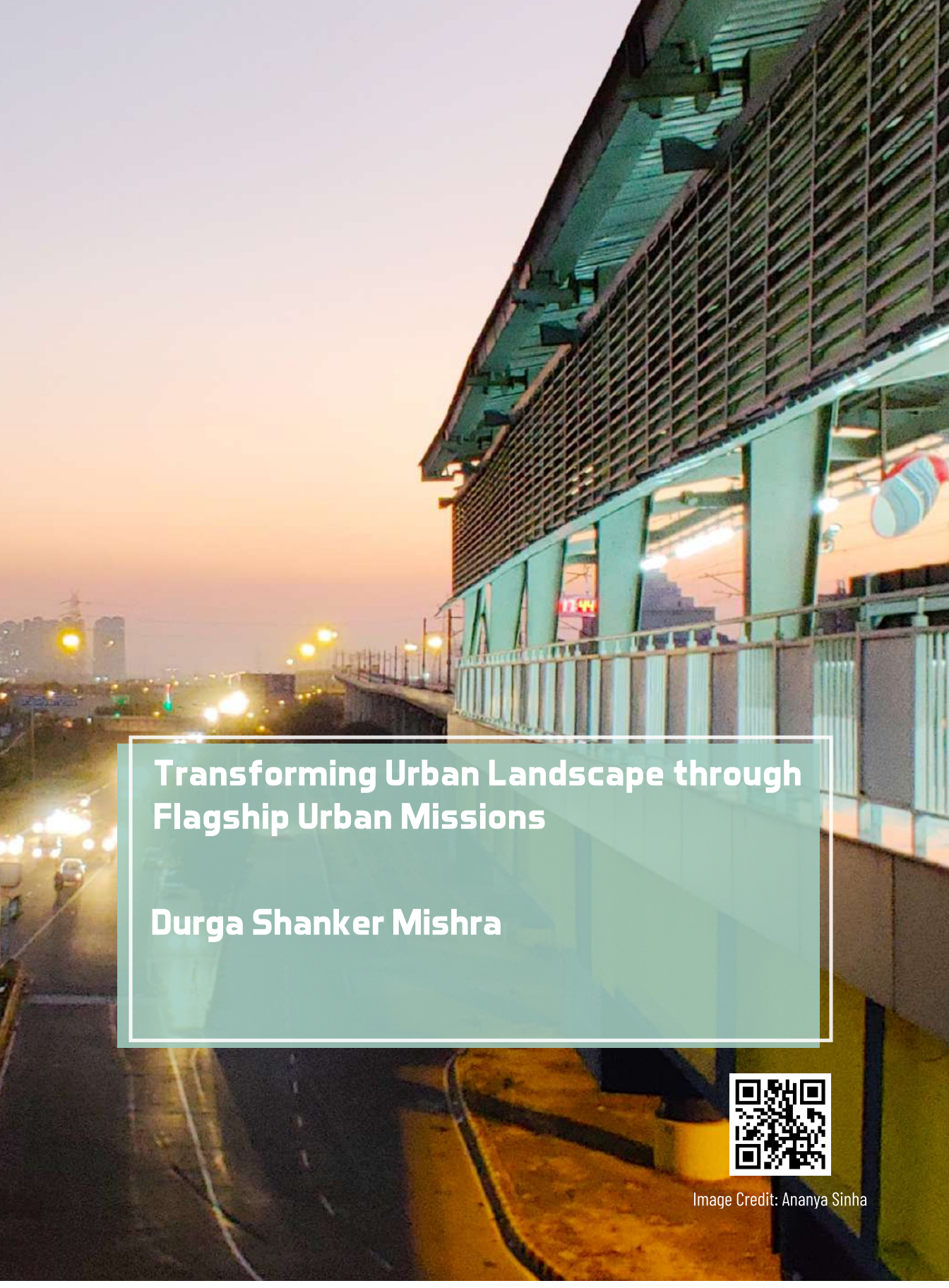


Image Credit: Ananya Sinha

"India is set to experience the largest wave of urbanization in the world in the next two decades. More than a challenge, we see it as an opportunity towards urban transformation. With the help of all stakeholders, we will achieve the dream of resilient and prosperous global cities."

–Hon'ble Prime Minister

Background

India is experiencing rapid urbanization. In Census 2011 urban population was recorded to be around 377 million (31.2%). The growth in urban areas was much more than in the rural areas. This population is projected to grow above 40% that is more than 600 million by 2030 and around 870 million by 2051. The latest studies estimate urban population around 460 million that means over 400 million population is going to be added in urban areas in the next three decades. On the other hand, the cities with population of over one million, which was 53 in 2011 Census are predicted to be 87 by 2030, that means not only the urban population but the size of cities is also growing.

Cities attract people from rural areas to migrate in search of better quality of education, health, entertainment, business and commerce. The growth in population puts huge pressure on the civic infrastructure and also leads to poor housing condition, pollution, environment degradation, flooding, etc., if development is not well planned. Business as usual may lead to far worse quality of life that may degenerate into various social and economic challenges.

Urban development had not been a priority of the Government for long time. It was through Jawarharlal Nehru National Urban Renewal Mission (JnNURM), a scheme launched for various kinds of infrastructure development that included sanitation, sewerage, roads, housing, etc., that it got some attention. A High-powered Expert Committee chaired by Dr. Isher Ahluwalia estimated expenditure of ₹39.2 trillion investments over a period of 3 decades at the end of 2011. Further, a study by McKinsey Global estimated expenditure of over ₹500 trillion to fulfil the infrastructure gap for providing good quality of life in urban areas. Though JnNURM made a start, it could not serve the purpose because of its ad hoc nature and various structural issues.

Launch of Missions

Under these circumstances, urbanization offered challenges as well as huge opportunities for investment and growth. Hon'ble Prime Minister Shri Narendra Modi could foresee these opportunities and the challenges ahead. With his vision, a large number of flagship urban missions were launched in 2014 & 2015, which could impact urban population to bring ease in their living. These missions could be shown in a pyramid as below:

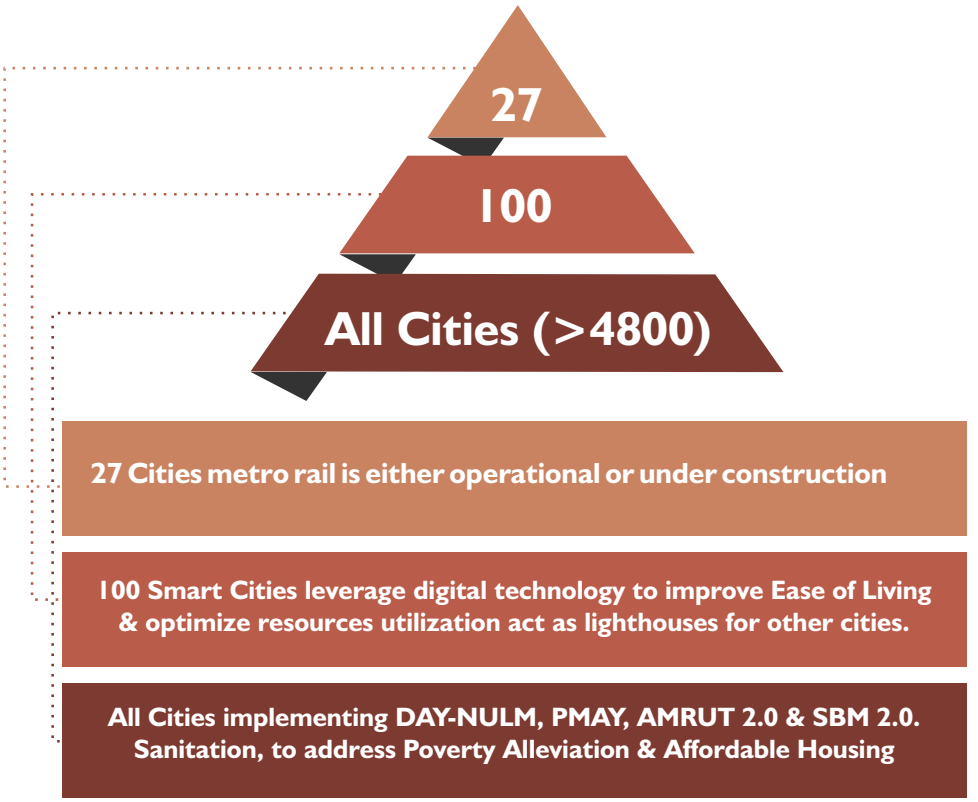


Figure 1: 3-level Strategy adopted by MoHUA for its various missions

A brief description of these Missions and their impact is given in following paragraphs:

Swachh Bharat Mission – Urban (SBM–U)

This Mission was launched by Hon'ble Prime Minister on 2nd October 2014 with an objective to meet all cities Open Defecation Free (ODF), 100% scientific management of municipal wastes and bring behavioural changes. In his address at the launch ceremony, Hon'ble Prime Minister emphasised that this Mission should not be run as usual Government Programmes but should shape as 'Jan Andolan' to involve public at large. Mission has brought transformative change in the urban landscape across the country. Swachh Survekshan from 2016 onwards involving over 450 million population with regular updates during the year and focused survey during 4 weeks for ranking the cities on performance in Swachhata. Mission has led to improvement in quality of life of sanitation workers. Safaimitra Suraksha Challenge has developed an ecosystem for sanitation workers so that they do not have to enter into manhole and if it becomes necessary then only trained persons under safe and secured gear is allowed to enter under supervision. Swachhata has involved

over 150 million citizens through various digital modes to get their feedbacks collected during Swachh Survekshan. It has really turned into a real Jan Andolan. In the Budget of 2021-22, the Ministry has launched SBM-U 2.0 to bring complete Swachhata in next 5 years that includes collecting of waste water before that enters into any water bodies and getting rid of single use plastic, etc.

Pradhan Mantri Awas Yojana – Urban (PMAY - U)

Hon'ble Prime Minister envisaged that all eligible urban poor must have their own all weather (pucca) house along with toilet, drinking water, electricity and cooking gas. These houses were to be in the name of lady of the house or in case of joint ownership lady being the first owner. More than 12.2 million have been sanctioned, nearly 10.2 million grounded for construction and over 6.2 million have been completed and delivered to the beneficiary families. Under this Mission, Global Housing Technology Challenge – India (GHTC – India) has led to grounding of six Light House Projects (LHPs) with over one thousand flats at each location, namely, Chennai, Rajkot, Indore, Lucknow, Ranchi and Agartala. They bring new construction technologies for real estate sector in the country which is resource efficient, climate resilient, disaster resistant and rapidly executable. LHP Chennai was inaugurated by Hon'ble Prime Minister on 26th May 2022.

During the pandemic COVID-19, a scheme named Affordable Rental Housing Complexes (ARHCs) under PMAY-U has been launched which is first of its kind in post-independence era to provide dignified living for urban poor/ migrants. In 2021, Union Cabinet approved Model Tenancy Act which brings complete transformation in the rental space by brining transparency, accountability and quick dispute resolution. This will further supplement the housing endeavour and open up a huge rental market assessed to the size of nearly ₹30 trillion. This Mission is being executed in all the cities.

Deendayal Antyodaya Yojana – National Urban Livelihood Mission (DAY-NULM)

This Mission caters to the need of economically weaker sections in the urban areas by providing skills upgradation and means for urban livelihood. The scheme is run on through a portal facilitating quick and transparent subsidy payment. The scheme has fostered inclusive growth by scaling up participation of more than 7.6 million women in Self-Help Groups (SHGs). It has developed entrepreneurs by providing demand based skill trainings and subsidised credits to more than 2.4 million individuals.

During the pandemic, a scheme for street vendors called PM Street Vendor's AatmaNirbhar Nidhi (PMSVANidhi) was launched. This scheme is end-to-end IT based facilitation and provides working capital loan to the nano-entrepreneurs of the urban economy. On timely repayment, it gives 7% loan subsidy automatically credited in the account on quarterly basis and cash back incentive for use of digital transactions for receipts or payment up to 100 or 200 or more transactions per month, credited on monthly basis automatically in the account. In just ten months from inception nearly 2.6 million

applications were sanctioned and over 2.3 million had been disbursed grants against nearly 4.35 million submitted applications. So far loan worth more than ₹ 3.9 million has been sanctioned for over 4.9 million beneficiaries.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

This Mission covers 500 cities with a population of more than hundred thousand (2011 Census) or important cities in islands, on the hills or back of the rivers. This Mission envisaged 100% water supply, enhanced coverage of sewerage/ septage (60%) and other infrastructure including atleast one green community park in every city. It also envisaged various reforms to improve capacity of the cities and make them self-reliant. As a reform, country's rank in Ease of Doing Business in Construction Permits by the World Bank jumped 159 places from 186 in 2016 to 27 in 2020. Over 2,500 cities have adopted online building approval system that includes 452 AMRUT cities. Nearly 700 water pumps have been replaced by energy efficient pumps. 11 cities have raised ₹39.4 billion through municipal bonds and many others above credit ratings are under process to raise money through bonds. AMRUT has implmented GIS master plans for all AMRUT cities.It has created more than 2,200 green spaces and parks covering around 4,500 acres of land.

Hon'ble Finance Minister in her Budget speech 2021-22 had announced Jal Jeevan Mission Urban with an investment of ₹2.97 trillion investment to ensure 100% water connection in all cities and making cities water secure through various conservation, preservation, reduce, reuse and recycle measures. The announcement of Hon'ble Finance Minister led to the launch of AMRUT 2.0 on 2nd October 2021. AMRUT 2.0 envisages universal coverage of water supply in all statutory towns of the country along with 24 × 7 water with Drink fromTap (DTP) in all 500 AMRUT cities. Further it aims to make cities water secure by rejuvenation of water bodies, urban aquifer management, rainwater harvesting and PeyJal Survekshan.

Smart Cities Mission (SCM)

Hon'ble Prime Minister envisaged new paradigm in urban development through Smart Cities Mission. For the first time 100 cities were selected through two levels of challenges, i.e., at State and Central levels. Such cities prepared projects worth nearly ₹2.05 trillion through large scale public engagements. The Mission is funded by the Centre and State Governments and convergence of various Missions/ programmes of the Governments, public private partnership, debts and other innovative resources. It builds on four pillars of development – institutional, physical, social and economic.

Smart cities are like light house projects, creative learning through area-based development (retrofit, redevelopment or green field development) or pan city development which could be replicated in other cities. Actions have been initiated to use this experience under Mission to make a smart movement for all urban areas and future urbanization. So far under SCM more than 5,000 projects using either area based development approach or pan

city development have been undertaken. Further challenges like Cycles4Change, Streets4People, Nurturing Neighbourhood, EatSmart and Transport4All have been launched in cities with population more than 500 thousand.

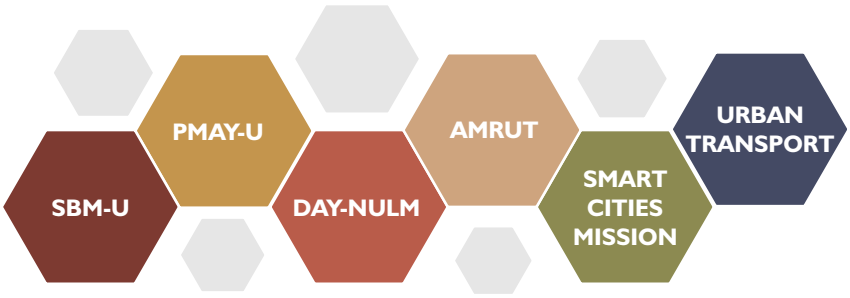


Figure 2: Flagship Missions of MoHUA

Urban Transport (UT)

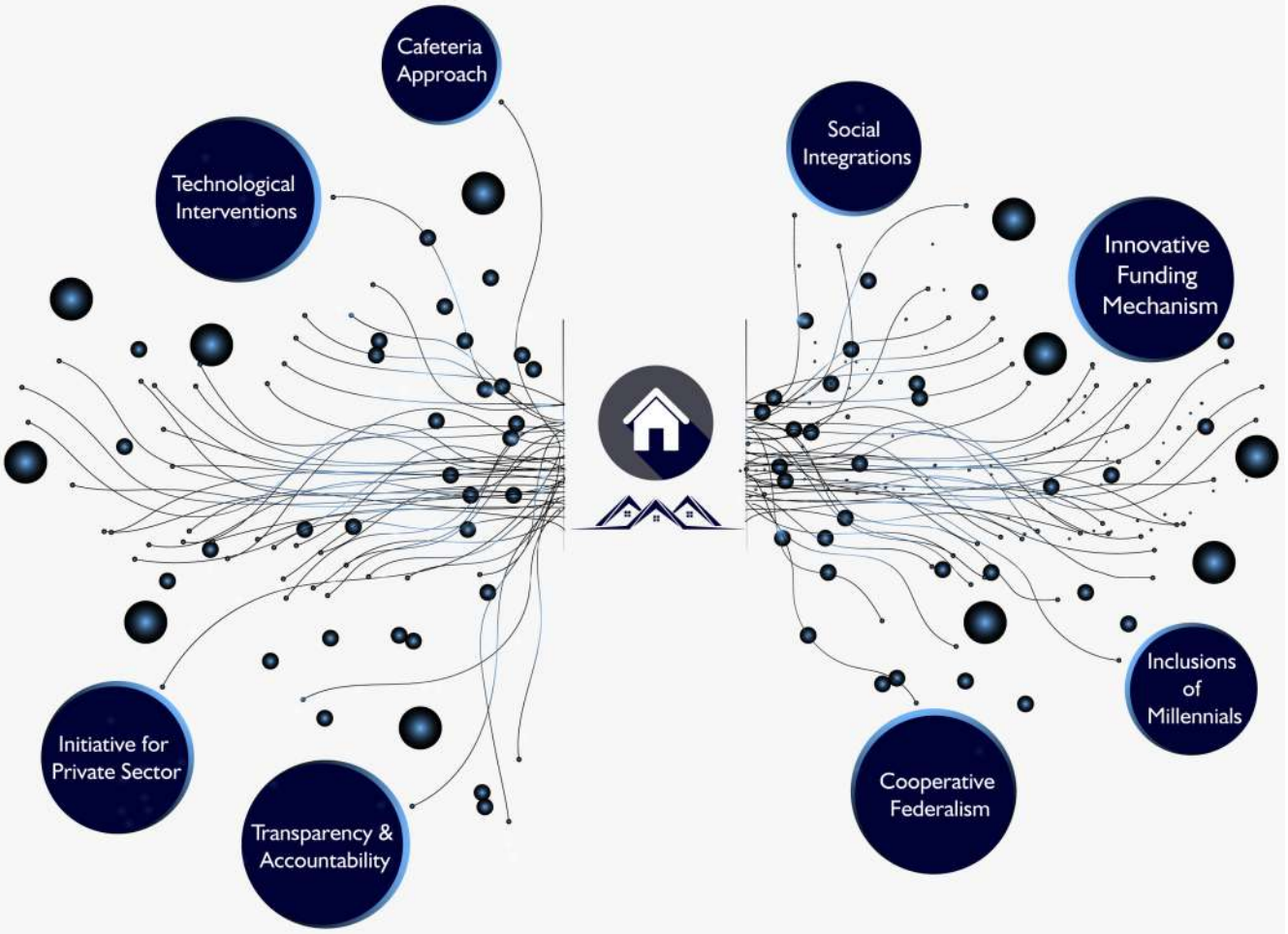
Transport in urban areas is a huge challenge. In the last 7 years Metrorails have been made operational in 20 cities with nearly 778 kms of network. Further, works on nearly 1,012 kms of Metro network in 17 cities is currently under progress. With a new Metro Policy circulated in 2017, standards and specifications have been launched for Metro Lite and Metro Neo i.e. Mass Rapid Transit with much lesser cost but similar experience in terms of punctuality, comfort and safety. Kochi Water Metro is an integrated ferry transport project in Greater Kochi region proposed by Kochi Metro Rail Limited. It serves as a feeder service to suburbs along with rivers where transport accessibility is limited.

For promoting non-motorized transport Cycle4change, Streets4people and Transport4all challenges have been launched in all smart cities and those with population above 500 thousand. Under AMRUT and Smart Cities Mission various other progammes have been executed to improve mobility.

Apart from above, Real Estate (Regulation and Development) Act (RERA) came into force in 2016 to bring transparency and accountability in the real estate sector and provide confidence to the home buyers. This Act is now being implemented in all the States other than Nagaland and so far, as over 94,000 real estate projects and more than 69,500 real estate agents have got registered and around 100 thousand grievances have been cleared. For the first time Ease of Living Index (EoLI), Municipal Performance Index (MPI), ClimateSmart Cities Assessment Framework (CSCAF), Cities Innovation Exchange (CIX) etc. have been launched to improve quality of life in the cities. National Urban Digital Mission (NUDM) with various components has been launched to bring various urban services and facilities on digital mode. Action is going on to make cities vigorously data smart and promote innovations with India Urban Data Exchange (IUDX).

In nutshell, there has been a surge over last seven years to bring ease in living for the citizens and huge urbanization as an opportunity to promote growth and economic development. These Missions are also making our cities future ready.

PART TWO
PMAY(U): Mission



A Multi-Pronged Approach for PMAY-U

Manoj Joshi

Few would contest that over the past seven years, PMAY-U has emerged as one of the largest mass housing schemes of the world. It echoes the ethos of *'Sabka Saath, Sabka Vikas, Sabka Vishwas, Sabka Prayas'*. A major contribution to the success of PMAY-U has been the policy shift towards an outcome oriented approach, as opposed to output oriented approach, wherein, the Government only set the outcome to ensure 'Housing for All' rather than fixing on output fixed on a pre-decided number of houses. Prior to 2015, there had been an array of housing policies in the country but the focus of these programmes was on building a fixed number of houses and then allocating them to beneficiaries. However, the implementation mechanism of PMAY-U was designed and perceived by keeping the beneficiaries at the centre. The Mission is demand driven at its very core. The focus of the Government has been to comprehensively solve the housing crisis of the country by on the one hand, ensuring supply and on the other, enhance the demand of the beneficiaries.

Answering the Housing Question

Transforming the housing sector to create a conducive and self-regulatory environment across the length and breadth of the country emerged a herculean task in itself. The spectrum of beneficiaries of PMAY-U came from various cultural, socio-economic, regional and linguistic backgrounds. It is being implemented in 4,500 cities/towns/planning areas/special development authorities across the country. Since the inception of the Mission, there has been a dedicated effort to contextualise strategies of information, education and communication, financial inclusion, construction materials and social engagement to ensure the benefits of the Mission reach all its beneficiaries.

PMAY-U was complex and challenging because there was no fixed target envisaged at the beginning of the Mission. The objective was to provide houses as per the choice and need of the beneficiary household. Instead of adopting a 'one size fits all' approach, the Mission is being implemented through cafeteria approach, where each beneficiary household is given the freedom to choose one out of the four verticals of PMAY-U. Many housing scholars believe that every household has the need for housing but the biggest hurdle the household faces is in converting that need to demand. The objective of the Mission is precisely to bridge this gap of need and demand. This in itself is an incredibly challenging task and given the scale of the country's diversity, a decentralised and flexible approach was adopted for the on- ground implementation of the Mission.

On the other end of the spectrum, there was a need for structural changes in the affordable housing sector of the country. From the very inception, it was envisaged that the role of the Government would be that of a facilitator and capability enhancer. Measures and initiatives under the Mission focused on creating a conducive environment for the affordable housing sector which promotes self-regulation, growth, prosperity and augmenting the supply of affordable housing in the country.

Augmenting Demand: The Interface of the Beneficiaries

The demand for housing in urban India remains directly proportional to the pace of urbanisation, rural-urban migration and enhancing per capita Gross Domestic Product (GDP). Economists argue that for the most households, housing is the first and largest expenditure from their income and the percentage of income any household invests in housing becomes higher as the income reduces.

For answering the housing question of diverse income groups, specific strategies were required for each of the income bracket to enhance their respective housing demands. In cases of Beneficiary Led Construction (BLC), a direct subsidy of ₹150 thousand is being offered by the Central Government to build their houses on the land already owned by the family. For Credit Link Subsidy Scheme (CLSS) which caters to the widest income brackets across the four verticals of PMAY-U (EWS, LIG and MIG), interest subvention is offered to the beneficiaries when they take home loan. In the Affordable Housing in Partnership (AHP) vertical, the Central Government provides a subsidy of ₹150 thousand to the beneficiaries and in case of in situ Slum Redevelopment (ISSR), a sum of ₹100 thousand is provided to the beneficiaries with cross subsidisation of monetising reclaimed land. The subsidy increases the purchasing power of the beneficiaries and makes houses more affordable for them.

Major credit is given to the respective State/UT Governments for reaching such a wide base of beneficiaries and dovetailing the Mission with their on-going housing schemes. As constitutionally, land & colonisation are subjects concerning State/UT Governments in India, some State/UT Governments took onto themselves to provide individual plots to the beneficiaries to build their homes with the financial assistance which substantially enhanced the demand for housing under the Mission. Along with, the State/UT Governments, the banking sector deserves appreciation for the massive campaign and inclusion drives they undertook to increase the demand base of CLSS and also promote financial inclusion of beneficiaries from other verticals. The three Central Nodal Agencies (CNAs) identified under the Mission, viz. National Housing Bank (NHB), Housing and Urban Development Corporation (HUDCO) and the State Bank of India (SBI) have led the journey of the banking sector within the Mission. These CNAs, through their respective Primary Lending Institutes (PLIs), have reached to over 2.4 million beneficiaries under the CLSS vertical.

Ensuring Supply: The Enablers

While on one hand efforts were made to enhance the demand, on the other, to fulfil these demand, supply side interventions and policy actions were rolled out. As envisaged by erstwhile Hon'ble Finance Minister Shri Arun Jaitley, it was the time for thinking big and making a quantum jump in the affordable housing sector. Mission became the harbinger of transformation in the housing construction sector in India which is continuously providing the much-needed push to the private sector to undertake affordable housing construction. The pain-points of the real estate sector were identified by multiple stakeholder

consultations, workshops and researches undertaken by committees. Recognising the role housing plays in an individual's day-to-day life and simultaneously evaluating its direct and indirect multiplier effect on economic growth of the country, various financial, technological, legislative, financial, fiscal and regulatory measures were introduced to provide impetus to the sector.

Financial Measures

One of the reasons why the previous housing programmes were intermittent and piecemeal in approach was the lack of continuous fund. The funds were either not available or not released on time which ultimately became a burden for the beneficiary. While designing PMAY-U, ensuring availability of continuous funding was one of the paramount considerations for the Government. It was understood that investment from our side became a big sign of faith and trust for the beneficiaries which encouraged them to invest their savings in building their houses.

Thus, a major step was taken to devise a separate funding mechanism away from regular budgetary allocations. A National Urban Housing Fund (NUHF) was created to mobilise the Extra Budgetary Resources (EBR) to the tune of ₹530 billion which was over and above the budgetary provisions. Further, from the priority sector lending backlogs, an Affordable Housing Fund (AHF) was created in NHB to assist PLIs in providing loans to the PMAY-U beneficiaries from EWS and LIG categories at reduced interest rates improving affordability.

Fiscal Measures

High tax liabilities and inadequate investment opportunities in the affordable housing sector was another hindrance which caused inhibition in the private sector for investing and encouraging construction of affordable housing in the country. The role of the Government in PMAY-U is to act as a facilitator which provides the necessary boost to the private sector and makes the overall sector self-regulatory and self-propelling. The Government realised that the treatment of regular housing construction and affordable housing construction cannot be same, as the profit margins in affordable housing sectors are slim as compared to luxury housing. It was thus decided to provide builders with tax incentives and open other avenues to invite investment in the sector.

Just at the very inception of the Mission, affordable housing was given an infrastructure status in 2017, which provided the inclusion of the sector in the Harmonised List of Infrastructure and thus, eased priority sector lending for the sector. Ministry of Finance on one hand reduced the tax burden for the buyer, simultaneously on the other hand, the GST on affordable housing was reduced from 8% to 1% (with no input tax credit) and for other housing projects from 12% to 5% (with no input tax credit). Various rebates under income tax were given to promote investment in the affordable sector and improve purchasing ability of the beneficiaries.

Regulatory Measures

Another factor which loomed the growth of real estate sector in the country was the lack of faith from the buyers and the untimely completion of projects. The real estate sector prior to 2016 was largely unregulated, leading to many anomalies resulting in unfair practices and adversely impacting the home buyers. Real Estate (Regulation & Development) Act, 2016 [RERA] marked the beginning of a new era to ensure regulation in an efficient and transparent manner to protect the interest of the home buyers. For AHP and ISSR projects under the Mission, RERA registration has been made mandatory.

One of the biggest paradox of Indian housing sector is that against the estimated housing deficit of 18 million, there were 11 million vacant houses in urban areas (as per Census 2011). The demand of the tenure in housing types is varied; and ownership-based housing rights are not the preference of all the families in the country, especially for the mobile migrating urban population. After a long deliberation and consultation, Ministry had prepared the Model Tenancy Act (MTA). The Act has been approved by the Union Cabinet in its meeting held in June 2021 and shared with States either to legislateor modify existing rental law. It will enable unlocking of vacant premises for rental purpose and create a vibrant and sustainable rental housing market. MTA balances the interests and rights of landlords and tenants in an accountable and transparent manner and prescribes a speedy dispute resolution.

The time invested in the building approvals and permission process sometimes took longer than expected which became a point of contention for the real estate sector and also adversely impacted foreign investments in the country. Subsequently, as a solution to the problem, Online Building Permission System (OBPS) with integrated seamless approval from all internal/external agencies with reduced number of procedures, time, online payment etc., was introduced in Delhi & Mumbai in April 2016 to enhance Ease of Doing Business (EoDB) in Construction Permits. As per World Bank's Doing Business Report, India's rank in construction permit improved from 185 in 2017 to 27 in 2020. As of now, OBPS has been implemented in all cities of 17 States, 2465 cities across the country.

Technological Measures

Using conventional brick-mortar construction technology, a one storey single family dwelling unit takes almost 10-12 months to be completed. This became the biggest challenge for the Mission. In order to fulfil the vision of 'Housing for All' in a time bound manner, construction practices need not be disrupted and mainstreamed from the grassroot level. There was a need to develop technology which matches the objective of speed of construction, remains sustainable and cost-effective. This involved doing things differently, thinking new and innovative, acting quick and building human resources.

Hon'ble Prime Minister emphasised how important it is to adopt new construction approach. Use of innovative and fast-track construction technologies has been adopted in a

big way under the Mission. In 2019, MoHUA organised Global Housing Technology Challenge – India (GHTC – India) to identify and mainstream globally best available proven construction technologies that are sustainable, green, resource efficient, disaster-resilient and rapid to enable a paradigm shift in affordable housing. This was followed by implementing the ambitious Light House Projects (LHPs) in six cities – Lucknow (Uttar Pradesh), Chennai (Tamil Nadu), Rajkot (Gujarat), Indore (Madhya Pradesh), Agartala (Tripura) and Ranchi (Jharkhand). LHPs are model housing projects which bring a revolution in India's construction technology landscape. It is envisaged that the impact will not remain limited to affordable housing sector but would also bring about disruptive changes in the overall construction sector of the country – for which the Ministry has launched the Live Labs in these sites and encouraged various stakeholders to visit and learn the technologies through the drive of Technograhis.

Handholding and Monitoring

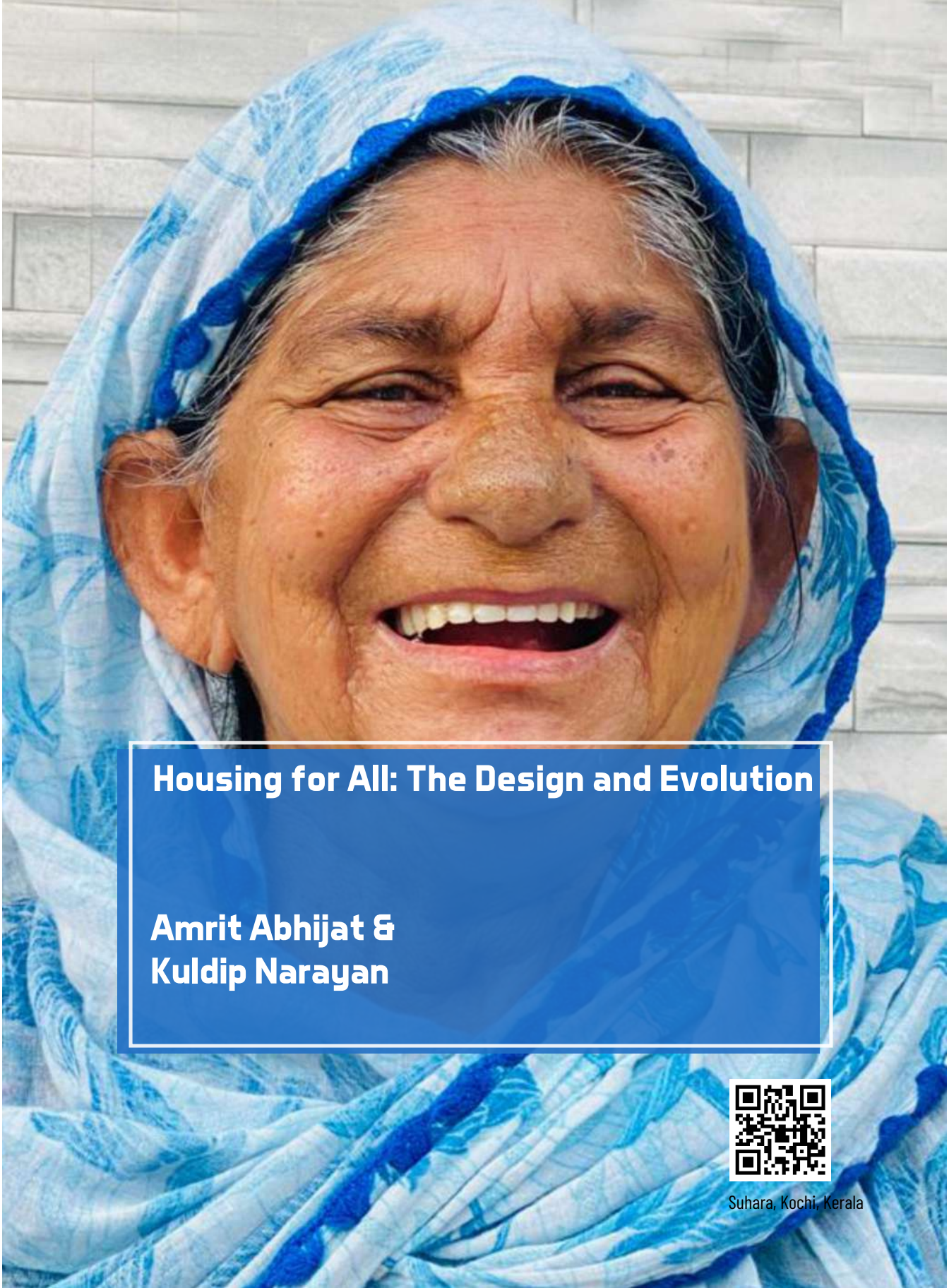
While providing homes to millions of people in urban India seemed an uphill task, there was an urgent need to work in "mission mode". Enthusiasm had to be created at all levels of the implementation structure, whole-hearted commitment to the cause of achieving 'Housing for All' was required; instead of following the traditional, non-time-bound approach. In the Ministry, the new normal is working extensively, keeping one-foot on the ground and encouraging quick decision making at all levels of implementation. MoHUA invited young and fresh talent from outside to take on new functions through formulating a Project Monitoring Unit (PMU), encouraged use of social media – for direct interaction with the beneficiaries and acting with agility on the feedback or grievances received on various platforms.

Whereas, the implementation of PMAY-U is carried out by State/UT Governments; the implementation structure puts forth a structure of cooperative and competitive federalism by formulating State Level Sanctioning and Monitoring Committee (SLSMC) and Central Sanctioning and Monitoring Committee (CSMC). SLSMC takes the pulse of technical appraisal and sanctioning of projects at State level, whereas, the CSMC takes over the monitoring and fund disbursement role at the Central Government level.

The team at the Ministry travels extensively to different States/UTs to actively engage with and motivate all levels of officials and continuously interacts with beneficiaries on ground which keeping us grounded and realistic in implementation and also providing us with constant encouragement.

Housing for All: The Design and Evolution

Amrit Abhijat &
Kuldip Narayan



Suhara, Kochi, Kerala

Housing for All

The 'Housing for All' Scheme or the Pradhan Mantri Awas Yojana – Urban (PMAY-U) is by far the largest housing programme of India and perhaps, in the world as well. As we complete seven years of the Mission, we drive the satisfaction of having provided much needed comfort to millions of households. To put it briefly, out of 12.2 million sanctioned houses, more than 10.2 million are in various stages of construction, out of which 6.2 million have been delivered. The chapter is divided in three main sections. It begins with a brief background and design of the Scheme. The second section looks at various initiatives that were critical to the better functioning of the Mission and kept evolving. The last section looks at the learnings that will help in addressing and defining the housing policies and programmes in future.

A brief historical background will help us appreciate the context in which the HFA Mission was envisioned. Independent India embraced the philosophy of a welfare state and strived for social, political and economic justice. It worked to reduce persistent inequities and addressing the housing shortage became an important aspect of development thought and policy. However, given the constraints of a developing country and more important competing priorities; housing could not be addressed comprehensively. This limitation was further affected by the political economy and electoral compulsions which was skewed against urban planning and growth.

This scenario gradually started changing as India's urbanisation picked up, particularly post-reforms of 1991. Ministry of Urban Development increasingly got focus and funds for infrastructure in urban sector with schemes on water, sewerage, transport, etc. Nonetheless, housing schemes remained incremental in nature and significant. They were limited in scope, allocation of funds, covered a few slum settlements. As a result of which, the housing goods reached to a few, based on complex criteria and predispositions. The Targeted Group on Urban Housing formulated by the erstwhile Ministry of Housing and Urban Poverty Alleviation in 2012 estimated the shortage of urban housing at 18.78 million. Clearly, there was need for a much more comprehensive – all embracing scheme to address this gap.

The estimated housing shortage emerged as a challenge and also an opportunity for the government and the society. It set the stage for a 'mission- oriented' approach to housing which is not top-down with an over shadowing role of the government but determines the direction of growth of the housing sector, making it more inclusive and sustainable (Mazzucato, Kattel, Collins 2019). The overall objective was to make strategic interventions and investments across many different sectors which directly and indirectly influence housing construction. The government committed itself to provide housing to all eligible beneficiaries, regardless of class, caste, region, area, gender, occupation and type. The Mission guidelines simply and boldly stated that any Indian citizen with an annual income of less than ₹300 thousand and no pucca house anywhere in the planning areas across the country will be eligible for a house under PMAY-U.

So, what was so unique about the programme? How did we go about working in the Scheme? What has been the role of the various stakeholders? What has been the strategy to ensure performance and compliance? How far has the monitoring design helped in the sanction progress? Can the PMAY-U strategy be replicated for other schemes? Overall, what has been the learnings from the implementation of PMAY-U?

Design of PMAY-U

Based on the historical experience of working on slums, the government went in for a cafeteria approach which meant that the people were able to choose the place, the type of house, whether they wanted to build their own houses (BLC) or choose to stay in pre-designed houses with public/ private sector participation in multistorey apartment (AHP) or would prefer to get their home in redeveloped slums (ISSR) or would prefer to buy their dream home from open market through interest subsidisation under the CLSS vertical of PMAY-U.

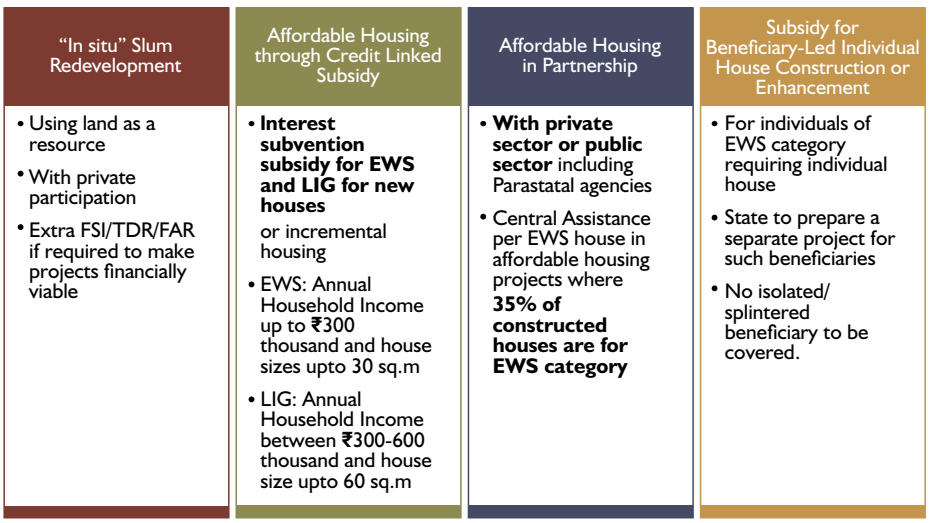


Figure 3: Verticals of PMAY-U

Assessing the Demand

Common wisdom to get a stock of beneficiaries would have been to go for the standard Below Poverty Line (BPL) list or Socio-economic Caste Census (SECC) datasets or the Technical Group (TG)-12 report. However, the Ministry rather opted for a demand survey strategy done by the respective States/UTs. This gave all the eligible beneficiaries an opportunity to 'demand a house' rather than houses being dispensed as state goodies for trade-offs. In addition, the seriousness of the applicant, the financial preparedness, site, infrastructure, compliance to master plans, etc., were all worked out in the HFAPoA.

Also, willingness of the beneficiary to opt for a house was taken, along with the preferred vertical, place, etc. The demand survey made the project options wide, enhanced the availability of funding and brought multiple stakeholders on board for a project to be envisaged. Further, once the demand had been consolidated at ULB level, an undertaking by the beneficiary was deemed sufficient for assessment. The Scheme thus, had the element of trust and freedom of choice and avoided unnecessary pressure on ULBs and attendant issues.

The Mission aimed to address both sides of the housing market, the demand and the supply. On one hand we rolled out demand driven verticals of BLC, AHP and ISSR; while simultaneously on the other hand, the Mission undertook supply side intervention through the CLSS vertical. Out of the four verticals, CLSS catered to the most diverse socio-economic groups: a household with an annual income below ₹300 thousand to a household with annual income below ₹1.8 million. Essentially, any aspiring home buyer meeting the Scheme's eligibility criteria could directly approach the Primary Lending Institutes (PLIs) and get the interest subvention of upto ₹267 thousand, offered under the Mission. With more than 2.4 million beneficiaries, CLSS has emerged as a game changer in housing finance sector. Debunking the paradigm of the buyer going to the banks, CLSS has redefined the housing market by bringing the buyer on the centre-stage. The PLIs were given monthly and annual targets which ensured that the banks reached the prospective home buyers.

Preparing the Housing for All Plan of Action

The States/ UTs, then dedicatedly strategised their HFAPoA with the help of beneficiaries, ULB officials and experts' group. The City Level Technical Cell (CLTC) and the State Level Technical Cell (SLTC) would formulate plans after consultation with designers/ civil engineers, grassroot levels, site availability and preparedness for implementation.

Finally, a set of specialists, planners, architects, engineers and social developers, formulated and discussed the infrastructure plan, and transportation issues while making the HFAPoA. The plan thus prepared would eventually be duly assessed by the respective SLTC, constituting domain experts who would strategise the annual/ quarterly implementation plan based on the availability of funds, infrastructure provisions, completion schedule and the priorities of States/ Uts.

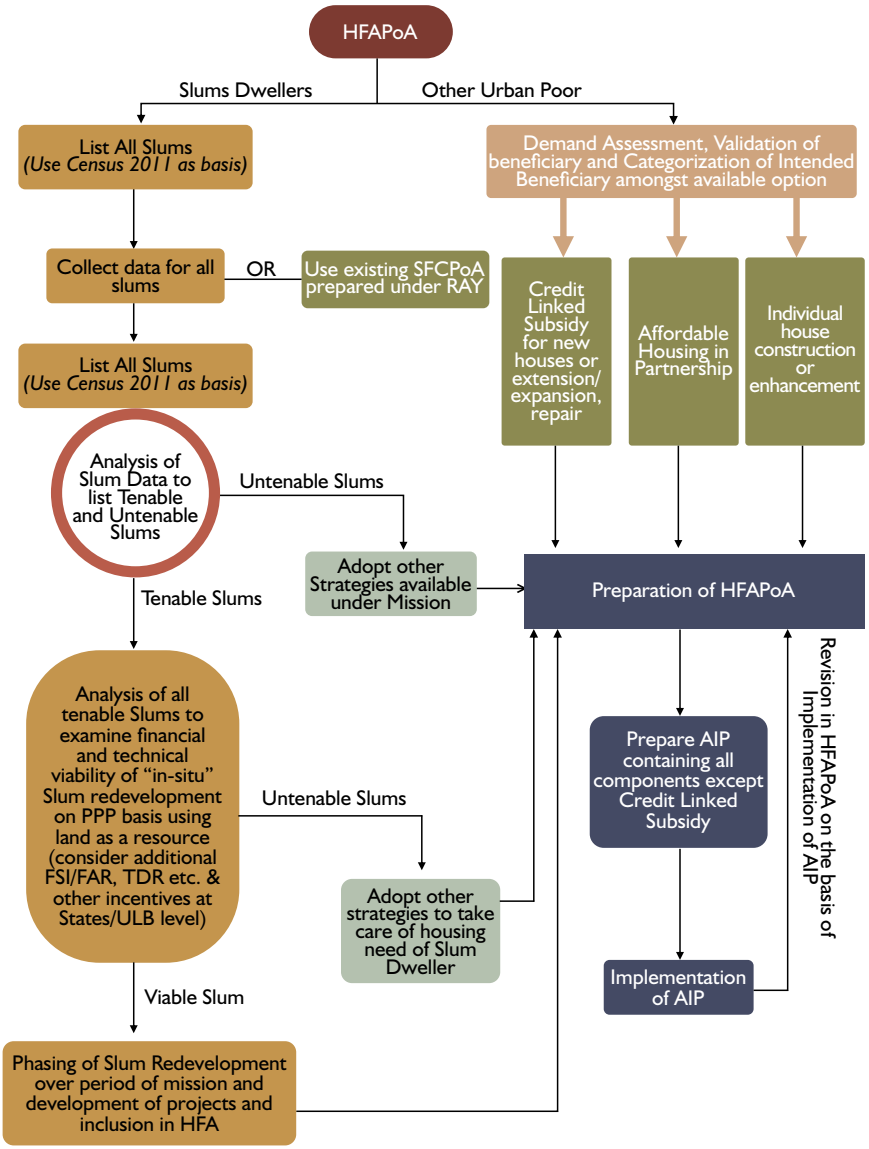


Figure 4: Broad Methodology for Preparation of HFAPoA

The State Level

Once the conceived project was ready in the form of a Detailed Project Report (DPR), it was put up before the State Level Sanctioning and Monitoring Committee (SLSMC), headed by the Chief Secretary of the respective State/ UT for examination of the proposal and obtaining approval for the urban development or the housing department, particularly on the issues of funds for State/ UT share, infrastructure coordination (if

required) and statutory clearances. The SLTC/ SLNA and Principal Secretaries, Head of Departments undertake site and project visits through physical visits and audio and video methods, during which they meet the beneficiaries, take their feedback on the progress of the Scheme. The respective Chief Ministers would take regular meetings and visits to assess the progress, arrange for funds and undertake deliberations with the Central Ministry on matters of administrative, finance, coordination and regulatory issues. It became a regular practice for Central and State teams to jointly review projects at State level and subsequently go for field visits. These gave the stakeholders an opportunity for genuine feedback, improved quality, monitored progress and cleared the bottlenecks.

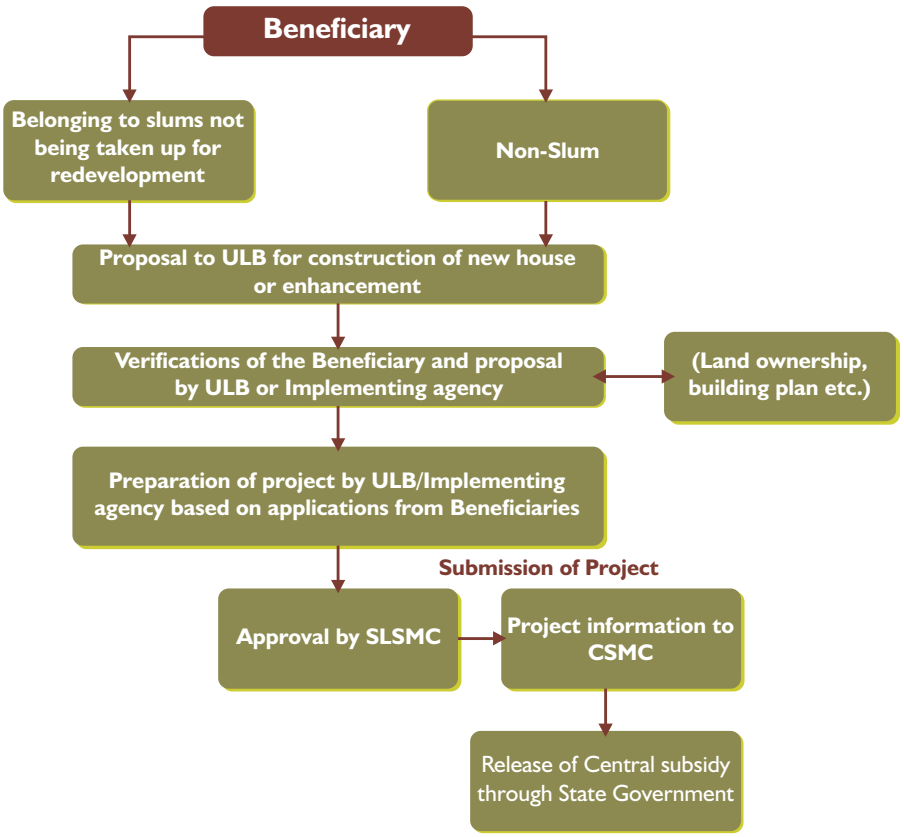


Figure 5: Methodology for Demand Assesment

The Centre

Central Sanctioning and Monitoring Committee (CSMC) is an inter-ministerial committee constituted under the chairpersonship of Secretary (HUA) for implementation of the Mission. CSMC usually meets once a month for overall review and monitoring of the Mission. It assesses and evaluates resource requirement based on HFAPoA and AIP submitted by States/ UTs and accordingly releases Central Assistance under various

components of the Mission, except CLSS. CSMC is also a platform for regular interaction between the Ministry and implementing States/ UTs, where issues related to effective implementation of the Mission are discussed. Role of monitoring and coordination has been central to the strategy of the Mission. Instead of relying on tedious correspondences, Government of India and respective State/ UT Governments interact at the respective headquarters, field visits and in the CSMC meetings.

Evolution of PMAY-U

The journey of PMAY-U has followed the path to develop knowledge, co-create, develop capacity and capability for officials at all levels and engage with beneficiaries to systematically re-engineer the implementation and monitoring mechanisms. Here, it is pertinent to discuss some important features of the Mission which have been constantly evolving to ensure accountability and transparency along with timely implementation.

Fund Allocations

Catering to the demand of houses within the designated time frame required consistent monetary allocations and other fiscal support. No doubt, regular release of funds was the most critical aspect for uninterrupted implementation of the Mission. Therefore, mobilisation of funds to finance the construction of houses was given special attention by Central Government. For construction of 12.2 million houses under PMAY-U, an estimated investment of 8.31 trillion, comprising of Central, State/ UT and beneficiary share has been made with a committed Central Assistance of about ₹2.03 trillion.

Thus, a separate funding mechanism was devised through creation of National Urban Housing Fund (NUHF) to mobilise resources through Extra Budgetary Resources (EBR) to the tune of ₹530 billion, over and above the year-on-year budgetary provisions. Further an Affordable Housing Fund (AHF), hosted at National Housing Bank (NHB) was created. Through regular funding support, PMAY-U Mission could achieve the grounding of over 10.2 million houses and completion of 5 million houses. In the 'Aatma Nirbhar Bharat' 3.0 package, an additional outlay of ₹180 billion for the year 2020-21 through budgetary allocation and EBR for the Scheme funding was made.

Project Management through Information Technology (IT) Systems

A Mission of this size no doubt required a digital infrastructure for monitoring implementation and assuring transparency and accountability at each stage. Hence, a unique feature of communication and monitoring the progress of PMAY-U was the use of Management Information System (MIS) and Information, Education and Communication (IEC) tools. The Mission anchored a robust MIS using space technology by linking the system to National Remote Sensing System (NRSC), a unit of Indian Space Research Organisation (ISRO). NRSC uses Bhuvan Geoportal application services to geotag the

houses under the Mission, which streamlines the monitoring progress. geotagging was initially started for BLC houses through BhuvanHFA portal and for AHP and ISSR houses through BharatHFA portal. The system had been developed to digitise and automate the work processes, from capturing of demand surveys to allotment of houses to the beneficiaries. The progress of each house was updated on MIS and verified by field supervisors for five stages of construction (grounding, foundation, lintel, roof and completion) and these were made available for open access on the PMAY-MIS website. This ensured efficient and effective utilisation of resources and helped identify the incomplete and stagnant projects. MIS was used to validate the authenticity of the beneficiaries and check duplicity. The system captures unique ID information, i.e., Aadhaar Number of the beneficiary and their family members and performs real-time demographic verification with the UIDAI server. Later, the MIS was inter-linked and integrated with a number of MIS/ dashboards of other Government department/agencies like UIDAI, NRSC, NIC, DBT, NITI, PFMS, MyGov, Umang, PMAY (Gramin), Ayushman Bharat, Ujjwala, Fit India Schemes for real time sharing of the Mission data. This has ensured transparent dissemination of information to citizens/ beneficiaries and facilitating States/ UTs/ ULBs/ Implementing Agencies to digitise their work processes and monitor the progress.

As the number of approved projects grew, it became a humongous task to maintain fund release data. The task of preparing sanction order manually was getting more complex and herculean for the concerned sections due to nature of beneficiary attachment, and multiple release for various instalments. In order to ensure financial discipline and standardisation of all fund release processes, along with the physical progress of houses, modules were developed for monitoring Sanction Orders and Releases, Utilisation Certificates and Adjustments in MIS. The transfer of funds through Direct Benefit Transfer (DBT) mode was gradually expanded, where the instalments are credited to the bank account of beneficiaries electronically. Further, a provision for generation of allotment letters through Aadhaar verified e-sign of the allotter for multi-storied apartments built AHP/ ISSR verticals was included.

Stage-wise instalments were released to the States/UTs only after completion of the compliances by the State/UT, like geo-tagging of all the houses, submission of 70% Utilisation Certificates against the released Central Assistance, reports from Third Party Quality Monitoring Agencies (TPQMA) and Action Taken Report (ATR) against each project, thus ensuring transparency, accountability and financial discipline.

As far as the CLSS vertical of PMAY-U is concerned, delays in processing of applications for release of interest subsidy resulted in increase in public grievances. In order to resolve the issue, a separate CLSS Awas Portal (CLAP) was conceptualised which enabled process re-engineering and speedy processing of cases. The portal expeditiously provided transparent and real-time web-based monitoring system for Ministry, CNAs, PLIs and CLSS beneficiaries. The CLAP software has also been synchronised with PMAY-U MIS system for de-duplication with other verticals of PMAY-U, along with dashboard. CLAP has an in-built application status tracking facility which reduces public grievances.

Citizen-oriented PMAY-U portal with www.pmay-urban.gov.in, advanced features and social media compatibility, acts as primary source for information dissemination/ IEC material and knowledge sharing. The website is user-friendly and contents/ banners/ pop-ups on the website are regularly updated to generate public interest and create awareness about the latest developments related to the Scheme or to mark some momentous occasions. The Central team continuously interacts with States/ UTs to share information for assistance. Here, social media too acts as a powerful and live tool of communication generation.

It was realised early in the implementation that there is a need to have a mobile application too since a huge percentage of people in India use mobile phones. Thus, the PMAY-U Mobile application was developed (both in Android and iOS version) to bring beneficiaries directly in contact with the Mission for all information about the implementation, along with Progress dashboard, and CLSS Tracker. This application allows beneficiaries to upload photos/ selfies of houses and videos of their stories/ testimonies and experiences of owning a house under PMAY-U. During COVID-19 lockdown, most of the Mission devoted itself through the online reviews or through Video Conferences.

Welcoming Construction Technology

Construction of 12.2 million houses within the time period of the Mission has its challenges. While we had developed a comprehensive monitoring mechanism with technology playing the vital role, there was also a need to move beyond the conventional construction techniques to fast-track the construction. The Ministry converted this into an opportunity to redefine the construction paradigm in the country. A Technology Sub-Mission (TSM) was set up under the overall Mission to facilitate adoption of modern, innovative and green technologies and building materials for faster and quality construction of houses. TSM would work on disaster-resilient and environment-friendly technologies, and also facilitate preparation and adoption of layout designs and building plans suitable for varied geo-climatic zones of the country.

A further impetus was provided when on the exhortation of Hon'ble Prime Minister, MoHUA incepted the Global Housing Technology Challenge (GHTC) – India in 2018-19. GHTC – India was conceived to attract the latest and best available construction technologies from across the globe to India through a challenge process. As an outcome, 54 construction technologies were shortlisted and categorised in six major categories. Subsequently, out of these 54, six technologies were further shortlisted to be implemented as Light House Projects (LHPs) in six different locations, each constituting of about 1,000 houses with basic social and civic amenities. The foundation stones for LHPs were laid by Hon'ble Prime Minister on January 1, 2021. LHPs are envisaged to serve as model housing projects located in Chennai, Lucknow, Indore, Rajkot, Ranchi and Agartala. LHP Chennai was inaugurated by Hon'ble Prime Minister on 26th May 2022.

LHPs have been introduced for familiarisation, adoption and adaptation of the innovative technologies, materials and processes suited to Indian geo-climatic and other

The Story of PMAY-U

Beneficiary Led Construction/Enhancement

GoI Grant @ 150 thousand per house

Sanctioned: 72,36,792
Grounded: 62,73,573
Completed: 29,90,674

Affordable Housing in Partnership

GoI Grant @ 150 thousand per house

Sanctioned: 20,63,162
Grounded: 13,64,550
Completed: 6,90,713

Credit Link Subsidy Scheme

Benefit up to 267 thousand through subsidy

Sanctioned: 25,36,864
Grounded: 20,76,864
Completed: 20,76,864

In-situ Slum Redevelopment

GoI Grant @ 100 thousand per house

Sanctioned: 3,52,862
Grounded*: 6,43,153
Completed*: 4,90,205

**Includes incomplete works of earlier JnNURM taken up and completed after 2014*

Space Technology
Robust MIS
Cooperative Federalism
Direct Benefit Transfer
Integrated Monitoring Dashboards
CLSS Awas Portal (CLAP)

Angikaar
A Change Management Campaign

Affordable Rental Housing Complexes

Beneficiariesof ARHCs

Figure 6: Story of PMAY-U

The Story of PMAY-U

12.2 Million Houses

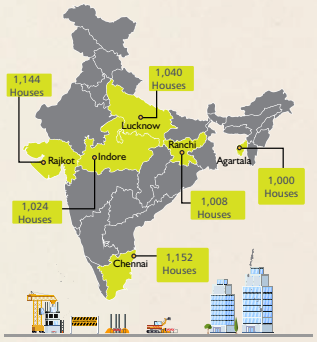
50 Million Citizens

Outcomes

- JOB CREATION
  24 million person days employment generated
- STEEL INDUSTRY
  9.63 million Ton of Steel
- CEMENT INDUSTRY
  42.6 million Ton of cement
- SECTORS OF ECONOMY
  130 Sectors of the Economy are directly or indirectly impacted
- SUSTAINABLE DEVELOPMENT
  Rooftop Solar & Rainwater Harvesting is being promoted in AHP & ISSR projects.

Inception of PMAY-U Excellence Awards

Six Light House Projects



Agartala, Tripura
Light Gauge Steel Framed System (LGSF) with Pre-engineered Steel Structural System

Chennai, Tamil Nadu
Precast Concrete Construction System

Ranchi, Jharkhand
Precast Concrete Construction System - 3D Volumetric

Indore, Madhya Pradesh
Pre-fabricated Sandwich Panel System with Pre-engineered Steel Structural System

Lucknow, Uttar Pradesh
Stay In Place PVC Formwork System with Pre-engineered Steel Structural System

Rajkot, Gujarat
Monolithic Concrete Construction using Tunnel Formwork

GLOBAL HOUSING TECHNOLOGY CHALLENGE INDIA

Construction Technology India- 2019
Expo-cum-Conference

ASHA India - Incubation Support to Potential Future Technologies

Identifying & Mainstreaming Proven Demonstrable Technologies for Construction of LHPs

Indian Housing Technology Mela (IHTM) 2021

Expo-cum-Conference

The exhibition showcased domestically developed indigenous and innovative construction technologies, materials and processes which could be useful for BLC houses and other low & mid-rise houses.

conditions so that they may be replicated for construction in the Indian context. We are also promoting LHPs as Live Laboratories for on-site and off-site learning, facilitating transfer of technologies to the field and its further replication. It aims to create large scale citizen participation and technical awareness for learning, deliberation, experimentation and innovation through the platform of Technograhis. The Technograhis, named in lines of *Satyagrahis* and *Swacchgrahis,* are the change agents to bring about technological transition in the construction sector. They will be able to learn the use of new and innovative technologies at the LHP sites and adapt them for future use. The Ministry has launched e-Course for facilitating online training of the Technograhis.

Acknowledging the fact that the scalability and adaptability of any new practice depends on capacity building and skill development of the involved professionals, the Ministry in collaboration with Building Material and Technology Promotion Council (BMTPC) and School of Planning and Architecture (SPA), New Delhi has introduced a certificate course on innovative construction technologies, NAVARITIH. Along with NAVARITIH, considering the disaster sensitivity of India, we have also launched an e-course on Vulnerability Atlas of India. This course offers awareness and technical understanding about natural hazards such as earthquakes, cyclones, landslides, floods, etc., and helps to identify regions with high vulnerability and specifies district-wise level of damage risks to the existing housing stock.

Information, Education and Communication (IEC)

Reaching out to such a wide socio-economically diverse population required an intensive and comprehensive IEC strategy. The Mission moved away from using print media, bill boards to campaign and moved towards using social media. Gradually, the footprint on various social media platforms, starting from Facebook, Twitter and YouTube more recently on Instagram to reach first the potential and then the validated beneficiaries was enhanced. Secondly, the Mission strategically collaborated with private sector, banks for spreading awareness about the CLSS vertical, wherein they directly interacted with the potential beneficiaries and got them on-board the Mission. Through direct human interaction media like street plays, focused group discussions and other mobilisation campaigns, reliance on word of mouth for reaching out to the beneficiaries. Majorly, the performance spoke for itself, beneficiaries acted as the biggest brand ambassadors: they mobilised their social networks to become beneficiaries under the Scheme.

The Mission did not stop at just delivering the houses. There was also a need to facilitate change management at ground level. This was realised through interaction with beneficiaries and the transformation they go through after shifting to a new house. The Mission thus introduced Angikaar, a campaign which facilitated change management and answered the larger developmental questions. Through Angikaar, the Ministry got the benefits of different programmes and schemes related to health and hygiene, energy efficiency, cooking gas, sanitation, financial literacy, etc., to PMAY-U beneficiaries. We also undertook door-to-door awareness on best practices. Under Angikaar, the Ministry had

opened up platforms for interested educational institutes in the country to conduct "Awas par Samvaad", a platform for practitioners to discuss urban housing sector. During the course of the Mission, e-Government platforms of mygov.in and Umang have been used to conduct multiple events and also to create awareness about the Mission.

Affordable Rental Housing Complexes (ARHCs)

When the COVID-19 pandemic resulted in massive reverse migration of workers/ urban poor in the country, there was a requirement of a home for the migrants and thus, the Affordable Rental Housing Complexes (ARHCs) was introduced. The mass exodus of migrants from urban areas raised alarming concerns over economic activities in the cities and also about the housing scenario. Recognising housing to be a basic necessity for any human being and the mobility of the population, the Ministry rolled out ARHCs. It envisions an inclusive urban India, built on the principles of AatmaNirbhar Bharat. These ARHCs are targeted towards EWS/LIG categories of beneficiaries who are labourers, urban poor (street vendors, rickshaw pullers, other service providers, etc.), industrial workers, migrants working with market/ trade associations, educational/ health institutions, hospitality sector and long-term tourists.

ARHCs adopt a 3E strategy, i.e., Empowering States/UTs, Ease of Doing Business and Ensuring Sustainability for effective implementation. The implementation of ARHCs is carried out on two Models. In Model 1, the aim is to utilise existing government funded vacant houses. Here, a concessionaire once shortlisted through a bidding process, will retrofit and operate the housing complexes for a period of 25 years. The Model 2 envisages construction, operation and maintenance of ARHCs by Private/ Public entities on their own vacant land. These complexes will also operate as ARHCs for a period of 25 years.

Learnings from PMAY-U

The past seven years have been an exciting journey of challenges, opportunities and new learnings at PMAY-U. It has transformed the lives of almost fifty million beneficiaries and given wings to their aspirations and dreams. The Mission has had significant takeaways in terms of implementation mechanisms, project management and stakeholder engagement.

Cooperative and Competitive Federalism

Moving away from the earlier approach of appraising and approving the projects in the Ministry, States/UTs were entrusted with power to drive the Mission as per their local context and requirements. This major step of building trust on the State/UT governments has yielded significant result in terms of delivering the houses. To optimise performance and fast-pace implementation, the PMAY-U Awards were introduced in 2019. These awards encouraged the States/UTs to engage in healthy competition and achieve the target of 'Housing for All' within the Mission period.

Use of Technology in Project Management

The use of information technology at all stages of implementation not only fast paced the implementation process, but also enhanced accountability and transparency at each level. A major takeaway from the Mission could be that technology should be embedded within the architecture of any programme or mission, as it enhances the ease of monitoring, cuts down on delays and ensures timely delivery.

Private Participation in Affordable Housing Sector

In order to enhance access to housing using land as a resource, the Mission encouraged private participation through the ISSR vertical. The ultimate rationale was to improve coverage, access and quality of housing while undertaking in situ development. However, during multiple stakeholder consultations, it was realised that the component needs more 'buy-in' factors for future policy initiatives. Further, the ambiguities and processes involved in public sector land realised for profit making ventures of the private sector needs more clarity. As we write the future policy considerations, we have to ensure that the policy takes into account financial costs, efficiency gain derived from the project, its longer term fiscal implications and at the same time ensure 'value for money' for the private sector as well as broader welfare benefits for the society.

Making Beneficiaries an Equal Stakeholder

One of the biggest reasons for PMAY-U being more successful than any other housing policy in the country is the beneficiaries themselves. We, at the Ministry, while formulating the policy and at any other level of implementation, considered beneficiaries as the most powerful stakeholder. Our intention and motivation was to facilitate every eligible household to access dignity of a house and not to just provide matchbox housing units; we trusted that the beneficiaries are capable actors and all that they needed was a slight catalyst, which they could use as a foundation to build their own houses.

Reducing Distance Between House and Livelihood Centre

In the houses built by previous housing schemes like JnNURM and RAY, the occupancy rate was consistently low. Even when the Ministry launched ARHC, there was an inventory of more than 100 thousand houses lying vacant. Often, these houses were built on the outskirts of cities, increasing the distance between the livelihood centres, which were around the core area of the city, and the homes of the beneficiaries. In response, PMAY-U adopted cafeteria approach where the beneficiaries were given the freedom to choose one out of the four verticals for implementation, encouraging in situ development as far as possible. Further, each house built or acquired under the Mission came with basic social and civic amenities which included access to public transport network.

Diversifying Tenure Options

Ownership has been the cornerstone for housing policies in the country, however, acknowledging that a significant portion of the population of the county is migratory in nature, the Ministry welcomed rental housing through first launching ARHC as a sub-scheme under the Mission, followed by the Union Cabinet giving a go-ahead to the Model Tenancy Act. These are the initial steps from the Government of India to make the rental housing market transparent, equitable and accessible for the diverse socio-economic migratory population of the country.

Housing, the basic need of any human being, was a dream for most of the people in India. Through several innovations taking place, the vision of 'Housing for All' will be a reality soon. When we started off in 2015, who ever thought a housing mission would be able to bring a roof over the heads of millions of people? The Mission takes pride in the achievements, in which the leadership at Centre, State/UT levels, private sector, banks, the construction industry and above all the beneficiaries have played critical roles. We all dream of an India where every Indian will have a pucca house and we collectively are taking every step possible to reach to our collective goal of 'Housing for All'.

Leveraging Technology for Monitoring the Mission

Dr. Neeta Verma,
Vishnu Chandra,
Pradeep Kumar Gupta &
M. Ezhil Arasu

"From humble to mansion, the home is compared to a beautiful bride, and a place where you find happiness." *– Atharveda IX.3.24*

House building is an expression of civilization. In ancient India, as now, home is where the heart is, with deep spiritual significance. Our home environment reflects our interior world. With an aim to provide happiness and meet the requirement of many, PMAY-U was launched as a national campaign to address urban housing shortage in India. To make this a reality, it was decided to extend 'Housing for All' under the programme. In order to achieve this, entire programme and associated process rationalised with use of technology enablement for effective planning, implementation and monitoring.

Technology plays an important role in the implementation of government programmes. It helps right from carrying out gap analysis to assess requirement, formulation of Scheme, financial allocation, targets and timelines. Technology enablement of PMAY-U leveraged digital solutions to plan, operate and monitor the scheme. Online platform provisioned services to beneficiary from various categories EWS/ LIG, MIG, including the slum dwellers.

National Digital Platform

To support the landmark initiative of the government, a national level digital platform was conceptualised and developed to cater to the end-to-end requirement of the PMAY-U programme right from receipt of application to assessment and approval at various levels to release of funds to finally monitoring the progress.

Different categories of the programme had different stakeholders and different processes. Platform was designed to cater to varied processes across all the four verticals. Citizens, as well as all other stakeholders could access the system online and perform their respective roles. Access privilege was provisioned on the basis of the role person had to perform as per the specifications of the Scheme. Right from dissemination of information, details of programme, eligibility to online application, approvals at various levels, sanction of funds, direct transfer of subsidy to the bank accounts of beneficiary to monitoring the progress of house construction, all the steps were supported by the platform. The following figure depicts some of these processes in schematic forms. Technology solutions such as Aadhar integration, demographic authentication, e-sign, bio-metric, etc., were used to make the platform robust.

Major Functionalities of National Platform of PMAY-U

There are 13 actors/stakeholders in the entire system. The stakeholders are namely Citizen, Central HFA Monitoring Unit, CSMC Unit, PMU, Appraisal Unit, SLNA, ULB, District, Release Sections (Maker), Release section (Checker), State Financial User, Agency, and Signatories. Role of each stakeholder will be different from each other. The

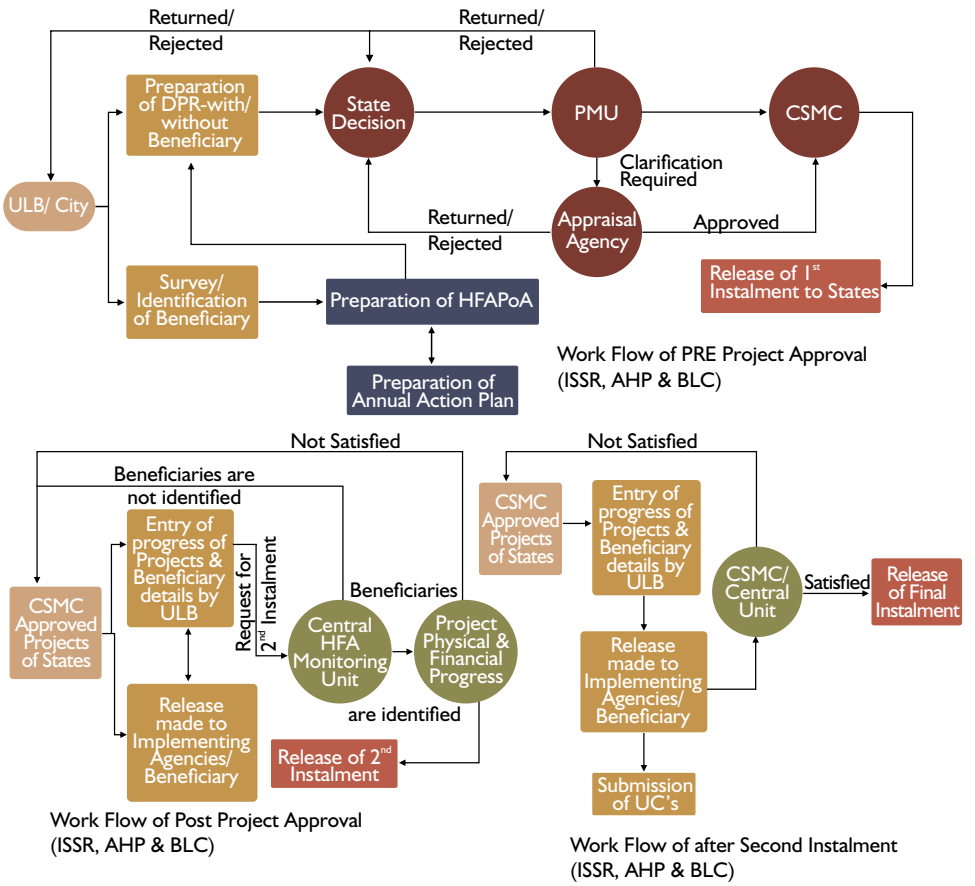


Figure 7: Schematic diagrams for depicting PMAY-U processes for different stakeholders

system covers all 4500 statutory towns' users, 17,966 planning area users, 697 district users and 36 States and Union Territories are using role-based access. More than 50,000 citizens access the PMAY-U website on regular basis for applying as well as to get their status.

The platform has a huge component of analysis and reporting of progress on different dimensions of the programme. Different type of reports are configured for different stakeholders on the basis of their roles and responsibilities. Almost real time, 24x7 access to reports and dashboard is provided to all stakeholders. One can drill down reports to track individual beneficiary as well. Provision for customised reporting is also enabled across multiple dimensions. These facilities are extensively used by Centre, States and Cities, Programme Management Unit, Appraisal Agencies as well as by CSMC to monitor progress, generate insight and take appropriate actions.

Use of Mobile App & Geospatial Technology

Under the PMAY-U project, two mobile applications were developed. These mobile apps provided citizens an interface to the National Scheme for submitting the application, tracking it, and to upload the house construction information on the portal. Mobile apps were designed to capture the geotagged images of the projects. The various stages of geotagging were used to monitor the construction of projects and to show the present state in real time on Multi-Layer GIS "Bharat maps" for the AHP and ISSR projects. For monitoring the BLC projects, the mobile apps were developed to capture the geotagged images of the individual houses. More than 6 million houses were geotagged at various stages to show the performance in real time. The geo-tagged phases of the projects have provided accurate information to the decision makers to manage effectively.

Geospatial technology helped in providing locational intelligence for PMAY-U programme. The project and financial inclusion were integrated with locations for visualisation. Choropleth maps were used for effective display and track the project location. The geospatial dashboard provided visual status progress.

Leveraging Cloud Infrastructure for Agility

The entire Information Communication and Technology (ICT) infrastructure for PMAY-U was provisioned from Government Cloud (MeghRaj), established by National Informatics Centre (NIC), Government of India. It provided servers and other installation requirements for hosting of the PMAY-U digital platform. This approach has saved lot of time during development and implementation of digital platform as it saved the department from entire lifecycle of procurement, installation of servers and storage. On-demand availability of infrastructure from MeghRaj also provided lot of agility to the Platform. Robust architecture design provides resilience and agility in the entire system.

NIC cloud infrastructure has been instrumental in providing faster upgrades of the software, information accessibility, better visibility of project modules to entire team, Quick Time for code deployment, elastic environment and ability to increase on-demand, rapid deployment and reusability, manageability and maintainability, reduced effort in managing technology, user mobility and collaboration through shared data and applications stored in the cloud when authorized – anytime, anywhere availability. The ability to collaborate over cloud services allows development and operations team the flexibility and support to work remotely or to continue projects while away from work desk.

Data Driven Approach

The data and the various technologies played a vital role in the digitisation of beneficiaries and their family details to find and avoid duplication. Data driven approach was helpful for the higher authority to take spot decision on the project sanction as well as in fund

releases to States. It helped to measure the success and also gave the cue to repeat the same at different locations.

By implementing the right reporting with due analysis and accurate measurement of data quality, data-driven decisions were made to take the PMAY-U Mission forward. The well-formatted, tabulated and pre-defined data analytical reports are available in the system for the decision taking.

Data Driven Decision Making (DDDM) is a process that involves collecting data based on measurable goals or KPIs, analysing patterns and facts from these insights, and utilising them to develop strategies and activities that benefit the Mission in a number of areas. DDDM helped at various times while making decision. This data-driven approach has facilitated performance measurement and ranking of States and associated various stakeholders.

Technology for Promotion, Awareness and Outreach

For any programme of this scale, the ability to disseminate information and share particular achievements is an important component which needed a simple and effective strategy. Social media, online platforms and the Government's collaboration systems were also critical enablers in the success of the programme. They were extensively used by the Programme Management Units, States and Urban Local Body (ULB) officials and the grassroot workers for knowledge sharing and outreach to local communities.

PMAY-U has dedicated social media platforms such as Twitter, Facebook, YouTube and Instagram which plays a huge part in information dissemination and outreach. For internal communication, WhatsApp is used extensively. For creating awareness among the beneficiaries, an Angikaar change management campaign was introduced with digitalisation of all activities. Using this programme, data on various parameters was collected from the grassroot level like number of AHP and ISSR projects using recycled water, helped the beneficiaries to receive health cards under Ayushman Bharat, get free LPG connections under Pradhan Mantri Ujjwala Yojana. Awareness on energy conservation and solid waste management training details were also digitised.

A digitised list of number of beneficiaries that were reached out for awareness programmes is maintained too. During the pandemic, the NIC-VC was fully utilised to train the user, as well as to monitor and interact with various stakeholders.

Way forward / Conclusion

It is evident that several factors have contributed to the success of PMAY-U. Of these, ICT played an eminent role in the construction and monitoring of the progress, identification of beneficiaries and allocating the money to beneficiaries in a transparent manner. The timely and comprehensive support provided by an agile and resilient

technology solution has been one of the critical success factors in facilitating the overall governance process at PMAY-U. The policymakers, programme managers and all stakeholders extensively utilised the digital platform in monitoring the progress by accessing real-time insight into the ground reality.

About 7 per cent of the world's labour force is employed in the construction industry, so it is a major sector of the world economy. Individuals and businesses spend $10 trillion per year on construction-related activities (McKinsey, 2017). Emerging technologies like AI, IOT, Sensors, Spatial Analytics and Predictive Modelling can be used to evolve enhanced ICT Driven PMAY-U Platform to achieve "Urban Resilience", in terms of "Sustainable Housing for All" as depicted below.

Geospatial AI and Drones

Geospatial Information Systems (GIS), Drones, and Geospatial AI (GeoAI) significantly reduce the time it usually takes to gather accurate survey maps and aerial images of a job site. Drones can be used for tracking the project updates and tracking issues at a job site. Spatial Analytics can be generated based on the development progress, selection of beneficiaries based on type, allotment to beneficiaries etc., to provide a visual insight for effective monitoring of the programme for citizens. AI for Better Design of Buildings through Generative Design - Building Information Modelling (BIM) is a 3D model-based process driven system for architecture, engineering and construction professionals.

Insights to efficiently plan, design, construct and manage buildings and infrastructure. Spatial Analytics can also be integrated with Geo-AI Enabled 3D-Housing Models. In addition to above, AI can be used for site activity tracking and monitoring, post construction and risk mitigation activities.

The potential applications of machine learning and AI in construction are vast. Requests for information, open issues, and change orders are standard in the industry. Machine learning is like a smart assistant that can scrutinize mountain of data. It then alerts project managers about the critical things that need their attention. Several applications already use AI in this way. Its benefits range from mundane filtering of spam emails to advanced safety monitoring.

Technology will remain one of the foremost enablers for PMAY-U. The rich data repository created during its implementation will provide a scientific basis for future policy formulation, planning, decision making and its implementation.

We Manage What We Can Measure: Enabling MIS in PMAY-U

Kuldip Narayan, Suvasish Das,
Pooja Gupta & Dipti Singh

Implementing the world largest housing programme with a target to provide more than 12 million houses to eligible urban poor citizens is no doubt a herculean task. Thus, emerges the need for a robust system to implement and monitor its progress at each and every stage, which emerged as a bigger challenge. We were set to bring all stakeholders like citizens, States/ UTs, Urban Local Bodies (ULBs), Urban Development Authorities, Planning areas and Ministry of Housing and Urban Affairs (MoHUA) to a common platform. There are 13 major stakeholder groups in the entire MIS system, namely citizens, Central Housing For All (HFA) Monitoring Unit, Central Sanctioning and Monitoring Committee (CSMC) Unit, Programme Management Unit (PMU), Appraisal Unit, State Level Nodal Agency (SLNA), ULB, District, Release Sections (Maker), Release section (Checker), State Financial User, Agency, and Signatories. More than 4,067 statutory towns' users, 17,966 planning area users, 697 district users and 35 States and Union Territories needed a role-based access. We thrived to develop a system that allows users to capture data, process and disseminate information in a systematic way and enables us to measure trends of various indicators based on the data collected in the field. It should be vital in supporting the strengths, finding weaknesses of the programme and provide sufficient information to the decision makers to take initiatives to improve the quality of the Programme. The system should also measure the expected objectives and outputs. In other words, monitoring ensures that activities are on the right path by checking them, measuring the progress towards objectives, identifying problems as they come up and identifying strengths that can be built up. Monitoring gathers information about beneficiary access to use of and satisfaction with the operation outputs.

Modest beginning was enabling 'Citizen Demand' for House module in MIS software to help citizen to directly submit their demand for house through online registration, without any cost and visiting government establishment. Next important and logical step was to integrate with Unique Identification Authority of India (UIDAI) server via API mode to perform live-demographic authentication of the Aadhaar information of the citizen as per registration form with the Aadhaar information available in UIDAI database before final submission. Aadhaar was also kept as unique identifier to perform de-duplication check of beneficiaries among all verticals of the Mission and with Pradhan Mantri Awas Yojana (Gramin). 16.5 million demand for houses was obtained directly from the citizens and out of which 12.2 million demand has been successfully validated through ULB/ State/ UT in the MIS system. Next challenge was to maintain the information of more than 22,000 projects along with their signed documents of statutory approvals (SLAC, SLSMC, CSMC) at a common place i.e., PMAY-U MIS which can be accessed 24x7 from anywhere, by all concerned stakeholders for faster decision making. ULBs/ cities submit details related to implementing agency, total dwelling units, project cost, project area, total central assistance sanctioned, State/ ULB share, beneficiary share etc. Category wise and gender wise break-up of dwelling units to be allotted to the beneficiaries in the project was developed in the MIS module. Monitoring progress on each approved project in PMAY-U, along with tracking of fund disbursement to beneficiaries through Central share, State share or ULB share thus became easier. Details of beneficiaries are captured in the MIS system, and the same data has been linked with their other information fetched from different

modules and mobile application like their spouse details, family details, geo-tagged images of constructions stage, payment status, benefits transfer to the beneficiaries and allotment details. Real time, 24x7 access to reports and dashboard is provided to all stakeholders. One can drill down reports to track individual beneficiary as well. Provision for customised reporting is also enabled across multiple dimensions.

The evolution of holistic decision support system took a quantum leap with integration of National Remote Sensing Centre (NRSC) based space technology through 'Bhuvan HFA mobile application', which envisaged tracking the progress in construction of individual houses under Beneficiary led Construction (BLC) houses through geo-tagged photographs of five stages captured as 'Not Started', 'Foundation', 'Lintel', 'Roof' and 'Completed', along with the comments of surveyor. This data usually consists of latitude and longitude coordinates, though they can also include altitude, bearing, distance, accuracy data, and place names, and perhaps a time stamp. In order to enable geo-tagging functionality, Bhuvan HFA web server had been integrated with PMAY-U-MIS server via web-services API on daily basis. After getting geo-tagged information in PMAY-U-MIS, system integrated such information in other modules which played a major validation in MIS software related to releasing funds. For each BLC house constructed under PMAY-U, beneficiary ID had been generated in PMAY-U-MIS and the same had been shared to Bhuvan for geo-tagging. The detail of house and beneficiary is essential as it solely describes the house type, quality and descriptive location of the house. Thus, 35,000 surveyors identified 6 million BLC houses through geo-tagging at various construction stages. In order to ensure transparency, accountability and good governance, all moderated geo-tagged photographs for both BLC houses and AHP/ ISSR projects was made available in public domain.

With accumulated experiences and learnings, MIS continued to grow. The latest addition was aimed at doing away with manual offline processing, generation of sanction and release order, and in turn, development of 'Sanction and Release Module' within MIS system. Now it is easier to generate sanction orders online, based on MIS compliances and beneficiary's data. Sanction and Release Module was linked with project and beneficiary module. This module ensures complete tracking of fund disbursements and supports Ministry in monitoring and reassessing the performance of each State/ UT with respect to funds disbursed v/s physical progress. This module has inbuilt analytics for generation of project wise reports.

Mission embarked upon another task of integrating PFMS (web based Public Financial Management System implemented by Controller General of Accounts) with PMAY-U-MIS named as 'e-finance module' to provide unique platform to all stakeholders (States/UTs/ULBs/ Implementing Agencies) for disbursement of Direct Benefit Target (DBT) payment to validated beneficiaries directly from the PMAY-U-MIS system. e-finance module has been integrated with all modules of the PMAY-U-MIS system like beneficiary, project, DBT, Monthly Progress Report (MPR) i.e., physical and financial progress, sanction and Utilisation Certificate in order to provide 'one solution' to all stakeholders to have a

complete monitoring, starting from approval to the implementation of project, DBT expenditure and up to the parking of funds at various level.

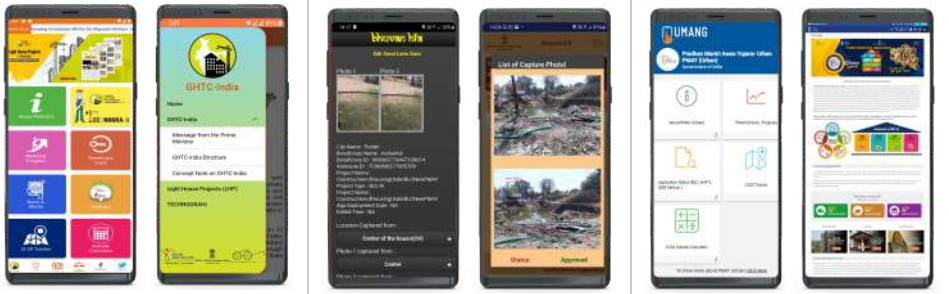


Figure 8: PMAY-U mobile applications developed for Android and iOS

For working faster, new branding experience and better personalisation, PMAY-U mobile app was developed. It is available in Android Play Store and iOS App Store respectively. The app allows beneficiaries to upload photos/ selfies of houses and videos of their stories/ testimonies and experiences of owning a house under PMAY-U along with geo-attributes. Moreover, all the personal data uploaded in the mobile app is with the consent of PMAY-U beneficiaries. This mobile app also allows Credit Linked Subsidy Scheme (CLSS) beneficiaries to track the status of application through CLSS tracker.

One of the largest ongoing campaign through IT platform by the Mission was launched aptly called Angikaar. This module in PMAY-U mobile app was integrated in real-time basis with PMAY-U-MIS to store need assessment survey details along with geo-tagged photo of the beneficiary in the website. The module was also integrated with Ayushman Bharat Scheme and Ujjwala Scheme for eligibility check and application of Ayushman Bharat Card or Ujjwala Scheme for PMAY-U beneficiaries. Through this campaign, more than 18,000 ARPs conducted around 18,00,000 Need Assessments across States/ UTs.

CLSS, one of the verticals under PMAY-U, where interest subsidy on home loan is provided through Central Nodal Agencies (CNAs) and PLIs/Banks to the EWS/LIG/MIG beneficiaries for purchase, construction or enhancement of house. In order to provide ease in processing of individual application, verification at initial stage, timely release of subsidy, transparency and minimising grievances, a web based real-time monitoring system i.e., CLSS Awas Portal (CLAP) was developed. CLAP integrates all stakeholders i.e., MoHUA, Central Nodal Agencies (CNAs), Banks/ PLIs, citizens and beneficiaries to one common platform. The software works in tandem on a real-time basis with the UIDAI, CNAs, PLIs and PMAY-U-MIS system for Aadhaar validation and de-duplication with other verticals and inbuilt CLSS Tracker tracks application status at their convenience, which has resulted in substantial reduction of grievance.

Create, manage and, most importantly, collaborate on content within and across other websites, dashboards, mobile applications, MIS systems of other stakeholders is an area where we are constantly evolving and trying to achieve new milestones. PRAYAS PMO PORTAL, NITI AAYGOG, UMANG Platform, UIDAI, PFMS, CLAP , DBT Mission Portal, NRSC/ BhuvanHFA mobile application and web portal, PMAY-U Mobile application, BharatHFA, MyGoV, Ministry Dashboard, MIS of PMAY(Gramin), National Infrastructure in Pipeline (NIP) are such platform.

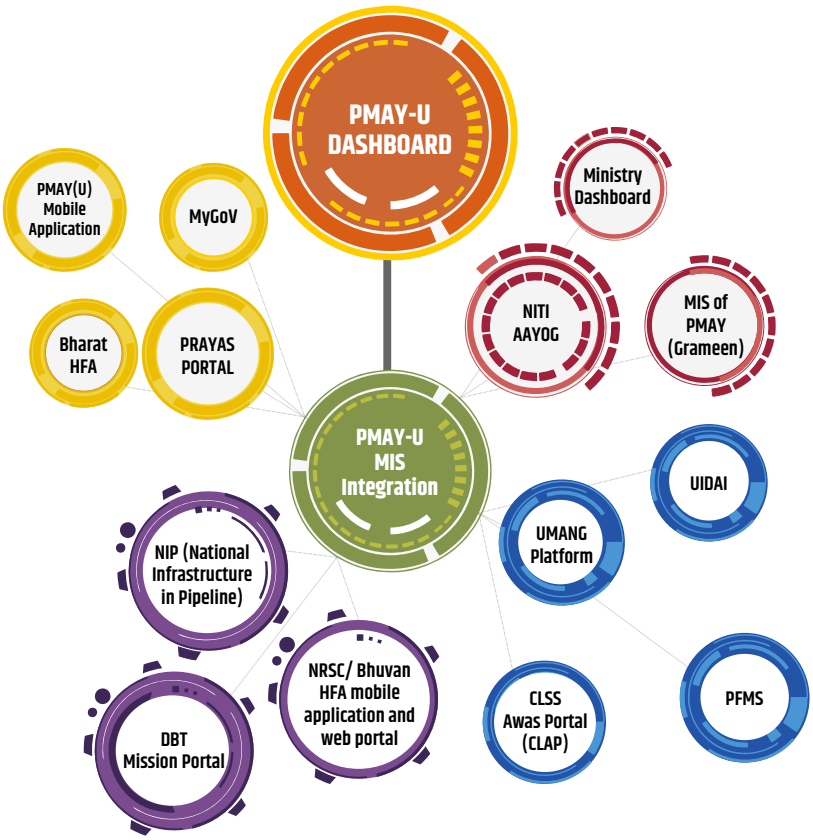
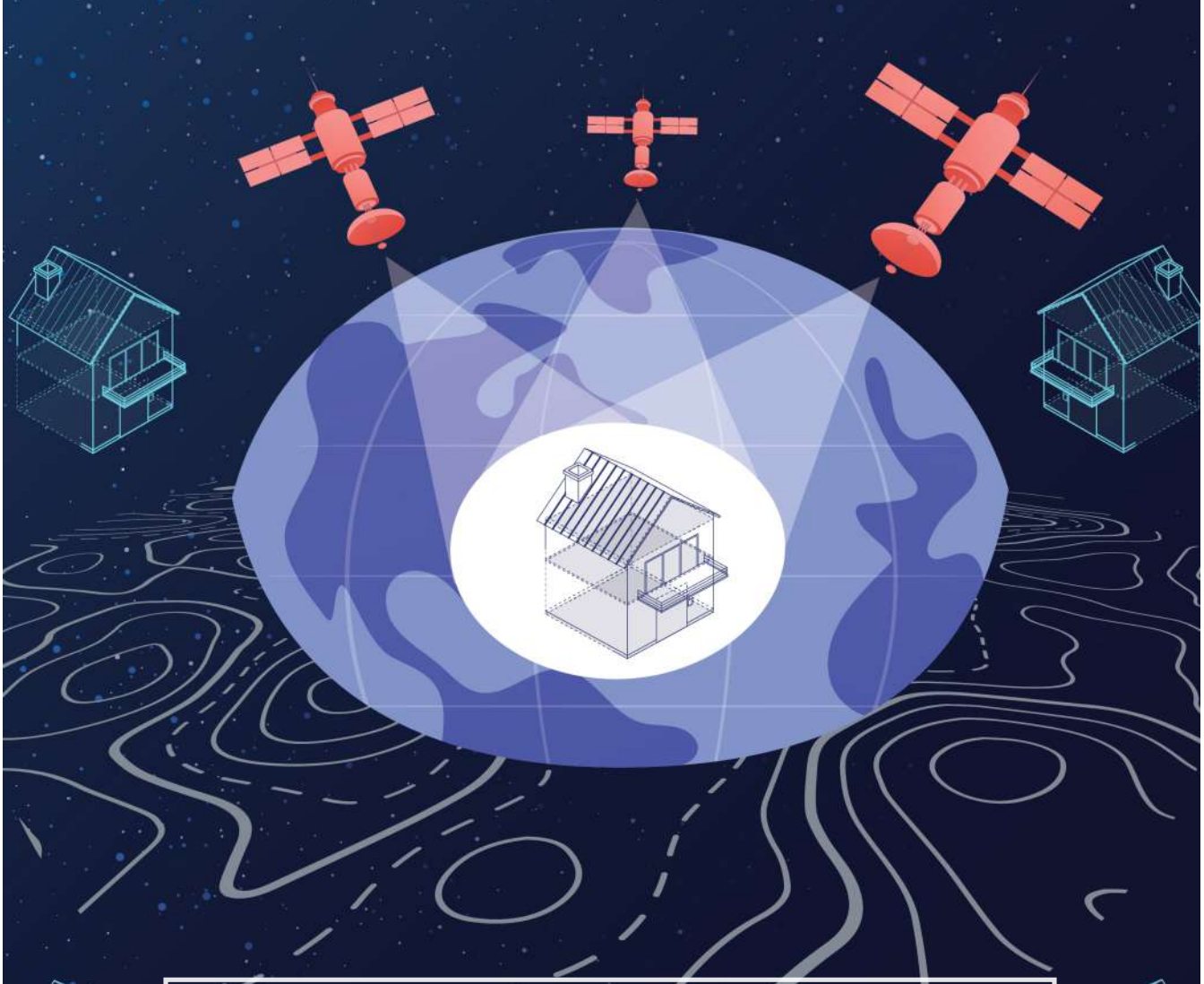


Figure 9: PMAY-U-MIS integration and convergence with various portals and platforms

In an evaluation done by DBT Mission under Cabinet Secretariat, MoHUA was ranked as the 'Best Overall Performing Government Department' in implementing DBT for FY April 2019-March 2020 and PMAY-U was the only DBT Scheme in the Ministry till then.

PMAY-U-MIS did play a pivotal role in the implementation of Mission goals. In fact, programme MIS are increasingly viewed as a central plank that holds together various components of the four verticals and it is the key to ensure efficient and reliable implementation of programmes, as well as to enhancing transparency and good governance.

In fact, several functionalities, like convergence with other portals of the government further helps in achieving the Mission objectives.



Role of Space Technology in PMAY-U

Dr. K Venugopal Rao,
Arulraj, A. Lesslie and
Dr. MV Ravi kumar

Space technology has been playing an instrumental role in implementation of PMAY-U. The scheme aims to address urban housing shortage among the EWS categories primarily, by ensuring a pucca house to all eligible urban households through its four verticals. The ULBs validate the information and building plan submitted by the beneficiary so that ownership of land and other details like economic status and eligibility can be ascertained. Central Government Assistance, along with State/UT/ ULB share, if any, is released in installments to the bank accounts of beneficiaries through Direct Benefit Transfer (DBT) by States/UTs based on the progress of construction of house.

MoHUA entrusted National Remote Sensing Centre (NRSC), a unit of Indian Space Research Organisation (ISRO), to provide a solution to locate, map the construction site and monitor the progress of houses using space technology. NRSC is responsible for remote sensing satellite data acquisition, processing, dissemination and geospatial applications/solutions and development for various end-use domains in the country. It has acquired a high level of expertise in each of these areas and extensively deploys and uses the state-of-the-art IT technologies to perform its functions efficiently. Recent advances in the field of mobile devices, communication systems, global positioning systems and Web GIS services have made it possible for NRSC to design and build innovative solution. The solution developed equipped MoHUA with effective methods of locating the site for house construction, mapping them using geospatial technique and monitoring the stages of house construction in a geospatial environment with geospatial intelligence having geofencing concepts.

The PMAY-U Scheme provides immense benefit to the common citizens of urban India spread across all States / UTs and involves a large number of beneficiaries, surveyors and supervisors, continuous work progress monitoring, timely monetary disbursements and so on. Management of all these connected aspects poses a serious challenge at the apex level and is beyond the realm of traditional operational methods. There have been significant recent advances in the field of mobile devices, communication systems, global positioning systems and Web GIS services Deployment of solutions having a judicious mix of such current technologies is essential to bring in the required efficiency, traceability and transparency.

NRSC experience in technology solutions

NRSC has designed, developed and implemented two innovative technology solutions that stand out in terms of their relevance to citizen-centric and societal benefit applications, and which have become an integral part of several Government of India programs. These are:

- Bhuvan Geoportal applications
- Mobile applications

Bhuvan Geo-portal applications

Bhuvan is the Indian geo-platform of ISRO, hosted through URL https://bhuvan.nrsc gov.in. It hosts a wide range of services that enable visualization of multi-date, multi-platform, multi-sensor satellite data, thematic map display, query and analysis, free download of data products, near real-time disaster services, apps for crowd sourcing and several other diverse geospatial applications towards societal benefit and governance. Bhuvan provides new applications and services on demand, including special products and innovative visualization capabilities. Bhuvan also serves as the server platform for all the mobile applications developed in NRSC, which will be used to geo-tag the field location along with the necessary project- specific attributes.

Bhuvan geo-platform is deployed on a massive computing and IT infrastructure located in a world-class 24x7 Data Centre at NRSC Shadnagar campus near Hyderabad. It comprises servers, storage, network, security devices, RDBMS, web & application servers, map servers, etc. Bhuvan hosts and manages a huge repository of remote sensing, GIS and other datasets which power the rich visualization and analysis capabilities in the deployed applications.

The Bhuvan geo-portal consists of datasets services like Bhuvan map service, satellite data service, Hybrid data service (integrated map and satellite data services), Terrain services and other data services like field photographs of other projects like crop, land cover, natural resources, landslides, POI, river bank erosion, etc. The portal also provides tools like navigation, add geospatial layer, measurements of area and distance, draw, get direction and proximity tools for the users.

Mobile applications

There have been significant technological advancements in mobile devices (smart phones and tablets) in recent years. The advancements have been seen in terms of increased processing power, large memory/storage, powerful OS, high-resolution digital cameras, better connectivity options (4G, WiFi, Bluetooth), integrated GPS receiver, etc. In addition, several programming languages, APIs and frameworks have become prevalent, offering a wide choice and opportunity for developing highly functional mobile applications. Mobile apps have a distinct advantage compared to other applications – their use of the embedded GPS in smart phones to associate instantaneous geographical location information with every collected data point. This 'geotagging' capability of mobile apps brings immense value addition in many application areas: i) infrastructure facilities information which is available only as tabular data can be referenced spatially using geo-tagging on the satellite data and GIS analysis can be extended, ii) geospatial analysis for constructed rooftop area that can be used for generation of solar based electricity, insurance for house, etc.

NRSC developed its first mobile app for field data collection to primarily meet the dire need of its many scientists to systematically capture, organize and manage scientific

'ground truth' data. This field data is used to validate, train and classify the raw remote sensing data into meaningful thematic information like crop type, water bodies, etc. Later, such mobile applications were found equally useful for a host of other end-use applications like disaster management, incident reporting, infrastructure facilities, inventory mapping, crowd sourcing, activity monitoring, etc.

In 2014, Andhra Pradesh State Housing Cooperation Ltd (APSHCL) approached NRSC for geospatial solution to map and monitor the construction site for different housing scheme of the State Government. The NRSC demonstrated mobile app based solution, which in turn, institutionalized it. NRSC supported APSHCL in operationalizing the solution on ground through Training of Trainers.

The use of mobile apps for project activity monitoring was successfully demonstrated with the geotagging of beneficiary houses by APSHCL. With this experience, NRSC went on to design, develop and deploy a scaled up comprehensive solution for PMAY-U-HFA programme in close cooperation with MoHUA.

Space technology components in geoportal and mobile applications

GPS

The Global Positioning System (GPS) is a satellite navigation system based on a global network of satellites that transmit radio signals in medium earth orbit. The GPS service provides users with approximately 8-10 metres accuracy 95% of the time, anywhere on or near the surface of the earth. To accomplish this, each satellite emits signals to receivers that determine their location by computing the difference between the time that a signal is sent and the time it is received. The GPS receiver sensor in the mobile devices enable users to capture location parameters through customized mobile apps. The location parameters can be used to geospatially map the construction site or building in the field. Further it can be superimposed on the geo-referenced satellite data to correlate the site and building information in the satellite imagery.

Remote Sensing Satellite Data

The Indian Remote sensing satellite data with 1 m spatial resolution is the base spatial data for PMAY-U data visualization, analysis and management (Figure 10).

Architecture of geotagging under PMAY-U : an overview

NRSC developed geotagging process involves recording of longitude and latitude of a location (construction site). The process enables to locate where the construction site is on the earth's surface. The date and time capture, represents temporal stage of construction of a particular building/house. Linking of construction site with beneficiary details enables who is benefited. Capturing of the photograph enables pictorial representation of the

Figure 10: Fused satellite data of LISS-IV sensor (5.8m spatial resolution) and CartoSat PAN (1m spatial resolution)

construction of the house. The representation of all these pieces of information together over a geospatial map or a latest possible satellite data gives an additional authentic proof and accountability. All this information tagged to each other in a system enables transparency and accountability of the entire project over traditional method of recording information in files and papers. The geotagging process carried out along different stages of construction will record how the construction has proceeded with the time.

The mobile app is used to capture house construction status and report. The field information consists of geotagging of the construction site by the surveyor in five different stages like Not started, Plinth or Foundation, Lintel, Roof and Completed. It is mandatory to geotag all stages of the construction. The surveyor needs to register on Bhuvan Portal (Figure 11). The registration process includes capturing of the surveyor's photograph, user ID, surveyor name, mobile number and office details along with their geographical jurisdiction like state, district, town or city, ward, project, etc.

Figure 11: Registration on Bhuvan Portal

After registration of BhuvanHFA Portal, the surveyor needs to fill in personal details in the BhuvanHFA Mobile Application as shown in Figure 12. The same is approved by State/ULB officials to enable process of authorized geotagging.

Figure 12: Profile Updation on BhuvanHFA mobile app

The field data collection process has five steps:

1

Selecting the beneficiary from the Bhuvan HFA mobile database by means of filters or key-in search. Automatic daily data sync through web services (Figure 13).

Figure 13: Beneficiary details selection

2

Correlate the location of the surveyor with respect to location of the house to be geotagged over satellite data. Selected beneficiary is depicted by Blue icon, and current location of surveyor by orange icon (Figure 14). The blue circle indicates virtual geo-fencing of the selected beneficiary to eliminate mismatch of beneficiary details.

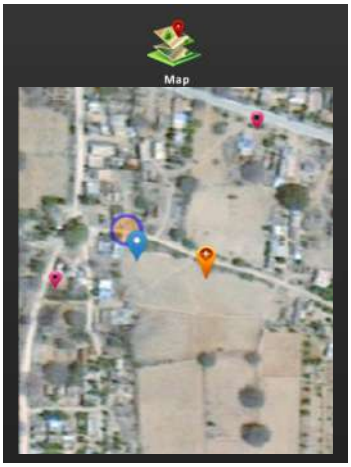


Figure 14: Correlation check on satellite data

3

Before geotagging of the house under construction, the GPS stabilization is analyzed using statistical technique and geotagging is enabled only after attainment of satisfactory GPS accuracy which is shown in the form of green dots on the screen (Figure 15).

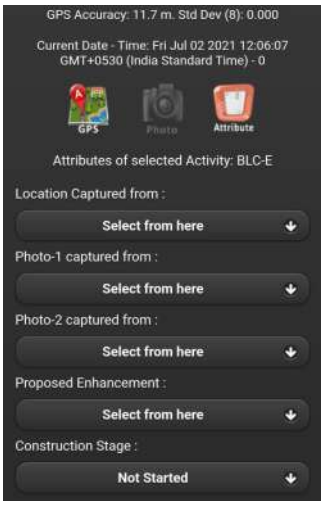


Figure 15: GPS stabilization indicator (a) and geo-tagging of building (b)

4

It has to be ascertained that the distance of surveyor from the house to be geo-tagged is within 10 metres to enable to capture the photograph of house under construction.

The attribute values such as position of capturing photographs, construction stage, floor etc., are filled by the surveyor based on the inspection of the site through drop down selection in the mobile app. The details of the beneficiary can also be validated by clicking on 'geotag details' on mobile app. The provision is also given to visualize the earlier geotagged data with photographs in the mobile app to correlate the site with earlier geotagged data as seen in Figure 16.

Subsequently, the photo is sent to the Bhuvan Portal which is made available in Supervisor account for moderation. After successful moderation the same is available in public domain.

The solution is designed to carry out the survey in non-internet zones and securely store the survey data in the mobile app. On availability of internet connectivity, the surveyor can upload the data to the Bhuvan servers where data is organized in centralized database (Fig. 17). There is a provision to upload the data in bulk to reduce the effort and time of the surveyors.

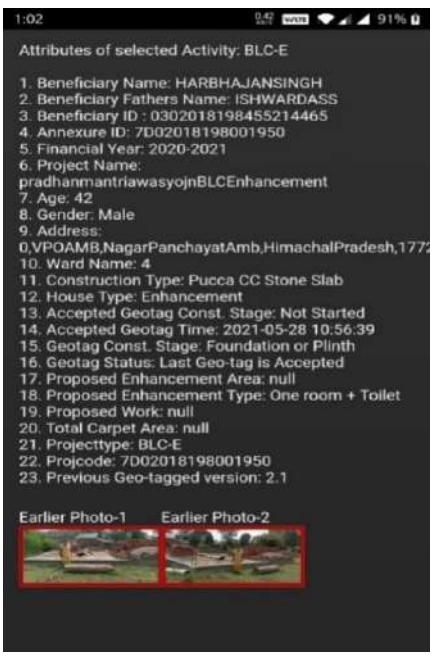


Figure 16: Different attributes of Geo-tagged Beneficiaries

Figure 17: Provision for securing data in non-internet zones

The overall workflow for the mobile app and server interfaces is shown below:

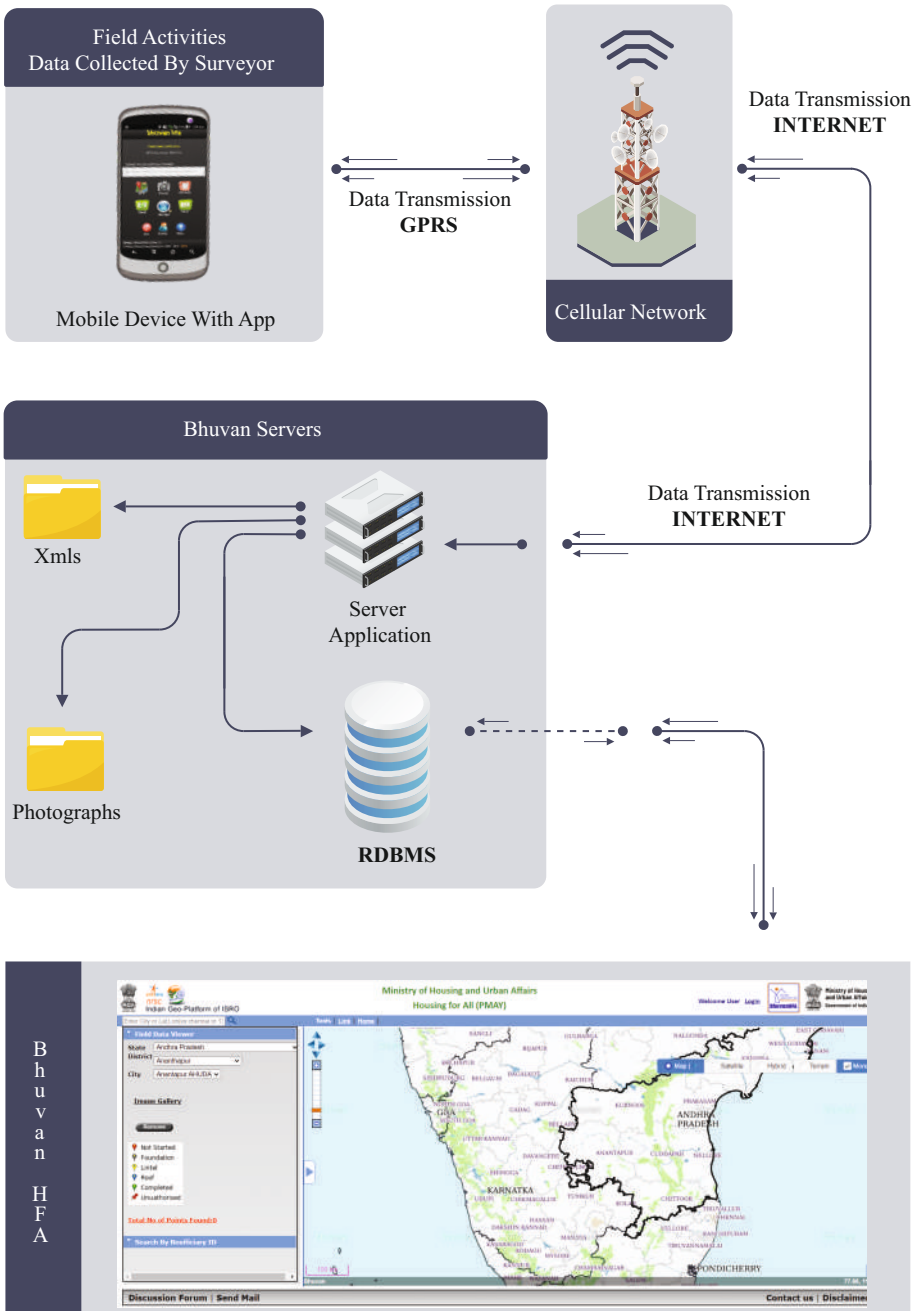


Figure 18: Overall work flow of BhuvanHFA solution

BhuvanHFA Web Module

BhuvanHFA is web based application to be used by different users to geotag the assets and visualize and analyse various sectors based assets on the selected category (i.e., state, district, city) on the field data. The application has both client end and server end. The assets attribute of different vector datasets is collected in data base and published as WMS in GeoServer. This WMS service is used for displaying the GIS vector collected from mobile and satellite data on the portal using open layers. Open layers is used to visualize Map and different Vector dataset layers on Web Browser.

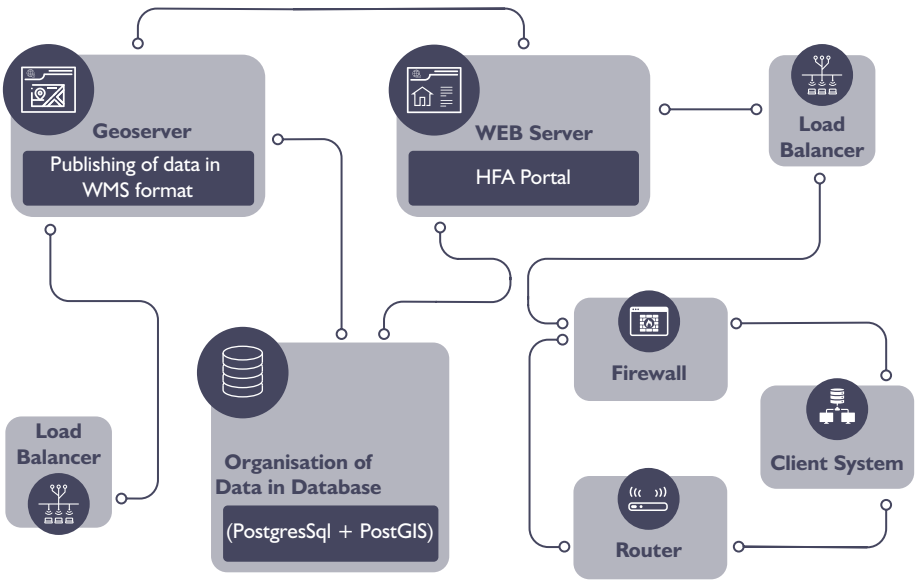


Figure 19: BhuvanHFA web module application deployment

Users - Roles and Logins

Role	Provision
Surveyors	**Able to collect field data for a given approved city**
Supervisors (Moderators)	**Able to accept/reject field data collected for an approved city and able to authorize surveyor.**
State	**Approve Supervisors and able to visualise data for the state and can perform second level moderation.**
Central	**Visualize all the data and approves state admin**

The Bhuvan HFA portal (Figure 19) is divided into the following modules:

- Authentication module
- Visualization of geotagged assets
- Moderation module (second level)
- Statistics module
- Dashboard / Report module

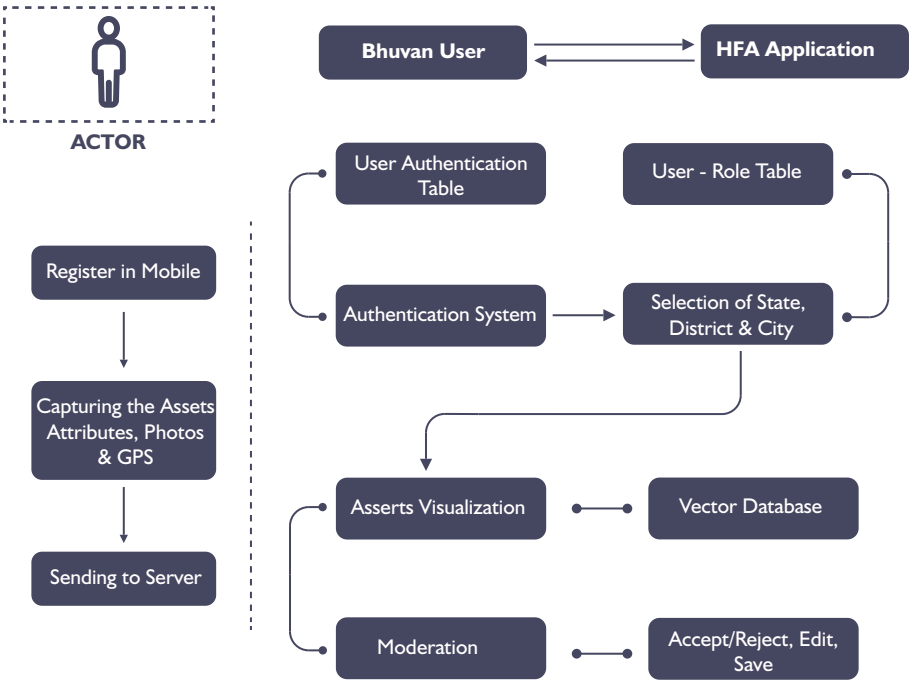


Figure 20: Data Flow Diagram of BhuvanHFA Portal

Authentication Module

This module will allow only valid user to enter the system with proper authentication. After successful authentication, it facilitates the User with the data in the field data viewer i.e., State, District, City and the drop downs according to the user Role Table upon successful Login and has privileges to approve another user based upon the roles that he has registered. A glimpse of the Authentication Module shown in Figure 21.

Visualization of geotagged assets

In this module, the User has to click on asset after selecting the menu in the field data view selection by clicking on the view button, the base map will be loaded with the geotagged assets according to the selection (Figure 21). Upon clicking on the asset, the asset

details such as photo, attributes and the status of geotagging can be viewed according to the user hierarchy role on the map.

Figure 21: User authentication in BhuvanHFA Web Module

Figure 22: Visualization of geo-tags in BhuvanHFA Web Module

Moderation module

The module will allow the privileged users to select the field data view categories and they can do both visualization and moderation for the geotagged assets that are sent by the field officer after capturing the asset from the field. This module will allow user to view the assets of state, district and city selected by user.

For Bhuvan HFA application, user can also see the list of different sectors assets and the status along with their captured user details like name and the place etc. The Moderation module is shown in Figure 23.

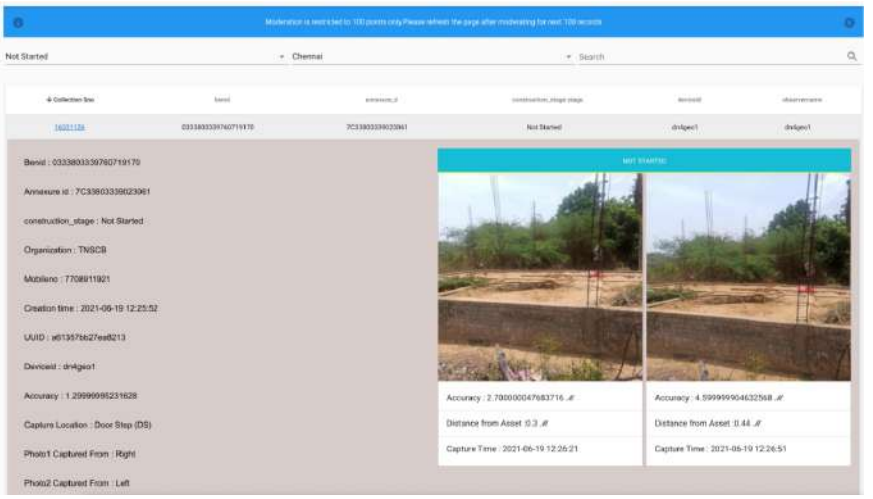


Figure 23: Visualisation and Moderation of Geo-tagged beneficiaries

Statistics Module

Before the view of geotagged assets, the user can view the whole statistics related to the selected sector and field category based on the hierarchy level, they can be able to view all the data related to the area, such as the state, district and city accepted points, rejected points, moderated points and numbers of total HFA assets geotagged as well. The table view for each sector is displayed on the statistics view Figure 24.

Performance of States:

State Name	Total	Moderated	Accepted	Rejected
Andaman and Nicobar Islands	21	9	7	2
Andhra Pradesh	1181875	1175009	1150453	24556
Arunachal Pradesh	5077	5056	4761	295
Assam	100022	93369	86299	7070
Bihar	141321	131361	128551	2810
Chhattisgarh	126086	125296	120194	5102
Dadra and Nagar Haveli and Daman and Diu	1463	1373	1304	69
Goa	4	1	0	1
Gujarat	114456	113702	110193	3509
Haryana	57088	44858	34367	10491
Himachal Pradesh	8534	8471	8188	283
Jammu and Kashmir	35988	35679	34879	800

Figure 24: Hierarchy level Statistical data of Geo-tagged beneficiaries

Dashboard / Report module

This module will allow the user according to hierarchy level to customise the selection of 15 type of reports according to the requirement. After the selection of state,

district and city the user can click on load the statistical report, and accordingly the report will get loaded along with selected area and the statistics can be viewed based on the selection of type of report. The downloading of report is available from the option export to excel, csv where the user can get the whole data in the form of the excel sheet or csv based-on selected report format. The dashboard is shown in Figure 25.

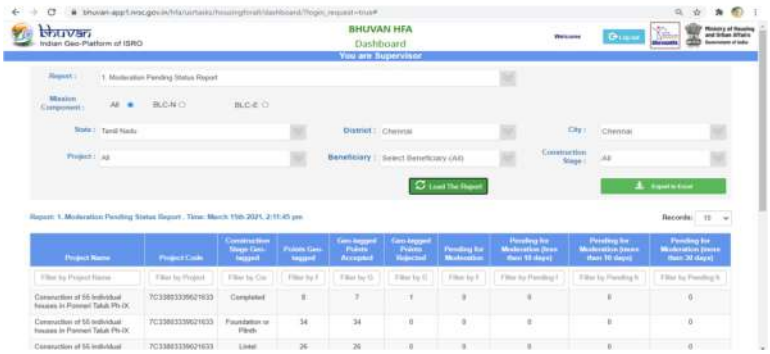


Figure 25: Downloading of statistical reports in various formats

Figure 26 demonstrates the effective project implementation through monitoring the houses construction in five stages. The longitude and latitude enables to locate the house under construction on the map or satellite data. The attribute enables to state the stage of the construction. The date and time shows when did the construction took place with respect to stage. The beneficiary details linked with geotag photographs showcase the major stages of building construction on the located site

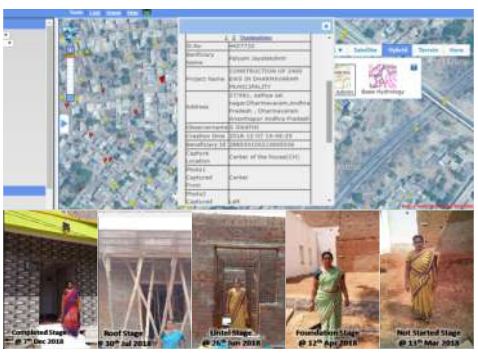


Figure 26: All stages of house construction on map with beneficiary details and photographs

The BhuvanHFA solution has brought out transparency and good governance in the system by means of geotagging to report the status of each house (stage wise monitoring) to MIS to enable further transfer of funds directly to beneficiaries through Direct Benefit Transfer (DBT) Programme of Government of India.

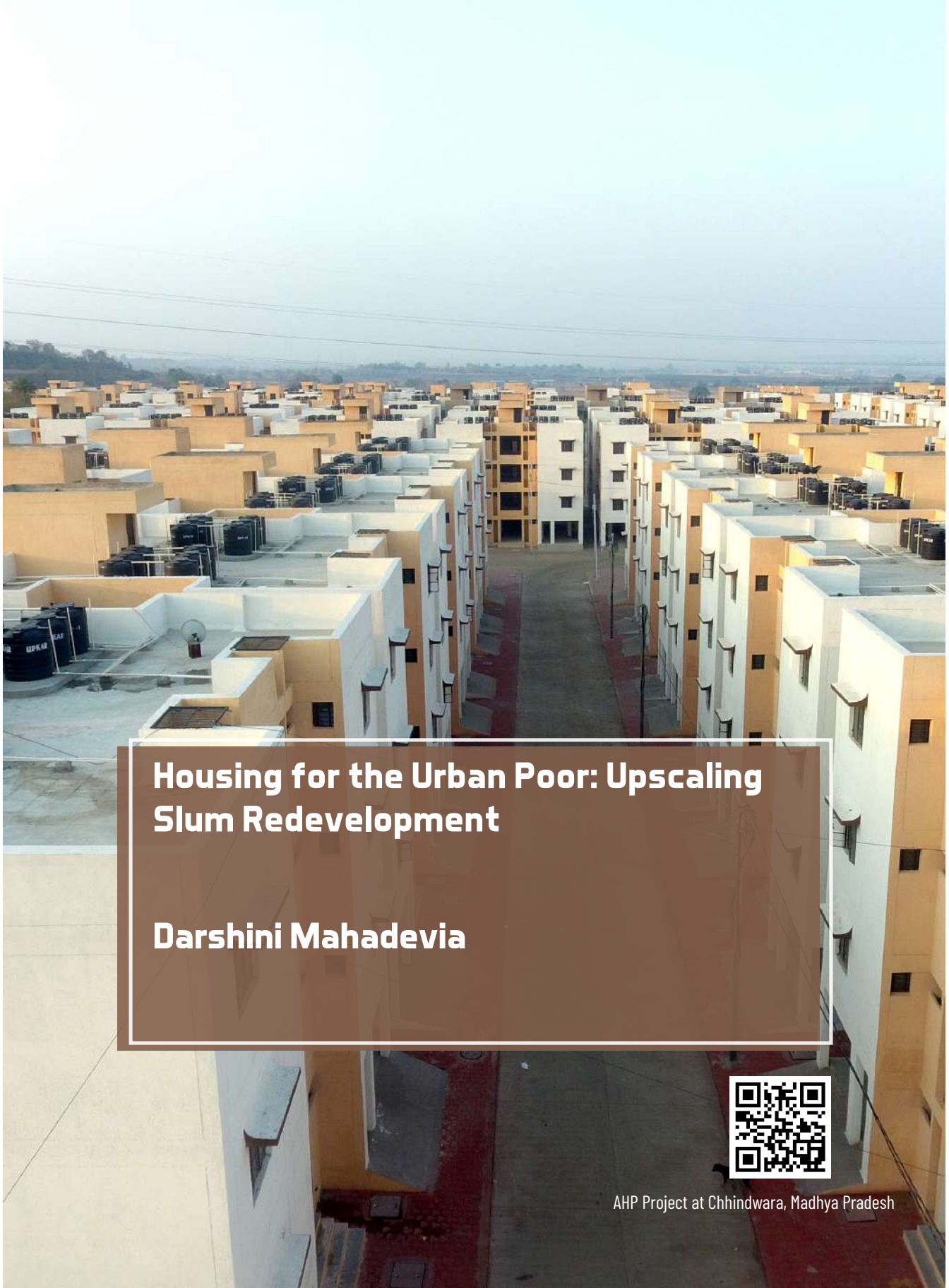
Conclusion

The PMAY-U beneficiary houses geotagging project implemented by NRSC and MoHUA at the national scale is a successful realization of the envisioned objectives of Digital India through integration and use of diverse state-of-the-art technologies. The in-house expertise available with NRSC in designing innovative technology solutions involving remote sensing satellite data, GIS, map-based visualization, mobile software applications and GPS integration has proven very useful in quick operational deployment of a customized solution for MoHUA. The contribution of space technology in this endeavour is evident from the extensive use of satellite derived remote sensing data in Bhuvan geoportal and in the use of GPS data in the mobile app and server side analysis.

The MoHUA decision on geotagging of beneficiary houses has put in place a secure mechanism to capture house location coordinates along with relevant attribute information via mobile app at various stages of construction, with near real-time transfer of collected data to central Bhuvan server for further data organization, verification, visualization, analysis, approval and reports generation. This has brought in the required efficiency, transparency, traceability and manageability. Site visit by Surveyor with geotagging mobile application brought out current stage of the house with time stamp and geolocation. Visiting to the next stage of the same house is ensured by geofencing. Dashboard provided in the web environment facilitates the supervisor and the higher officials to validate the physical progress and ensure the physical progress and financial transfer to beneficiaries.

Housing for the Urban Poor: Upscaling Slum Redevelopment

Darshini Mahadevia



AHP Project at Chhindwara, Madhya Pradesh

Introduction

Housing is one of the main pillars of successful urbanisation. With 162.02 million[1] population living in the slums of the total 460.30 million urban population in India in 2018 (35.2%), successful urbanisation in India will depend on how quickly slum dwelling population is transited to living in decent and affordable housing. This is all the more urgent given that the growth rate of slum dwelling population has outstripped the growth rate of urban population in the decade (Table1). Affordable urban housing programme targeting slum population is essential to reduce urban poverty including the multidimensional and housing poverty.

Period	Slum pop GR (p.a.)	Urban pop GR (p.a.)
1990-2000	-0.10	2.74
2000-2010	-0.77	2.71
2010-2018	2.98	1.51

Table 1: Urban and Slum Population Growth Rate[2]

Recognising the importance of improving living conditions of slum population Government of India has embarked on large-scale interventions in the cities since mid-2000 through funding under Basic Services for the Urban Poor (BSUP) and Integrated Housing and Slum Development Programme (IHSDP) component of Jawaharlal Nehru National Urban Renewal Mission (JnNURM). It was followed by Rajiv Awas Yojana (RAY) and PMAY-U since 2015.

PMAY-U has proved to be a landmark Scheme in the housing domain. Thus, it is important to analyse the experiences of its implementation with a focus on in situ Slum Redevelopment (ISSR) component. Since slum redevelopment is very context specific due to differences in land prices on which the slums exist, the viable solutions depend on the slum-specific conditions such as its location, density and neighbourhood characteristics.

Slum Development in PMAY-U

ISSR is one of the vertical of PMAY-U targeting the slums among its four components. It provides housing options to those living in slums by using land as a resource and construction of houses on-site. If the project is not technically and financially viable, the beneficiary has options to choose from other verticals of the Scheme. With a focus on slum

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[1] *Calculated using percentage population living in slums, percentage urban population from https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=IN (accessed on 29/03/2021).*

[2] *Calculated using*
a) Percentage population living in slums from https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?locations=IN, (accessed on 29/03/2021),
b) Percentage urban population from https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=IN (accessed on 29/03/2021) and
c) Total population from https://data.worldbank.org/indicator/SP.POP.TOTL?locations=IN, (accessed on 29/03/2021)

redevelopment, different methods for implementation have been adopted by States and in-depth study has been undertaken for Gujarat, Maharashtra, Tamil Nadu, Odisha, Madhya Pradesh and Andhra Pradesh to understand implementation models.

State Implementation Experiences of Slum Redevelopment

Different approaches to slum redevelopment can be observed at the State level. Each State has taken benefit from the Central Schemes of, earlier BSUP and now PMAY-U, to move forward on slum redevelopment efforts. Officials[3] at the State or City level were contacted to understand their development models. The study finds that the slums are being developed primarily by using two verticals of PMAY-U, namely, ISSR and BLC components. The implementation experiences have been summarised under five sub-heads, namely, convergence with existing programmes, innovative partnerships, identification of beneficiaries, innovative guarantee for housing loan and land issues.

Convergence with Existing Programmes

States have converged their ongoing programmes with ISSR component of PMAY-U. For example, in Maharashtra, the earlier SRS in place since 1995 has been converged with ISSR vertical, implemented by Mumbai Slum Rehabilitation Authority (SRA). This slum development approach based on land value capture was first initiated in Mumbai, then in other cities and has now scaled-up at national level. In Odisha, 'Jaga Mission', a State Government initiative focussing on giving land tenure rights to slum dwellers and other urban poor households, is converging the BLC component for construction of houses on tenured lands. This mission covers all urban areas except Municipal Corporations. Andhra Pradesh has Pedalandariki illu-Navaratnalu (Housing for All) Scheme, through which all those who do not own any land property are provided one cent of land (435 sq.ft) to every eligible beneficiary. The slum dwellers are also included in this Scheme. The State Government provides ₹180[4] thousand as part of financial assistance or will build a house with the same cost and handover the constructed house to the beneficiary.

Innovative Partnerships

Innovative Partnership with a Non- Governmental Organisation (NGO) has been observed in Ahmedabad, wherein Mahila Housing SEWA Trust (MHT) and now Awas SEWA (a non-profit company, set up by MHT-SEWA) is partnering with private developers for the ISSR projects. Mumbai, Ahmedabad has the largest number of ISSR DUs approved

[3] *The officials contacted were Deputy Tahsildar of Urban Community Development (UCD) office of Vishakhapatnam, expert from State Level Technical Committee (SLTC) of PMAY-U, Urban Development and Environment Department (UDED), Government of Madhya Pradesh, Project Officer from Tamil Nadu Slum Clearance Board, Executive Engineer from Maharashtra Housing and Area Development Authority (MHADA), official from Slum Rehabilitation Authority (SRA) Mumbai, and technical people from NGO Awaas-SEWA in Ahmedabad. The information on Odisha was sourced from a presentation by Mr. G. Mathi Vathanan, Principal Secretary, Housing and Urban Development Department, Government of Odisha.*

[4] *Based on data provided by the MoHUA.*

and constructed. The slum dwellers have many apprehensions about the project, and often mistrust the private builders. A mediator, to build trust between the two parties, is an important aspect of project implementation. The builder has to prepare a beneficiary list, which is done by Awas-SEWA as a consultant, along with the mediating work. The organisation has developed good contact with Ahmedabad Municipal Corporation (AMC) and hence are able to work with them on day-to-day basis. One of their important works is identification of beneficiaries and preparing a list through door-to-door survey while ascertaining eligibility criteria and collection of required documents including Aadhaar for verification.

Identification of Beneficiaries

In most of the States, Authorities undertake the process of beneficiary identification. Housing authority under the State/ UT Governments or the ULB prepares a list of beneficiaries based on their own survey. The cities have adopted varied approach with respect to documentary proofs. Madhya Pradesh takes self-attested documents and provides a house to all married couples within a household. In Ahmedabad, if there is one ration card for a joint family, having multiple families within, if they are able to provide either a separate gas connection bill or electricity connection bill, then each family unit is considered eligible under ISSR. In Mumbai, eligibility survey is conducted by SRA and in Vishakhapatnam by Urban Community Development of Municipal Corporation.

The challenge is when different family units within a joint family are unable to establish their being a separate household. In such situations, in Ahmedabad, AMC has decided to give second unit to such a family by charging an extra amount of ₹300 thousand. In Mumbai, SRA has suggested to the builders to recover the construction cost from a family unit wanting a separate DU. Under Jaga Mission, Urban Area Slum Rehabilitation and Redevelopment Committee (UASRRC), set up by District Collector at the city level, deployed NGOs to undertake surveys using hand-held device. This was a door-to-door survey and the data was validated by the Slum Dwellers Associations.

Innovative Guarantee

Access to loan for urban poor from the banks has always been a challenge. Due to irregular and informal source of income, the financial institutions are generally reluctant to provide them small ticket loan. In order to address such issues, few States such as Madhya Pradesh and Andhra Pradesh have pitched in to facilitate loans for the beneficiaries for contribution their share in AHP projects. A tripartite agreement is made among the beneficiary, the bank and the local government which acts as a guarantee for the loan.

Land Issues

Most ISSR projects are in slums on government lands belonging to ULBs or the State/UT Government. The slums that are on private lands or on lands owned by Central

Government Ministries and Undertakings are not available for ISSR. In Odisha's Jaga Mission, a decision has been taken to look into the tenability of slum land for giving land pattas (land titles) to those who are living there. If the land is in untenable for giving patta, i.e., it is under reservation in the Master Plan or has a different land use classification or is hazardous, then the State Government looks into the possibility of land conversion. If there is a possibility of converting the land use into residential, it is done through a process or else the beneficiaries of dwellers on such untenable land are given a Land Entitlement Certificate (LEC). Once, land allotment takes place on any other location, the beneficiary can obtain loan under the BLC vertical to construct a house.

Scaling-Up of Slum Redevelopment Efforts: Issues and Recommendations

This section brings together ground level understanding of efforts required to scale-up slum redevelopment across all cities in India, specially through the ISSR and BLC vertical. It is important to critically analyse the issues, meta issues the ones specifically with the ISSR and BLC components. The meta issues include reaching financial viability, State level land tenure policy and data bank on slums. The Scheme-specific issues include beneficiary identification process, process to avoid time and cost over-runs, cleaning up land-title deeds and streamlining approvals, solution for multiple and private land ownership in slums, creating a decision-making entity at the city level within the ULB, innovative financing, improvement in house design, and de-notifying redeveloped slum.

Reaching the Financial Viability

ISSR component works only in the cities where the land market is buoyant, like the metropolitan cities. Hence such a scheme, namely SRS, was first introduced in Mumbai, which has the most expensive real estate among the metropolitan cities in India. This is the reason why viability of this Scheme in cities such as Pune in Maharashtra is attained but in cities of other States like Madhya Pradesh, Andhra Pradesh, etc., and non-metros is very low.

In cities where ISSR is viable for the builders/developers, these are being taken up only for slums on public land, largely that of the municipalities. In particular, Central Government lands are not available for ISSR implementation and considered untenable. ISSR project's viability on slums on private land is low, given that the land owner would also have share in the project's profit besides the builder/ developer. In cities with very high land prices, like in large metropolitan cities, would mean that the land owner would expect a high price in letting the land available. The additional Floor Space Index (FSI) given and it being fructified through use of Transfer of Development Right (TDR) would not cover for additional profit to be generated from the project for even the land owner to benefit. Even in case of slums on public lands, the location of slum is important to realise the potential of the 'land value capture' principal on which ISSR component is envisaged. In an early study of SRS in Mumbai, it was found that the viability of this approach was limited to the slums that were within a kilometer of the suburban railway line; in other words, the land prices were high in only slums that had good accessibility (Mitra 2003).

State-level Land Tenure Policy

The most important issue in implementation of BLC component is granting of pattas. This is important also in case slum-upgrading is introduced as the fifth vertical of the PMAY-U. As argued above, ISSR works only in slums on public lands. BLC component has been useful, as in case of Jaga Mission in Odisha, in combination with the land tenure policy. Besides Odisha, other States such as Punjab and Madhya Pradesh (since 1984) have this policy. The states need to bring in a land tenure policy that supports ISSR and BLC components of PMAY-U.

City level Data Bank on Slums

City level data base on slums along with the names of occupants is generally not available. Some cities may have prepared such a list at the time of preparing their respective Slum-free Plan of Action, a requirement under RAY. When such a data pre-exists, the task of verifying it only remains, either by deploying local government surveyors or local NGOs, as done under Jaga Mission in Odisha and Ahmedabad. Such a data bank also has to be dynamic and needs to be updated periodically.

Beneficiary Identification Process

This process is quite cumbersome, dispute-ridden and time taking, particularly in case of ISSR component or also when land tenure/ titles have to be given. This leads to project delay or in most instances abandoning of the project. Beneficiary identification process is smooth when ULBs or State/ UT Government have created a mechanism to survey the slum before taking up the development, as in case of Odisha, Andhra Pradesh and SRA, Maharashtra. In Ahmedabad, the beneficiary identification is left to the developer/ builder who undertakes ISSR. The builder/ developer does not have capability to deal with this issue and in many instances has contracted a non-profit company, a sister organisation of a NGO that has been working with the slum dwellers for a long time, to take up this task. The following issues crop-up[5]:

- Many households tend to get missed out from the beneficiary list in case there is a cut-off date based on which the list is prepared. In Ahmedabad and Mumbai, the cut-off date is 2010 and 2000 respectively. If the project has to be implemented in 2021, there would be many new occupants and the earlier occupants with the proof of residence up to 2000 would have left. But, when the beneficiary list is to be prepared, the latter ones too stake claim. There are some units which would have changed hands multiple times and there could be a possibility of multiple households staking claim to the same house.
- If there is a joint family, then among them the most resourceful family unit tends to stake claim while leaving out the others.
- The tenants do not get listed and landlords might push the names of their own family members as beneficiaries.

- In case of Ahmedabad, the non-profit company taken onboard by the developers have faced challenges from local anti-social elements who want to influence the list of beneficiaries being prepared.
- After the list is prepared, the aggrieved use Right to Information (RTI) route to seek information and which then delays the process.

Controlling the Process to Avoid Time and Cost Overruns

In the process of identifying the project beneficiaries in case of the ISSR component, there are time and cost overruns, making the project often financially unviable. The project cost is generally based on Schedule of Rate (SoRs) prevailing at the time of issuing tender. Time overruns then lead to increase in construction costs, often due to increase in prices of steel and cement. This negatively affects the developer's profit margin. Time overrun also means that the developer has to pay rent to the slum dwellers for the entire period of the project construction, again stretching the developer's finances. Thus, it is essential that the list of beneficiaries is made available to the developer before the start of project implementation

Cleaning-up Land Title Data and Streamlining Approvals

This process is also quite difficult given that the land title data is not up-to-date. The land title data in town planning/ urban planning documents can be different from the revenue records. This is because, taking example of Gujarat, Environmental Planning Collaborative (2008) argue, that there are two regimes that work on land, one of the revenue department and second of the planning department, which need to be synchronised. If not, then there is a dispute, as we see in case of ISSR implementation in a slum covered under Smart Cities Mission (SCM) in Ahmedabad. The land ownership of a plot in this SCM slum (which is large and has multiple land owners), is mentioned as private in the areas Town Planning Scheme because that is what is contained in the revenue records, whereas at some point, the private land owners were given a plot elsewhere in lieu if being[5] surrendered for the ISSR project[6]. Such anomalies in land ownership is consistently found, which can only be addressed by digitising land data and synchronising town planning and revenue department's land ownership data.

Solution for Multiple and Private Land Ownership in Slums

Some slums have multiple land owners including private owners. In Ahmedabad and Mumbai, estimates put slums on private lands in the range of 50 per cent to 75 per cent. These are guesses and not the exact data. In both these cities, after promulgation of Urban Land Ceiling and Regulation Act (ULCRA) in 1976, the land owners with large land parcels

[5] *The author was a member of the R & R Committee under the Resettlement and Rehabilitation Policy for the Sabarmati River Front Development Project (SRFDP) set up by AMC. The issues discussed are based on personal experience of the author as well as discussion with technical person of Awas-SEWA and a developer engaged in the ISSR projects in the city.*

and facing eminent notification for acquisition, sold the land by plotting them and invited informal housing developments (Mahadevia 2015). In case of the SCM Ahmedabad, wherein a large slum is being redeveloped under ISSR, the land parcels have different owners. The redevelopment therefore is planned in different sectors to address the land issue. BLC will work in slums with multiple land owners as well as slums on private land too. In case ISSR is preferred, then a land-swapping mechanism has to be approved through a legislative intervention, similar to the mechanism introduced in the Jaga Mission in Odisha.

Creating a Decision-making Entity at the City Level within the ULB

Slum redevelopment efforts have to be at a city level. In some States, the former entities within the city government that were undertaking slum improvement or upgrading, such as the UCD departments in the state of Andhra Pradesh, or the Slum Networking Programme (SNP) cell in Ahmedabad, and so on should be made in charge of the project implementation. Such an entity needs to be empowered to negotiate all local (city) level issues such as disputes with regards to beneficiary identification and create slum data bank (Mahadevia 2014). The ISSR projects require multiple approvals for the project from the planning and other regulatory authorities. For example, in Ahmedabad, the Estate department looks after the demolition in case some households refuse to vacate their units, Housing department looks after the construction, the land related information is with the State/ UT Government Revenue department and the Planning is with the planning department. This entity within the ULB can assist in streamlining the approval process and save time and efforts of the developer. This entity can also frame required rules to respond to the situation that emerges on ground in the process of implementing the ISSR project in particular.

Innovating Financing

The ISSR is not viable in small and medium sized cities where the land markets are not buoyant. For this the city or the State/ UT Government can co-finance the project. The developers can utilise the TDR only after the project is completed. If the project takes a long time to complete, the developer's finances get locked up for long. Thus, only large developers are able to participate in the ISSR component. For this as well, a co-financing mechanism from the State Government should be available to bring in large developers. Overall improvement in the data and approval process could make such projects viable also for the small developers.

For households to also contribute towards ISSR or slum-upgrading efforts, the slum dwellers need to generate collateral guarantee. With no assets that can be offered as security, the slum dwellers cannot apply for a bank loan. In such a case, there can be a tripartite loan agreement, with the slum dweller, the local government and the bank as parties to an agreement. This mechanism is used in Madhya Pradesh and Andhra Pradesh as discussed

[6] *Based on author's site visit in Ahmedabad prior to COVID-19 lockdown for a research project. This paper is not yet published.*

above. The other option is to extend loan on the house allotment letter and not wait for ownership documents.

Improving House Design

The ISSR projects often try to maximise saleable built-up component, compromise on size of corridors and stairwells. Even, the buildings are put so close to each other that the experience is of creation of a vertical slum. The dwelling units' design are not culturally sensitive; for example, the toilet is placed adjacent to kitchen. Thus, there has to be quality monitoring of the DU design as well. The new settlements need to have well designed open spaces in such a way that these are used for community purposes and not for throwing garbage.

Denotification Slum on Redevelopment

The slums redeveloped using either the ISSR or BLC component need to be de-notified as slum so that the attention to redevelop other slums can be taken up.

Way Forward – Upscaling to City-level Slum Redevelopment

Slum redevelopment upscaling will require a city-wide effort. Term 'slum redevelopment' includes two main options, in situ redevelopment using land as a resource (now termed as ISSR) and slum improvement using BLC component. The other option, which is not desirable, is 'slum rehabilitation'. This means shifting slum dwellers to a new site, which, the experience in cities shows they are on the urban periphery (Alberts et al. 2015; Coelho et al 2020) which significantly affect the life and livelihoods of slum dwellers and urban poor adversely. Hence, ISSR and BLC components are best suited to inclusive slum redevelopment, that will benefit the city as well as slum dwellers. The following recommendations reflect upscaling slum redevelopment in a generic way so as to make the entire city slum-free or achieve 'Housing for All' :

1. The most important step is to create a city level data base on slum households. This data is already available in different data bases, that needs to be extracted and compiled to make a draft list. The draft list should also have list of households. Such a list can then be regularly updated so that at the start of the project, a tentative list is available, that can be verified on ground.

2. It is not argued that the two components of the PMAY-U, the CLSS and the AHP would not be useful. However, if the permission for such projects are given on locations where public housing is available, this would facilitate shift of the slum dwellers to new and liveable house. Another variant of such an approach is to have a policy on 20 per cent reservation of the total units in the projects developed under the TOD. The other option is to find land through the use of land management mechanisms such as land pooling and

redevelopment, deployed successfully in some cities such as Ahmedabad (Mahadevia et Al 2018).

3. As discussed, the fifth vertical of upgrading slum would work well in combination with BLC component or a separate funding could be made available for the same. In case of slum upgrading, a quasi-legal tenure up to 20 years could be extended and such slums can then be charged property tax. This approach will also work for slums on private lands. Land tenure policy at State level will be critical for slum redevelopment at a city scale.

4. Land tenure policy is at the centre of upscaling the BLC component, particularly in the small and mid-sized cities.

5. To make ISSR component viable in cities with less buoyant land market, there are two options. One is that the subsidy from Central Government be increased from ₹100 thousand to ₹150 thousand, which is at par with the subsidy in the AHP component. The second option is that the ISSR should be a joint venture or partnership of the government and builders in 50:50 composition. In that case, instead of total free houses, there could be some proportion of the cost recovered from slum dwellers who are extended a housing loan.

6. The cities operate with a cut-off date, making it difficult. All households residing before the start of a project should be included as beneficiary or else, the cut-off dates have to be dynamic. Since the allotment of DU is linked with Aadhaar number, there is less possibility of one household benefitting from more than one scheme. This would reduce the time taken for beneficiary identification and reduce time and cost-overruns.

7. For multi-family households, municipal government should take a decision on offering DUs to other family units within a joint family by charging either the actual construction cost or a fixed price based on EWS housing unit cost in the state.

8. Single window clearance of projects through facilitation by an entity created within the ULB for the purpose can speed up ISSR projects. This might make these projects viable also for small developers.

9. ISSR or BLC projects should have a design component so that there are adequate public spaces in the new settlements. The house design should be culturally sensitive. The building design should not creating cramped corridors and stairwells so that the new housing is an example of good liveability.

10. To expand horizon of outreach of PMAY-U there is a need to think of an intermediate solution such as in situ slum upgrading wherein the rights to live are short-term. An example of this is SNP implemented in Ahmedabad and Indore. The one implemented in

Ahmedabad has received many UN-Habitat awards. For those who are living on pavements in extremely temporary structures in the city need to have rental housing option, which would require expansion of Affordable Rental Housing Policy.

11. Last, but, not the least, slum redevelopment should be the priority at city level, bringing in all the resources at hand – Central Government finances, city level planning competencies, small and large private sector in project development, financing construction and community level participation in local level implementation and negotiations.

Achieving Housing Affordability through Rightsizing the Role of the State as Provider and Enabler

Dr. Sejal Patel &
Dr. Bimal Patel

AHP Project at Nellore, Andhra Pradesh

Introduction

Access to decent housing that is affordable for all income groups is key for a habitable city. Cities across global south and north are grappling with varying degree of housing unaffordability, as per specifics of the local land and labour market. Within cities, access to Affordable Housing has been a challenge for all income groups and not just low income families.

For long, housing market in Indian cities has been riddled with barriers such as inadequate delivery of serviced land in the periphery of cities, irrational building regulations that increase land capital on house price, multiple approval and transactions to secure construction permits, challenges in access to construction finance and high risk and low yields in rental housing. Markets were unable to provide units below a certain price range, leaving a large section of households seeking housing adjustments uncatered. Housing market, thus was characterised by oversupply of high end housing, low supply of affordable housing and small rental housing supply. This led to burgeoning housing need or shortage, characterised by households living in substandard housing and seeking housing adjustment but uncatered or marginally catered by markets. In order to improve access to Affordable Housing for all income groups, a multipronged approach is advocated where the role of the State is rightsized as an enabler and a provider. On one hand, states should take initiatives to enable markets to efficiently generate adequate housing stock by addressing the barriers, on the other hand, they should devise strategies to provide assistance to uncatered and less catered households living in substandard housing to access decent affordable housing. Such a multipronged approach recognises that housing is an integrated market or ladder where failure in any submarket has ramifications across all submarkets. Therefore, housing policy has to address distortion and barriers across all submarkets rather than focus only on low income submarket. It is creditable that Government of India (GoI) through MoHUA has set in motion this multipronged approach of enabling the market to meet housing demand through various initiatives and providing assistance to households constituting housing needs through PMAY-U and other supplementary initiatives.

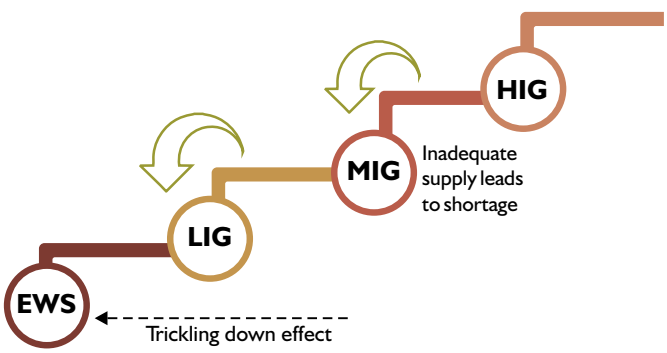


Figure 27: Trcikling down effect in Housing sector

This chapter discusses ambitions and outreach of PMAY-U and other initiatives to bridge urban housing shortage through an ambitious target of 12.2 million housing units through a provisionary role. The enabling initiatives set in motion by MoHUA that address barriers to market and the status and challenges in implementation at local level are discussed. In conclusion, it is inferred that with this multipronged integrated approach of basket of provisionary and enabling initiatives across the housing ladder, housing affordability in Indian cities has the potential to improve incrementally, early signs of which are evident.

Figure 28: Facilitating upward mobility of urban households on housing ladder through integrated approach (Source: compiled by author)

Meeting Housing needs through PMAY-U and convergence with other submissions

PMAY-U, with the aim to provide ' Housing for All', is a good way forward to meet the housing need of India, which stood at 18.78 million units in 2012, constituting obsolete units (12% of shortage at 2.3 million), congested units (80% of shortage at 2.315 million), non-serviceable units (5% of shortage at 1 million) and the homeless (3% of shortage at 0.53 million) (MHUPA 2012).

PMAY-U addresses housing needs through four verticals with a provisionary role of the State. These include 'in situ' Slum Redevelopment (ISSR) for construction of housing for eligible slum dwellers by private sector through land value leverage and financial assistance from GoI; Affordable Housing in Partnership (AHP) for construction of EWS housing by

states or their agencies or partnerships with private sector through Central assistance from GoI; Beneficiary led Construction (BLC) for construction of new house or enhancement of existing house on self-owned land by EWS beneficiaries through direct financial assistance; and Credit Linked Subsidy Scheme (CLSS) for purchase of new or enhancement of existing house for EWS/LIG/MIG beneficiaries through direct interest subsidy on home loan.

PMAY-U verticals are supplemented by other grant and reform based sub-missions such as Atal Mission For Rejuvenation and Urban Transformation (AMRUT) (MoHUA 2014), Swacch Bharat Mission- Urban (SBM)(MoHUA 2017) and Deendayal Antyodaya Yojana- National Urban Livelihoods Mission (DAY-NULM) (MoHUA 2014) to facilitate access to different components of housing and mobility across the housing ladder. AMRUT provides basic services (water supply, sewerage, urban transport, etc.) and social amenities in 500 cities with focus on coverage of poor settlements such as slums (MoHUA 2014). SBM provides scientific municipal solid waste management and access to household and community toilets to those urban poor households who either depend on open defecation or have insanitary toilets. DAY-NULM provides 'homeless shelter' equipped with essential services to urban homeless along with creating opportunities for skill development, leading to market-based employment or self-employment venture by ensuring easy access to credit (MoHUA 2014). Thus, these sub-missions interventions needed across housing continuum are covered as shown in Figure 28.

PMAY-U is a shift from the erstwhile conventional housing schemes of GoI with cookie cutter units and silver-bullet solutions in three fundamental ways. First, PMAY-U caters to differing housing 'demand' of different segments of urban families through supply side or demand side provisionary support under four verticals. The differing housing demand was captured through ambitious 'Housing for All' surveys at city level which allowed interested beneficiaries to sign up for suitable vertical and thereby allowed cities to formulate housing demand based on which national targets for each vertical were formulated. Second, the vision under PMAY-U is 'Housing for All' rather than 'Slum-free city' of earlier programmes, implying that it addresses housing needs for all income groups across housing ladder rather than only one segment and submarket. Third, it offers Urban Local Bodies (ULBs) an opportunity to converge PMAY-U with other submissions such as AMRUT, SBM, NULM and thereby provides integrated housing policy framework across housing value chain and ladder.

With a well-defined scope and timeline, PMAY-U appears on a right trajectory to meet the target of constructing 12.2 million housing units under the four verticals. BLC has shown the highest uptake accounting for 61% of sanctioned units. Till september 2022, 6.1 million units or 51% of sanctioned units were completed whereas about 6.2 million units are under different stages of construction. The sub-scheme of Affordable Rental Housing Complex (ARHC) announced post-pandemic in July 2020 has also gained momentum in implementation (MoHUA 2020).

Provisionary support for the homeless

For homeless families, transitional housing termed 'homeless shelter' are provided through NULM in partnership with State/ UT Governments. The core belief of NULM is that the poor are entrepreneurial and have innate desire to come out of poverty. Through initiatives that expand their skills, enterprise and assets, it is assumed that they will leverage these to elevate to higher rungs of the housing ladder. Though riddled with implementation issues at local level, such as inability to mobilise land for homeless shelter and unwillingness of homeless families, etc., this is a step in the right direction. Supply of subsidised formal rental housing by upcoming ARHC projects in a few cities will facilitate the mobility of homeless families to next rung of housing ladder.

Provisionary support to slum dwellers on tenable and untenable sites

ISSR Scheme aims to leverage the locked potential of land under slums to provide a formal dwelling unit to eligible slum dwellers with private participation. GoI plays a provisionary role with assistance of ₹100 thousand per family to the developer. State/UT Governments plays the role of enabler of markets through the state policy for incentivising the market such as additional Floor Space Index (FSI), Transferrable Development Rights (TDR) and zoning variance allowing commercial development in the 'free sale' component of the project. Local government facilitates the market through transparent bidding process and 'single' window for project approval. The experience of implementation of this initiative is varying in different states as the implementation efficiency primarily hinges on an incrementally developed ecosystem of trust and confidence between local government, developers, community and non-governmental organisations (NGOs) as intermediaries, as is evident in States like Gujarat and Maharashtra. To scale up ISSR in slums on private land and motivated by its success on public lands in cities of Gujarat, State government has launched a similar policy for redevelopment of slums on private lands in October 2019.

Tenable slums which are not located on high potential land and are not likely to be redeveloped by market under ISSR, are in situ upgraded with basic services through AMRUT and SBM. AMRUT aims to ensure that every household has access to a tap with assured supply of water and a sewerage connection (MoHUA 2014) with GoI and matching State/UT Government assistance. Under SBM, household level toilets are constructed with subsidy of ₹4,000 and ₹8,000 from GoI and State/UT Governments respectively to build toilet super- and sub-structure in slums, delinked from tenure.

For untenable slums on hazard-prone site or public reservation site, currently there is a policy vacuum for rehabilitation and resettlement (R&R) of the dwellers. PMAY-U guidelines prescribe that such families can be rehabilitated on ISSR projects with surplus land (MoHUA 2016) but more clarity on the policy around R&R would help in its convergence on ISSR sites.

Improving access to formal Rental Housing

Rental market in India has long been fragmented and underdeveloped, characterised by low yield of 2 to 3 % and high risk. Rental housing fell under the purview of archaic Rent Control Act, with each state having its own version. Tenant- landlord conflicts were quite common, leading to lengthy litigations. Despite housing shortage of 18.78 million in 2012, interestingly 11 million houses were lying vacant in cities. Absence of an appropriate legislation regulating rental housing was arguably the key reason for this.

Model Tenancy Act, 2020 aims to plug the many gaps in current rental policies by ensuring better accountability and transparency in transaction between landlord and tenant and speedy adjudication mechanism for resolution of disputes. Like Real Estate (Regulation and Development) Act (RERA) 2016, this Act holds the potential to be a game changer that can give a boost to rental housing and unlock the vacant housing unsold inventory with developers. To achieve this, it would be prudent for State/ UT Governments to adopt the act, formulate relevant rules as per local context and put in place an institutional framework for grievance redressal mechanism, comprising of rent authority, rent court and rent tribunal to provide fast-track resolution of disputes. Disposal of a complaint by rent court and tribunal is mandatory within 60 days. Though the Model Tenancy Act does not address the issue of low rental yields, it is expected that it will incrementally unlock existing vacant stock and unabsorbed inventory with developers and in the long run, incentivise new private rental housing complexes.

MoHUA has initiated ARHC as a sub-scheme under PMAY-U post pandemic in July 2020 to improve access to decent affordable rental housing for urban poor who are homeless, living in slums, or other substandard housing. ARHC guidelines propose two models, i.e., retrofitting of existing government funded vacant houses to convert into ARHCs through Public Private Partnership (PPP) or by public agencies and, construction, operation and maintenance of new ARHCs by public/ private entities on their own vacant land.

The role of GoI is to provide direct and indirect assistance to the supplier entity by allowing retrofitting of vacant government-funded housing as ARHC, by exempting income tax on profits and gains derived from operation of ARHC under section 80-IBA of Income Tax Act, 1961, exempting Goods and Services Tax (GST) on profits and gains derived from operation of ARHCs, allowing project finance at lower interest rate through concessional window under Affordable Housing Fund (AHF) by Housing Finance Companies (HFCs) and Priority Sector Lending (PSL) by commercial banks and providing Technology Innovation Grant (TIG) for technology supporting fast and high quality construction. The role of State/ UT and local governments it to enable the supplier entity by making necessary changes in Development Control Regulations (DCRs) such as allowing 50% additional FSI and zoning variance for commercial development within ARHC, delivering services to ARHC site and forming single window for construction permit within 30 days of application for ARHC.

It is envisaged that vacant government funded housing stock will be unlocked through this Scheme and affordable rental units will be made available to urban poor families. This is a promising early response to the first model and may pave way for a new paradigm in public rental housing and bridging housing shortage.

Provisionary support for ownership housing

Credit Linked Subsidy Scheme

This is a demand side intervention under which GoI provides interest subvention on home loans taken by eligible EWS, LIG and MIG families for construction or enhancement of a house. GoI offers interest subsidy of 6.5%, 4% and 3% for EWS, LIG and MIG on loan amounts of ₹600 thousand ₹900 thousand and ₹1.2 million respectively (MoHUA 2016). National Housing Bank (NHB), Housing and Urban Development Corporation (HUDCO) and State Bank of India (SBI) act as Central Nodal Agencies (CNAs) to channelise this subsidy to Prime Lending Institutions (PLIs) and to monitor progress of the Scheme. The process involves borrower applying for a loan to the lender, lender checking the eligibility criteria of the borrower for a loan and subsidy, lender sanctioning the loan and initiating a claim for a subsidy from CNA.

In initial stage of roll out, there was no provision for PLIs and benficiaries to track the status of subsidy release. As applications were processed in bunches, subsidy release was delayed, resulting in public grievance. In response to such implementation challenges at local levels, MoHUA developed a real-time monitoring system – CLSS Awas Portal (CLAP), where all stakeholders such as MoHUA, CNAs, PLIs, and beneficiaries are integrated. CLAP allows beneficiaries to track their application through unique identification (ID), starting from submission of application till subsidy release. Benficiaries also receive status through SMS alert at different stages (MoHUA 2019). This shift to digitalisation has enabled fast processing of applications, validation, timely release of subsidy, transparency in the process and minimised grievances under CLSS.

Beneficiary led Construction

This is a demand side intervention under which GoI provides direct assistance of ₹ 0.15 million to eligible EWS families to either construct a new house or to enhance an existing house. Enhancement is defined as addition of minimum carpet area of 9 sq.m to an existing house with permanent construction of at least one habitable room or room with kitchen and /or bathroom and/or toilet conforming to National Building Code (NBC) norms. The total carpet area after enhancement must not be less than 21 sq.m and must not be more than 30 sq.m.

BLC has emerged as the most popular component of PMAY-U with 7.34 million sanctioned units, accounting for 61% of the total sanctioned units. High demand for BLC,

especially in small and medium cities, stems from the comparative flexibility it offers to beneficiaries to construct standalone houses on their own plot as per their need and aspirations. GoI releases Central assistance in phases, after submission of utilisation certificates for earlier released funds and submission of construction progress by the beneficiary. In some States, during the pandemic, beneficiaries were not able to contribute their own share towards the construction of the house despite the release of Central subsidy. Despite that, progress in many States is good and at national level, 32% or 2.24 million out of the sanctioned units of 6.1 million have been completed by June 2022.

Affordable Housing in Partnership

This is a supply side intervention under which GoI provides financial assistance of ₹0.15 million per EWS house being built with different partnerships by States and ULBs. An AHP project could be a mix of houses for different categories but would be eligible for Central assistance if minimum 35% of the houses in the project are for EWS category and if project has at least 250 houses.

To make homes further affordable, State/UT Governments are to extend further enabling and provisionary measures such as making public land available, making necessary changes in Development Control Regulations (DCR) to support AHP projects, reduced stamp duty and providing matching State/ UT Government assistance for AHP. State Level Sanctioning and Monitoring Committee (SLSMC) approves Detailed Project Reports (DPRs) of AHP projects submitted by ULBs. State/UT Governments were to set an upper ceiling limit on the sale price of EWS units and beneficiaries were to be charged on carpet area. Homes in AHP were to be allotted to eligible beneficiaries as per the Housing for All Plan of Action (HFAPoA) through a transparent procedure approved by SLSMC.

After BLC, AHP has the next highest uptake and accounts for 2.09 million sanctioned units. Initial phase of the roll out evinced low response from the markets because of the price ceiling criteria. Hence, initial projects were largely public housing projects funded and implemented by State housing boards or ULBs. After the increase of ceiling price to ₹1.5 million by few State/UT Governments, private sector began to respond by developing private or PPP projects.

Enabling markets to meet Housing Demand

While the initiatives discussed in the previous section represent a basket of provisionary strategies to improve access to decent housing for families constituting housing shortage, the next section discusses interventions initiated by MoHUA to address barriers to the market in delivering adequate affordable housing and meeting expected housing demand in local area.

Delivery of serviced land in inner city and periphery

For long, Indian cities have been characterised by slow delivery of serviced land in the periphery and densifying core areas which accommodate population growth and housing demands (Ballaney S and Patel B 2009, Bertaud A 2010, KPMG-NAREDCO 2012, JLL-CREDAI 2014). Land management frameworks which allow local authorities to appropriate land for infrastructure and social amenities have been inefficient in delivering serviced land with the exception of Town Planning Schemes (TPS) practiced in cities of Gujarat and Maharashtra (Bertaud A 2010). Similarly, Local Area based Plans (LAP) create a framework to enhance public spaces and areas under roads in existing built-up environment and thereby enable redevelopment (MoHUA 2018).

MoHUA recognised the need to mainstream TPS and LAP to improve delivery of serviced land in cities. However, the key challenge for implementing these strategies was lack of appropriate capacity at the States and local level. Use of new planning techniques such as TPS and LAP would require significant capacity building of planners who can then be made responsible for preparing and overseeing these in their respective cities. To extend both financial and technical assistance to cities to undertake preparation of TPS and LAP, MoHUA and Town and Country Planning Organisation (TCPO) launched and delivered Training Programme on 'Pilot on Formulation of Local Area Plan and Town Planning Scheme' under AMRUT Mission to planning authorities from 25 States, with each expected to formulate and submit TPS and LAP proposal for their respective city.

Through this pilot programme, State/UT Governments are expected to review and suitably reform Town Planning and Urban Development Act of their states to enable formulation and implementation of TPS and LAP. The reform process has already been initiated in many states. With these affirmative steps, it can be expected that incrementally local ecosystem will be developed within which serviced land will be delivered more efficiently to the market to meet the housing demand (MoHUA 2014).

Streamlining approval and transaction process for construction permit

The process of securing construction permit prior to commencement of construction has been historically riddled with delays amidst array of authorities and transactions in cities of India. Such transaction delays and costs have been shown to constitute 10 to 20% of the price of a housing unit. Studies have shown that on an average it took 2 to 2.5 years to secure multiple approvals in the preconstruction stage in Indian cities (KPMG-NAREDCO 2012, JLL-CREDAI 2014).

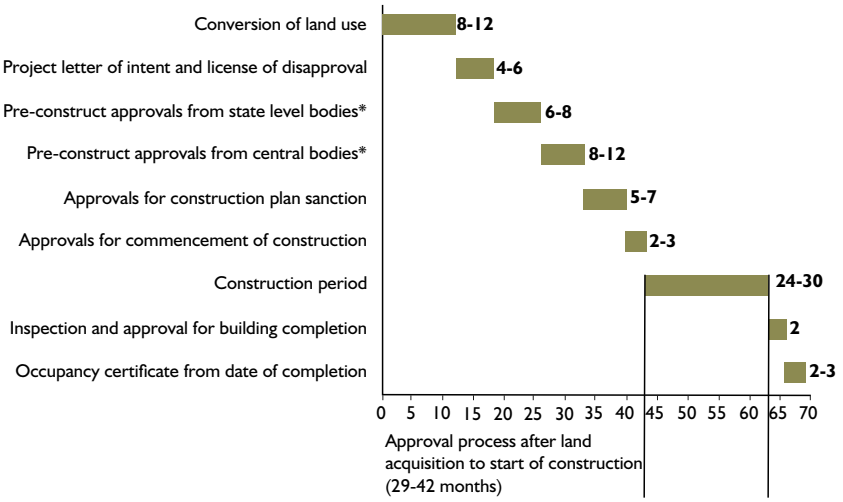


Figure 29: Approval and transaction process for construction permit

World Bank's ease of 'Doing business' study audits the performance of 190 economies in eight sectors, one being 'Dealing with Construction Permits'. Since 2014, GoI has taken serious cognisance of these audits and set in motion reforms in all eight sectors to improve the performance. As a consequence, India's overall performance, as well as specific performance in 'Dealing with Construction Permits' has progressively improved. As shown in Figure 30, India's overall rank has improved from 134 in 2014 to 63 in 2020. In 'Dealing with Construction Permits', India's rank markedly improved from 182 in 2014 to 27 in 2020. With concerted efforts and reforms put in place by MoHUA and case studies of Mumbai and Delhi, it is seen that average time to secure construction permits reduced from 168 days in 2014 to 106 days, procedures reduced from 35 to 15 days and related transaction cost reduced from 28 to 4% of the project cost.

To achieve this marked improvement in performance in construction permits from 2014 to 2020, Delhi and Mumbai incrementally streamlined the process of obtaining building permit by introduction of Online Building Permission System (OBPS). This reduced the time and cost of obtaining permit and improved building quality control by strengthening professional certification requirements by introducing decennial liability and insurance (The World Bank 2014, The World Bank 2015, The World Bank 2016, The World Bank 2017, The World Bank 2018, The World Bank 2019, The World Bank 2020).

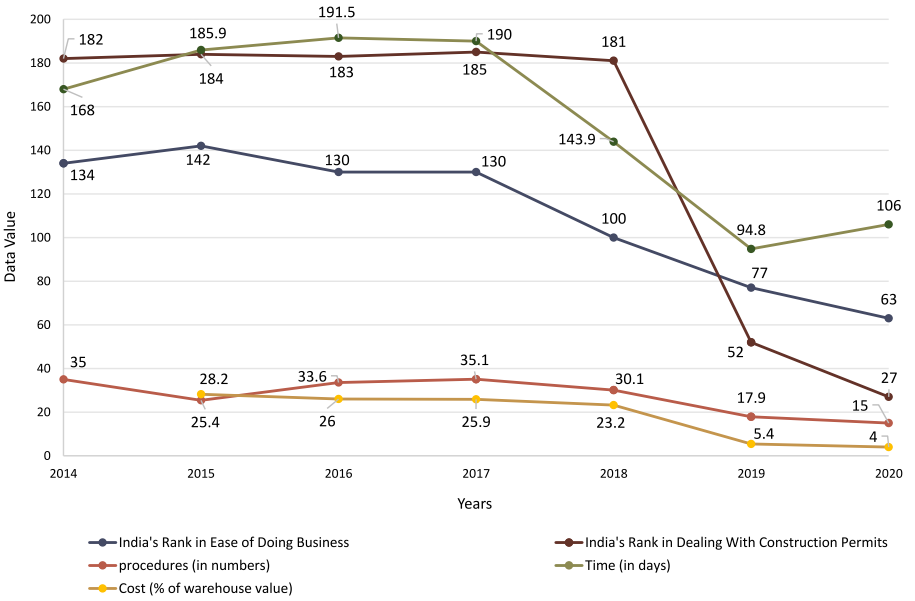


Figure 30: Dealing With Construction Permits in India

To replicate this initiative in rest of India, MoHUA is handholding cities to implement OBPS and has made its implementation a part of State/UT and Urban Local Body (ULB) level reforms to receive grants under AMRUT submission. By April 2021, OBPS has been made operational in 1705 cities including 439 AMRUT cities (MoHUA 2014), which is a significant achievement. It can be envisaged that through competition, markets will pass on the increased profits from savings in time and cost in securing construction permit including interest on investment in land to consumers. Thereby, housing price across all segments may reduce marginally and this may increase housing affordability.

Rationalising land and building regulations

Land capital contributes 30 to 45% to the price of housing unit in Indian cities (with exception of Mumbai and a few other metropolitan cities where it is as high as 90%). Planners use Floor Area Ratio (FAR) as a tool to substitute capital for land, which is constrained by cost of construction per square metre of floor space and follows a U-shaped curve as the number of floors increases. Possibility of substituting capital for land by varying FAR, thus depends on the relative cost of land and construction (Bertaud A 2010).

Indian cities have one of the lowest permissible FAR amongst cities of global south. While it is not advocated to indiscriminately increase FAR in cities, it is important for planning authorities to be liberal in fixing it as per the local land and constructions costs.

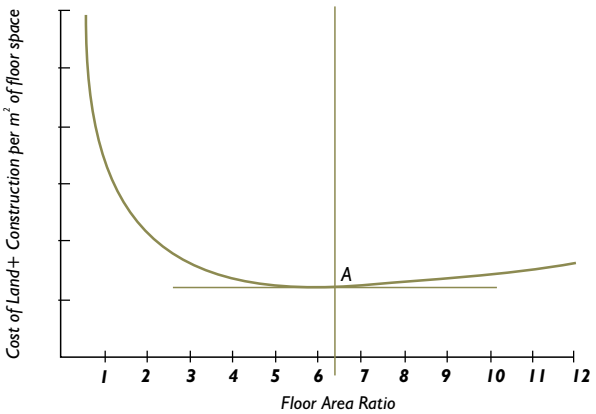


Figure 31: Cost per sqm of floor space with varying FAR (Source : Bertaud A 2010)

Construction costs contribute 20 to 30% to the price of a housing unit. To build legal housing, developers must meet a high minimum cost threshold established by mandatory standards in building regulations. These, thus impose costs on construction, make them less affordable to low-income households and deprive them access to legally built housing. A study by the lead author analysed impact of relaxing a few mandatory building and site planning regulations on the cost of small two-room homes in Ahmedabad by developing two alternative layouts for the same site, one in accordance with prevalent regulations, and another after modifying a few regulations. The study showed that rationalising building regulations can reduce housing cost by 34% and increase supply on site by as much as 75%, without significantly lowering the quality or compromising safety of the residents. It further showed that for a large portion of poor households, the costs imposed by mandatory standards are not trivial and have a high impact on the affordability of legally built housing. It is imperative for local authorities to critically audit and reform building regulations as per the specifics of local land and labour market, such that land capital and construction cost can be optimised without compromising comfort and safety. While MoHUA's initiatives in streamlining procedural building regulations through OBPS is appreciable, it would be prudent to also include audit and reform of local building regulations as part of AMRUT reforms.

Regulatory and fiscal incentives to enable supply of mid segment Affordable Housing supply

GoI has taken several initiatives to enable developers to augment supply of mid-segment affordable housing, typically in the range of ₹1million to ₹4.5 million, where the supply was substantially lower than the demand due to low margins and high risks. The initiatives included incentives, tax benefits and institutional funding which were offered till March 2022 (Figure 7). These measures have spurred growth in this segment at local levels. Convergence of the definition of Affordable Housing under these initiatives would further boost the supply.

	GST Incentive	Income Tax Incentive	Infrastructure Status to Affordable Housing
Regulatory Reform	Decisions taken by the GST Council in the 34th meeting held on 19th March, 2019 regarding GST rate on real estate sector	Section 80 IBA of Income Tax Act, 1961	Ministry of Finance (Department of Economic Affairs) (Infrastructure Policy & Programme Section). Notification, 24th August 2020, F.No. 13/1/2017-INF
Incentives	GST on affordable housing project 1%	100% tax exemption on profits from sale of units	Priority Sector Landing, mobilise funds from channels such as ECB and Foreign venture capital and portfolio investors.
Affordable Housing Definition			
Unit Size Ceiling	Carpet area<=90 sqm in non-metropolitan areas and <=60 sqm in case of metropolitan areas	Carpet area<=90 sqm in non-metropolitan areas and <=60 sqm in case of metropolitan areas	Carpet area <=60 sqm
Built Area Distribution	15% pf the aggregate carpet area of the project	3% pf the aggregate carpet area of the project	50% of the Floor Area Ratio (FAR)/ Floor Space Index (FSI) for above units
Unit Price Ceiling	INR 4.5 million	INR 4.5 million	NA

Regulatory and fiscal incentives for Affordable Housing. Source : Compiled by author

Conclusion

With a multipronged approach that MoHUA has set in motion with interventions that enable markets and provide assistance to the uncatered and less catered families, the trajectory is promising. Housing affordability for all income groups may be viable if local and State/UT Governments continue on the implementation and reform path that has been triggered through these initiatives. Ratio of median price of a housing unit to median annual family income (after tax) is often used to reflect housing affordability in a city with a desirable value from four to five (McKinsey Global Institute 2014). A recent study of housing affordability in key cities of global south and north shows Indian metropolitan cities with moderate ratio not too far from five (with exception of Mumbai).

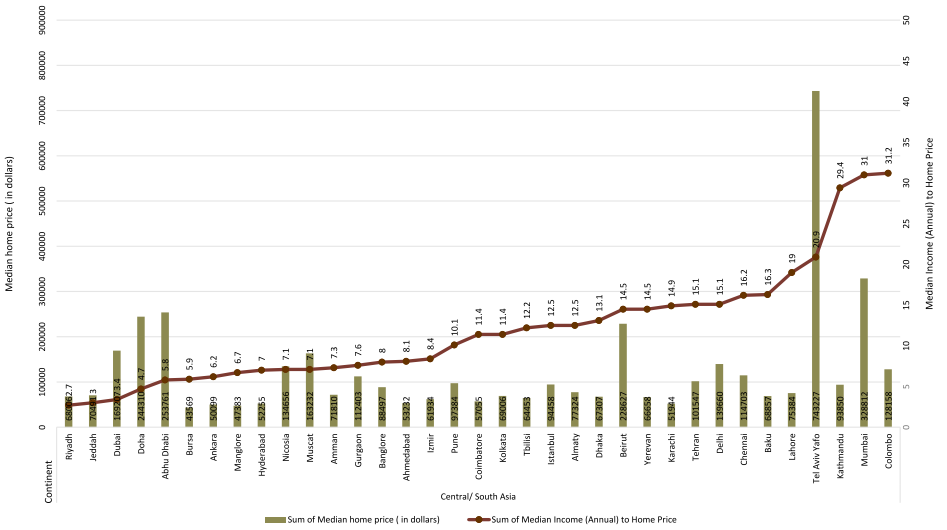


Figure 32: City Housing Affordability in Central/South Asia: Ratio of Median House Price to Median (Annual) Income

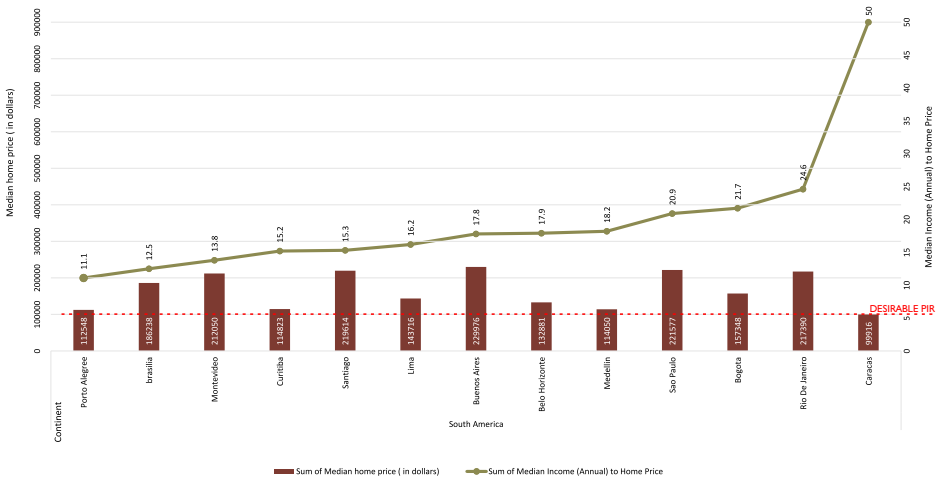


Figure 33: City Housing Affordability in South America: Ratio of Median House Price to Median (Annual) Income

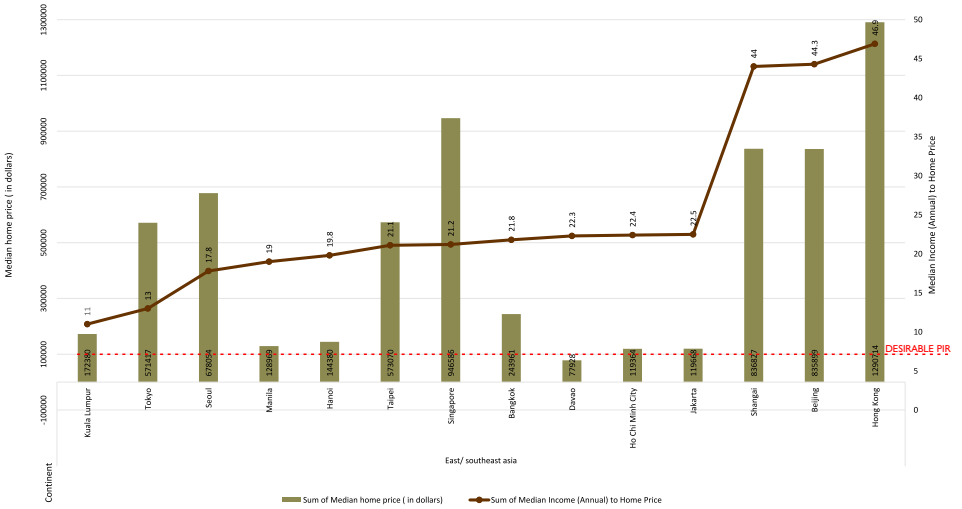
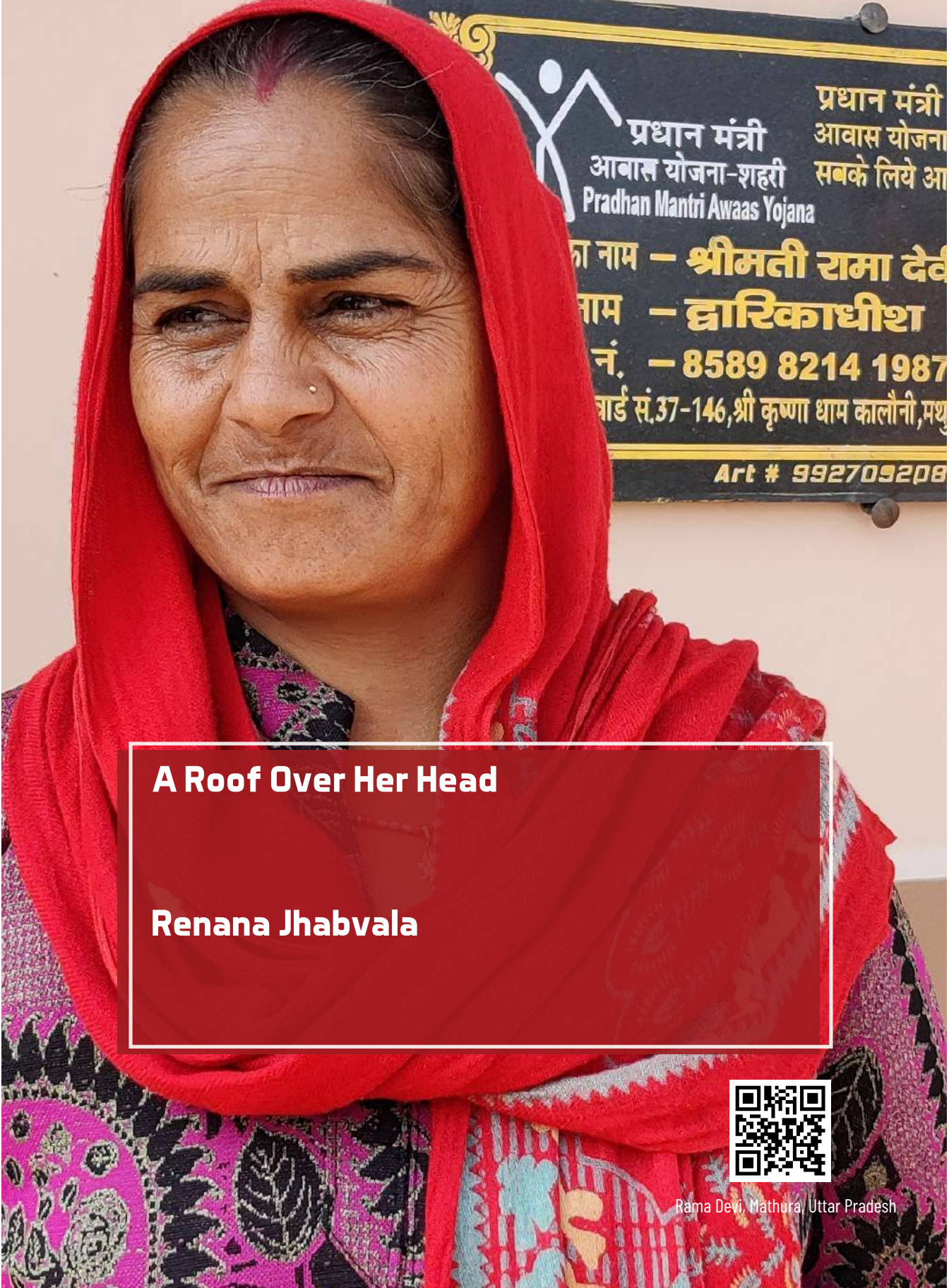


Figure 34: City Housing Affordability in South Asia, South East Asia and South America: Ratio of Median House Price to Median (Annual) Income

The study highlights that Indian cities with median PIR below 10, in most cases are posited much better with respect to similar sized cities of global south including Southeast Asia and South America. Consistent and continuous audit of performance and reform of ongoing housing initiatives by MoHUA by local governments will be the key to incrementally improve access to Affordable Housing for all in Indian cities. If local authorities adopt a standard operating process to periodically collect data on household income distribution, housing consumption pattern, temporal housing flow and price, they will be able to audit housing affordability in the local land and labour market and accordingly propose local reforms to these integrated enabling and provisionary initiatives as needed from time to time.

A Roof Over Her Head

Renana Jhabvala



Rama Devi, Mathura, Uttar Pradesh

The Informal Sector and Women

Indian cities are mostly informal as over 80% of the workers work in the informal economy and a large percentage of them live in informal housing. These urban informal workers exist in almost every walk of life. They may be self-employed, such as street vendors or producers with small workshops; working for wages like cleaners, loaders or domestic workers; working in commercial establishments, in homes of the better-off, on streets and in markets, on construction sites, they are everywhere. They often live in squalid conditions where water, sanitation and solid waste management is lacking or intermittent; their homes, usually half kutcha, are small with a whole family crammed in one room, and yet they prefer to stay in these unsanitary conditions as urban employment is far more plentiful than rural. They see a blossoming future for themselves and for their children in the cities.

Among these families of the informal economy, it is the women who are the most vulnerable. As workers, they are paid the least. They may be domestic workers doing cleaning, cooking, childcare in other's homes; home-based workers producing goods such as garments or food stuff in the invisibility of their own home; street vendors facing a threat of eviction by police and municipality or construction workers often having to take their small children to work along. For these women, a roof over their heads, running water, toilet at home, and clean and healthy surroundings are vital indicators of a good quality of life. Inadequate housing is an extremely visible dimension of poverty and vulnerability. It is important to understand that for low-income communities around the world, a house is considered a key asset, especially in urban areas. A home functions as a shelter, a commodity as well as an investment. Home ownership confers collateral in credit markets, social status, and security in the event of natural disasters like floods, earthquakes and human made disasters like riots. A home, however small, offers an opportunity to increase the income through small-scale, home-based economic activities. Therefore, in addition to being a place to live, a home is a production and wealth generating asset for millions of low-income women. When these women are enabled with a modest house with satisfactory basic services like toilets, running water and security of tenure, it can change the cities we live in to make them participatory, inclusive and sustainable.

A Roof over her Head: PMAY-U

This is what PMAY-U aims to do. It aims to improve the housing condition of the people in the informal sector in various ways. The four components of this Scheme address the issue in different ways. First, the ISSR component recognises that families have already been living in slums for a long time, often for generations, but these slums have not been recognised or authorised. Often they are not provided with basic infrastructure such as water and sanitation. The houses remain semi-pucca as families are sceptical to invest and there is always an underlying threat of eviction. ISSR component involves three actors, the Urban Local Bodies (ULBs), the private sector and the slum dwellers themselves.

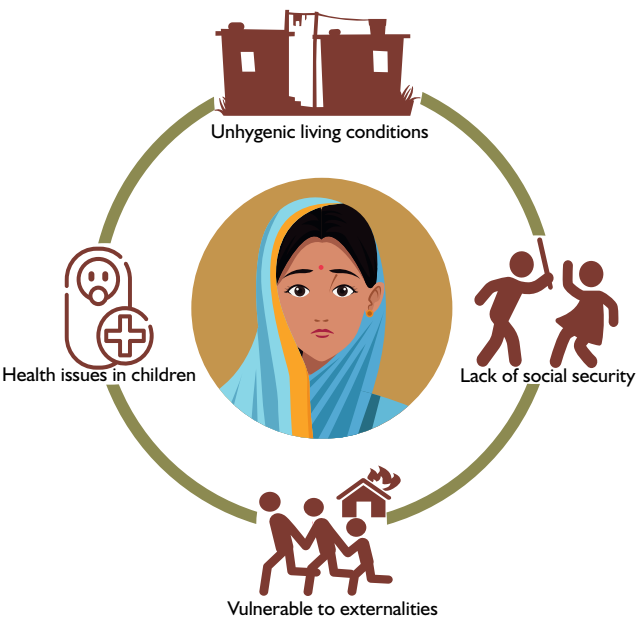


Figure 35: Adversities faced by women in informal sector

The second component is Credit Linked Subsidy Scheme (CLSS). Most poor people do not have access to institutional housing finance and have to access this finance from private moneylenders at high interest rates from five to eight per cent per month. CLSS is a way to persuade the banks and other housing finance institutions to lend downstream so that the poor are able to benefit. The third component is Affordable Housing in Partnership (AHP) where State/UT Government entities can partner with private sector to build homes for the low income people. The fourth component is Beneficiary-led Construction (BLC), where the beneficiary, owning a title to a piece of land in an urban area, gets a subsidy towards building her home.

Civil Society Participation in PMAY-U

Although the main lead is taken by the State/UT Government entities, Civil Society organisations do have a major role to play in ensuring the success of these schemes. The author's experience with Mahila Housing SEWA Trust (MHT) and with Self Employed Women's Association (SEWA) shows that for women, housing has become a vital need and that helping them to come together in order to address that need makes all the difference in their lives. The efforts can be especially transformative, when at the same time the Government is also putting huge resources to work for the benefit of the low income informal sector.

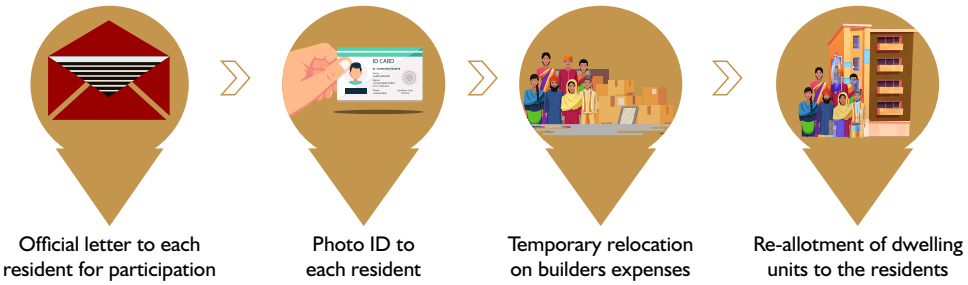


Figure 36: Beneficiary participation in ISSR

ISSR has been quite successful in Gujarat, one of the first States to work with it. In fact, one could say that even before the Scheme was introduced by Central Government, it was experimented in Gujarat and the contours of the Scheme were worked out. In 2010, Gujarat State Government initiated Slum Redevelopment Scheme (SRS). Private builders were involved in the process of 'redevelopment' of slums in situ, i.e., the builder would bear the cost of constructing flats for slum dwellers in the same location. As compensation (for the cost incurred), additional Floor Space Index (FSI) generating additional space available for commercial sale was granted so as to make the project financially viable for the developer.

The Regulations for Rehabilitation and Redevelopment of the Slums 2010 required a Slum Rehabilitation Committee (SRC) to be set up and each slum dweller was notified to get a well ventilated flat with all basic amenities. The Scheme was first implemented in Ahmedabad and MHT was nominated to be a member of the SRC. The regulations also specified that in order to avail this benefit, the slum dweller had to prove 25 years of domicile in Gujarat and 10 years of stay in the notified slum. To benefit from the redevelopment, a slum dweller had to produce one of the three recognised documents as proof of stay, namely, electricity bill, ration card and voter ID card.

Few builders came forward to implement the Scheme in slums, but both the builder and the slum dwellers realised that the conditions stated in the rules made the redevelopment unviable. MHT was working in one of the slums chosen by the builder and tried to help the slum dwellers gather their residence and domicile proof, but found the going tough. There was no document that could prove 25 years of domicile and the documents that could be submitted as proof of residence of 10 years in that particular slum did not carry the required information. Electricity bill was not of much use as these slums had been connected to legal electricity meters only a few years ago. Slum dwellers were not in a habit of keeping electricity bills, especially not for 10 years! Ration cards listed the date on which the card holder took ration, but did not have the date on which the card was issued. Every time a new family member was added to the household, such as when a baby was born, the Public Distribution System issued a new card. As a proof of residence, ration cards did not solve the purpose. Almost every slum dweller has a voter ID card, but the name on the card could be incorrectly spelt, or address details were missing, and there was no date of issue on it.

Without a record of when the card was issued, it could not be used as a proof that a resident had lived in that slum for 10 years.

There was dissatisfaction among private builders and developers with the additional FSI granted. They felt it was too low and the additional floors that they could build in their commercial developments would not be sufficient to compensate for the expense of building flats for slum dwellers. Also, most slums that were notified for redevelopment were located in the municipality's east zone and builders were constructing flats in the more prosperous west zone. Hence, giving the additional FSI in the same zone was of little commercial use to them.

Regulations requiring proof of 25 years of domicile and additional FSI being granted in the same zone were two major stumbling blocks for the Scheme not taking off. MHT advocated for more documents to be included as proof of residence and the builders lobbied for transfer of the FSI gain to a zone where they already had planned projects. After intense advocacy, the State/UT Government agreed to use an earlier survey conducted by MHT[1] as a basis for eligibility, increased the FSI from 1.8 to 3 and allowed the builders to transfer the FSI to any zone. Simplification of regulations made the Scheme more attractive for both the builders and slum dwellers. MHT began mobilising households, convincing them to enrol and helping them organise the residence proofs.

The Scheme required slum residents to hand over their houses to the builders and live in transit accommodation till the new flats were ready. This made them insecure, as no government agency was directly involved; all they had to go on was the assurance of a private builder that a new flat would be built and handed over to them. MHT began actively speaking with municipal officials to relay the residents' concerns and finally after several months, the municipality issued a letter on their official letterhead to each resident explaining the Scheme and requesting them to participate. MHT also convinced Ahmedabad Municipal Corporation and SRC to give each resident a photo identity card signed by the Corporation, the builder, MHT and a member of the Residents Welfare Association (RWA), as proof that the resident giving up their house used to live in this slum. Happy with the official recognition of their rights to live in this location, 4000 households across seven slums went to live in rented accommodation paid for by the builder, and in less than two years they were back, living in new flats with adequate light, ventilation, running water and individual toilets.

Similarly, with the implementation of ISSR in other cities, MHT and other civil society organisations are working to mobilise slum dwellers to accept the Scheme, coordinating with ULBs to ensure that eligible beneficiaries are included and convincing private builders to give the best benefit to the slum dwellers. Another widespread Scheme is the CLSS. Finance plays a crucial role in housing development and for any middle class household in India, looking to invest in property, buy a house to live in, or renovate their

[1] *This survey was validated by Centre for Environmental Planning and Technology, a highly reputed university in Ahmedabad teaching architecture and planning.*

homes, there are numerous commercial banks willing to lend them the money. Poor families lack this ease of access to housing finance. Commercial banks prefer to deal only with middle and higher income groups, in fact, many banks do not even have instruments or loan schemes for potential loan seekers from the bottom of the pyramid.

Commercial banks, serving the middle and higher income groups, provide loan sizes that are above ₹500 thousand for a longer term (5-10 years), with registered collateral, and verification of income and credit history. The quality of the mortgaged property is key in making the credit decision. Low-income borrowers seeking funds, mostly for incremental shelter construction, usually need a loan of ₹ 0.1 million to ₹ 0.5 million. Only a few commercial lenders issue housing loans in this range. The perceived incapacity of poor households to repay, determined through the size and security of household income, is the primary factor for the credit decision made by the mainstream financial market not to provide these loans.

The deficit of housing finance to low income households can be termed alarming for two reasons. First, with one to six million households of the urban population requiring housing loans between ₹ 100 thousand and ₹ 500 thousand the incapacity of markets to deliver to this large segment, unnecessarily distracts the public sector from the provision of basic infrastructure, services and shelter for truly poor households. Second, the structural problems in the field of urban planning and land management, paired with banking regulations, contribute to undermining the security of the underlying asset, i.e., the land on which the semi-formal housing is built. A back-of-the-envelope estimate suggests that the financial need of low income households may be to the tune of ₹1 to ₹1.5 trillion. This is a significant market size, and it illustrates why financial products that make available affordable micro-housing finance to urban poor households is a necessity.

Mainstream institutions that offer housing finance need some proof of income, most often a salary certificate. They also insist on mortgageable titles. Women in the informal sector have two major handicaps in meeting these requirements. First, their incomes are informal and so it is difficult to assess their repaying capacity. Second, the titles to their houses are informal and so they cannot mortgage their house as leverage.

SEWA Grih Rin (SGR) or Sitara, a housing finance company, is dedicated exclusively to serving the vast and largely unmet housing finance needs of poor households in India. CLSS has been an important factor in ensuring that the women have access to these loans. Sitara's innovative process for assessing the need and repayment capacity ensures that women with informal incomes are included and that informal titles are upgraded to become semi-formal and hence eligible for mortgages.

An important point to note here is that for the informal sector women, a home is not just a shelter but also a workplace. Low income people do not view their houses as passive investments. Rather, home improvements are seen as an investment which will generate both short-term and long-term returns. Borrowing for home improvements enables changes that

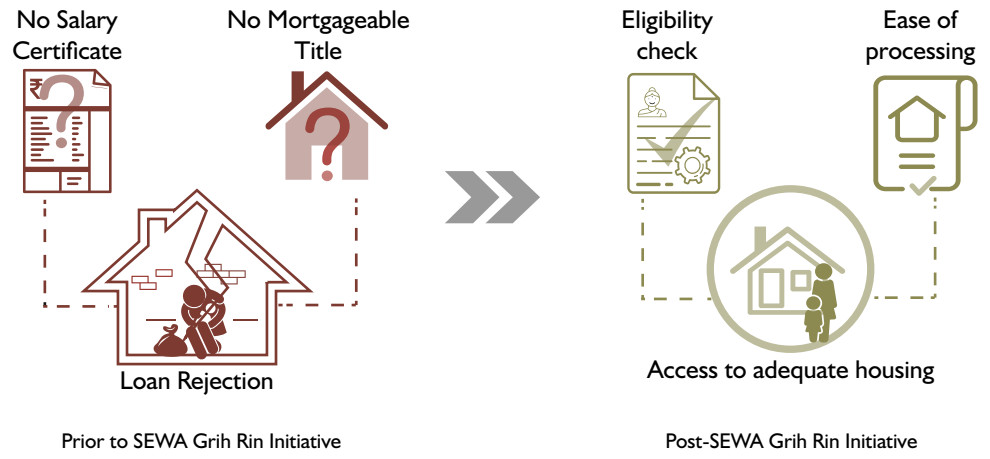


Figure 37: Impact of SEWA Grih Rin Initiative to access adequate housing

can raise the earning capacity of the household. Taking a case of Guddi, living in Jaipur, where she and her daughter Salma, sewed and embroidered quilts, many of which were exported. However, as their home was very small, they had to spread out their work in their living space and could only work certain times of the day, at the same time there was danger of damaging their work. Guddi took a loan of ₹115 thousand from Sitara with a CLSS which made the loan affordable for her. She constructed a separate room where she and her daughter were able to work and have doubled their earnings. They are now easily able to repay their loan and would, in fact, like to hire one or two helpers and increase earnings even more.

Civil society can be active in the other two components of the PMAY-U also. State/UT Governments build low income housing and often these homes are used for housing families who are to be evicted from their earlier dwellings or slums. Civil society organisations can help to convince people to move, help them rehabilitate in their new dwellings, help to form and build the capacities of RWA and act as a liaison between ULBs and the community.

A Step Towards Empowerment

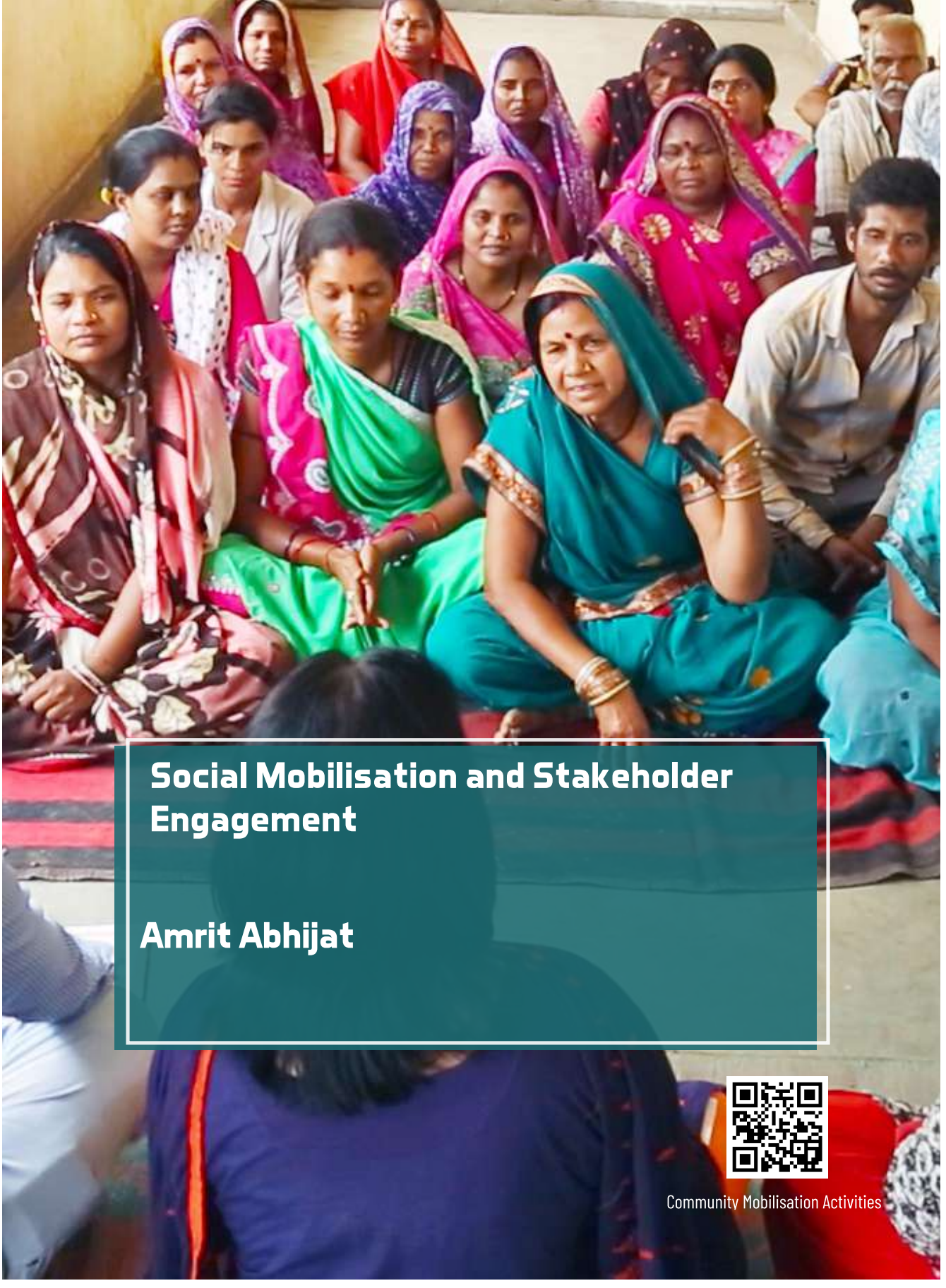
In our society, there is definitely an inequality between men and women. Women have little say in major decision making within the family, they are less active in the public sphere and in the economic sphere and they are right at the base of the pyramid with the lowest paid, or often even unpaid work. In India, Government has made major efforts to lessen the inequality with many measures including reservations for women in panchayats and ULBs, educational benefits for girls and many more women-centric schemes. PMAY-U is a step in this direction of reduction of inequality, by helping creating assets in a woman's name. This is especially true in those cases where a new home is constructed under the AHP

Scheme where construction is done by State/UT Government. It may also happen under ISSR, however in that case the ULB and civil society partner need to be alert.

In most families, the assets are owned by men especially all types of land and property. The ownership of a house is also generally in the name of men. This means that a woman continues to feel insecure in her own home. There are many cases where there is a conflict in the family and a woman is told to leave the home, since it is not in her name and she has no choice but to become homeless. There are other cases where to pay debts or even for drinking or gambling, men have mortgaged the house and made the family homeless. When the home is in the name of the woman she is more secure, she can speak her mind and she feels more empowered and truly have a roof over her head.

Social Mobilisation and Stakeholder Engagement

Amrit Abhijat



Community Mobilisation Activities

The communication and outreach strategy of 'Housing for All' was multidimensional and developed dynamically. It cut across diverse strata, both horizontally and vertically. Initially, the Mission articulated the vision of Hon'ble Prime Minister through awareness, training and dissemination about the Scheme, which later moved towards participation and implementation of the Scheme. The Mission, from its inception, took a citizen-centric participative approach as a fundamental guiding principle. As a result, a transparent, inclusive and knowledge based Information and Communications Technologies (ICT) became the core of the mobilisation strategy. Another significant shift was the manner in which the Ministry engaged with other stakeholders like bankers, builders and public representatives in communicating the requirements and advantages of the Scheme to the potential beneficiaries. Systematic sustained awareness and information dissemination was developed in a cogent and unambiguous manner. The beneficiaries' sentiments and the life transformational experiences had a demonstrative effect. This participatory, proactive approach in communication and engagement of all stakeholders helped the Scheme take off and progress in myriad ways.

Theoretically speaking, Sherry R Arnstein in her seminal work 'A Ladder of Citizen Participation' affirms that participation of the governed in their government is, in theory the cornerstone of democracy. It became quintessential to the Mission to define 'what' participation meant. More so, because of the Mission being demand driven, assessing the actual demand of housing on ground was not possible without incorporating citizen-centric participatory approaches. The challenge was to redistribute the power which enabled the citizens to be deliberately included in all stages of implementation. The Mission understood that for a family, a home means much more than just four walls and a roof, it is a realisation of their dreams, aspirations and opportunities for a better future. This chapter is broadly divided in two parts, wherein the first part deals with understanding the target audience, their requirements and limitations and the second part builds on the strategies adopted for each of the target group.

Target Group

The target group was defined in the Mission guidelines, “A beneficiary family will comprise husband, wife, unmarried sons and/or unmarried daughters. The beneficiary family should not own a pucca house (an all-weather dwelling unit) either in his/her name or in the name of any member of his/her family in any part of India”. In order to run a successful demand-oriented housing Mission, the first step was to move towards stimulation of demand, create visibility for the Mission and its objectives and subsequently identifying the eligible beneficiaries. Though the demand for housing is spread across almost all the income groups of the society, the Mission caters to specific socio-economic groups, viz. EWS, household with annual income up to ₹300 thousand/ annum, LIG, household with annual income between ₹300 thousand and ₹600 thousand/ annum and MIG, households with annual income between ₹600 thousand and ₹1.8 million. The Scheme opted a cafetaria approach for implementation, where a beneficiary could choose one out of the four verticals. The communication strategy was designed accordingly, suitable for the specific socio-

economic class or preference of the beneficiary. The campaign thus designed for engagement responded to these diverse socio-economic groups, family sizes clubbed together on the basis of commonalities like access to mass media, interaction with technology and functional relationship with the house. More complexly, within the broader umbrella of the beneficiaries, HFA true to its essence had to respond individually to each of the beneficiary household depending on the vertical for implementation chosen by them and their individual access to information and capabilities.

PMAY-U is being implemented in all States/UTs covering 4500 statutory towns, planning areas spread across the length and breadth of the country. It is for the first time that a housing scheme has such a wide geographical coverage. The Ministry had to be imaginative in our approach, ensuring that whether a citizen was based in New Delhi or Ziro Valley in the far-east to Kanyakumari or Kargil Valley in Jammu and Kashmir, had the same level of agency and power to become a beneficiary under the Mission, access the same level of information and build their own homes. The Ministry realised that the message needed to be channelised in a clear direction towards the beneficiaries and from them back to us in an efficient and time-bound manner.

Working in 'Mission-mode' provided us with a unique opportunity to put citizens' participation at the very heart of implementation. The Mission planning created a framework for collaboration between the three levels of governance – Centre, State/UT and ULBs. The vision of 'Housing for All' created a sense of shared purpose which helped optimise resources, streamline collaborations amongst all stakeholders, States/UTs, institutions and potential beneficiaries to deliver houses optimally on time. Since the very inception of this fascinating and ambitious journey of PMAY-U, the team realised the need to be bold, inspirational and at the same time remain relevant to our diverse geo-demographic base of beneficiaries. The leadership displayed by the Mission was empathetic, innovative, creative and supportive for the entire workforce, being aware of the long and intense challenge.

While getting millions of people on board, PMAY-U was going to be no easy task. At the Ministry it was realised that mobilisation has be started at home and the first change was required to the overall approach moving away from cynicism about the success of the Mission to faith and belief that it was very much achievable. It was ensured that the PMAY-U team remained enthusiastic and motivated about the common goal. The Mission undertook a transformational path where the team changed the work culture by realigning with the new vision of 'Housing for All' ; it called for shared assumptions, values and norms (Bass and Avolio, 1994). The Mission moved away from traditional non-time-bound approach of policies and flatten the curve of organisational hierarchy and red-tapism. A conscious decision was made to maintain a balance of experience hands and young fresh talent in the team at all levels. Once the core team comprising of the Directors, the Government officials and the Project Management Unit (PMU) with experts from varied fields (MIS, Finance, Urban Planners, Social and community experts, Engineers, etc.) was in place, the strategy to fulfil the vision was discussed thread by thread. The firm belief in the vision, a clear timeline, wherewithal of human resource and funding helped us in taking decisions. As we set about

evolving a transformational spirit as against transactional or laizzez faire leadership models, (Eagly,2001) amongst the entire machinery; the anxiety and apprehension started to give away to confident and a positive team around 'Housing for All' Mission, which became our mission with about 25,000 dedicated people working across the country to make things happen (including CLTCs/SLTCs PMCs/ State/UT Governments/ ULBs/ surveyors). The Mission started opting for agile planning, created strong feedback loops, encouraged prompt decision making and kept the motivation high at all levels.

Ladder of Participation

Arnstein, in her work, establishes a ladder of participation which is a simplistic version of gradation of citizen-participation in government initiatives. I use the indicative ladder here to decode the beneficiary engagement process under the Mission. The ladder starts from non-participation and goes up to citizen control, where the author believes resides the real power to affect the outcome of any process. I believe, a beneficiary under the four verticals of PMAY-U, undergoes all the eight rungs of participation.

The bottom rungs of the ladder are (1) Manipulation and (2) Therapy, which describe the levels of 'non-participation', where the real objective is not to initiate direct participation but to educate the target group. We used these two techniques to educate the future beneficiaries and other stakeholders about the Mission, sensitise them about the implementation process and create an understanding about the on-ground challenges and opportunities.

Rungs 3, 4 and 5 progress to the level of 'tokenism' where we gradually involved the stakeholders in the implementation process of the Mission, including (3) Informing, (4) Consultation and (5) Placation. We created platforms at the level of ULB through Common Service Centres (CSCs), municipalities, Electoral representatives, Lending Institutes and

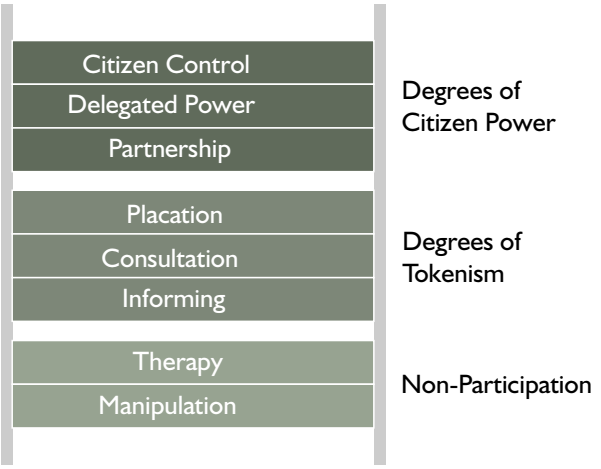


Figure 38: Indicative Ladder of Citizen Participation; Sherry R Arnstein

Development Authorities, which enabled the beneficiaries to register their demand for housing, based on which the ULB then prepared the Housing for All Plan of Action (HFAPoA). It created an opportunity for the beneficiaries to 'hear' and 'be heard'.

Further up the ladder are the levels of citizen power with increasing degrees of decision making. Beneficiaries entered a (6) Partnership which enabled them to choose the implementation vertical. They had the ultimate agency to decide how their house would be, depending on their needs and capabilities. At the topmost rungs (7) Delegated Power and (8) Citizen Control, the beneficiaries obtained the majority decision making seat. They had the freedom to decide what kind of house they wanted, how much would they want to invest in their homes and the eco-system created by the Mission acted as an enabler for them. They further became the voices of the Mission, spreading the word and bringing in other beneficiaries on board.

Strategies

Karl Deutsch has famously defined social mobilisation as a process in which "old social, economic and psychological commitments are eroded or broken, and people become available for new patterns of socialisation and behaviour". Analysing Deutsch's work, David R Cameron emphasises that this eroding or uprooting Deutsch refers to happens with urbanisation or industrialisation, which eventually leads to new and more stable social systems. The kind of social mobilisation envisaged by the Mission was not possible without active participation from all relevant stakeholders and we vitally ensured engagement and feedbacks from each part of the circle. The most important outcome envisaged from the social mobilisation process was to enhance the spread of the Mission, increase the number of beneficiaries and include more and more stakeholders which could help the Government reach the desired outcome of 'Housing for All'.

Delegation instead of Control

The Mission had not only presented a basket of options to its beneficiaries through the cafeteria approach, it also empowered States/UTs and ULBs to customise their individual and institutional mechanisms. The Ministry echoed the ethos of Cooperative Federalism and entrusted States/UTs to deploy specialists at the State and City level from a bouquet of skill sets like planning, engineering, social development, financial planning, etc. based on the requirement after the approval of the SLSMC and the CSMC. The roles of specialists were clearly defined, e.g., social development specialist was responsible to mobilise citizens and potential beneficiaries into the programme, civil engineers reviewed the implementation status and provided technical support in city's 'Housing for All' Action Plan, finance specialists provided support to ULBs on methods of increasing financial inclusion, IEC specialists contributed through communication management strategies.

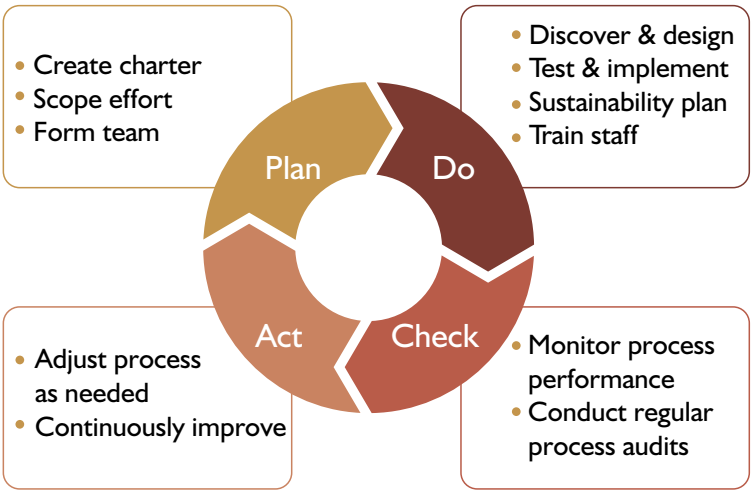


Figure 39: Illustrative PDCA Cycle

Another step in the direction of transparency, effective monitoring and community mobilisation was engaging more than 20,000 surveyors by States/UTs for geotagging of houses at every stage of construction. This strong force of foot soldiers works across urban India, outreaching the last beneficiary. Apart from geotagging of houses, they are also the first point of contact and communication to beneficiaries. Their services are being utilised to spread awareness on the Scheme and motivate beneficiaries towards completion of houses. The Mission has invested heavily in sensitising and educating the surveyors, who are an integral and critical bridge between the beneficiaries, the ULB/ implementing agencies.

Electoral Representatives

The political support received by the Mission has been another reason for its success. From being the brainchild of Hon'ble Prime Minister to the on-ground involvement of ward councillors, elected representatives have played an integral part at each level of implementation. From the very inception, the Mission has received unparalleled attention from Hon'ble Prime Minister. He has, on many occasions, interacted directly with the beneficiaries. The Mission remains close to his heart which is evidently visible in the discussions on the Mission in PRAGATI meetings and other sectoral reviews. The Mission has featured regularly in his radio programmes and other public addresses. He has also laid the foundation stone for projects under the Mission, including the Light House Projects (LHPs), which has not only ensured a greater sense of commitment for completion of the projects but also embedded a sense of pride amongst all stakeholders of the Mission. The Mission and the construction sector got a push through the active involvement of Hon'ble Prime Minister in the Global Housing Technology Challenge. On many occasions, his posts on various social media platforms has given fillip to our Mission and attracted attention of stakeholders on issues of women empowerment, construction technology. It has also

emphasised on dignity and given wings to the dreams that the Mission has given to the beneficiary households.

The then Minister (HUA) Shri Venkaiah Naidu and current Minister Shri Hardeep S Puri toured the country extensively, interacted with beneficiaries, State/UT level officials and have reviewed the Mission. They also chaired workshops aimed for States/UTs to mutually learn and build capacity of their officials. PMAY-U has remained one of the top priorities of MoHUA to ensure availability of funds and coordinated with other ministries to maintain the pace of the Mission to remove roadblocks. The office of the Minister (HUA) uses print and visual content on various social media platforms, which has helped the Mission in its outreach.

Respective Chief Ministers embraced the Mission and paved way in their respective States/UTs for implementation of the programme through fund allocation, convergence with the State level housing programmes and other infrastructure programmes, reaching out to people and ensuring participation in the celebration of beneficiaries' 'Griha-Pravesh' or the ceremony of entering the house for the first time. They also visited the project sites, interacted with the beneficiaries and implementing authorities. They have regularly monitored the progress, played a continually active role and arranged for sustained funding, posting motivated officials in the Mission.

The respective MLAs/MLCs, Mayors, Ward Councillors played a pivotal role in the formation of HFAPoA. They acted as a bridge between the planning authority and the beneficiaries. They mobilised the beneficiaries through their socio-political networks, sensitised them towards the Mission, and also built a strong feedback loop for the grievances and lag identification. They operated a two-way interface, where on one hand they interacted with the planning authority, understood the processes involved in the Mission; and on the other hand, they simplified those processes for the prospective beneficiaries, made them aware about their rights and duties and acted more like a mediator between the two parties.

PMAY-U: A Word of Mouth

Right from the stage of demand survey, teams outreached through various sustained awareness campaigns about the Mission. Posters, banners and hoardings at all strategic locations were placed in ULBs to attract the attention of prospective beneficiaries and homebuyers. ULBs organised 'Awas Melas' about the Scheme, its verticals and financial options in wards and slum areas to mobilise people for enrolment. Further, public announcements were made to invite people to the ULB office.

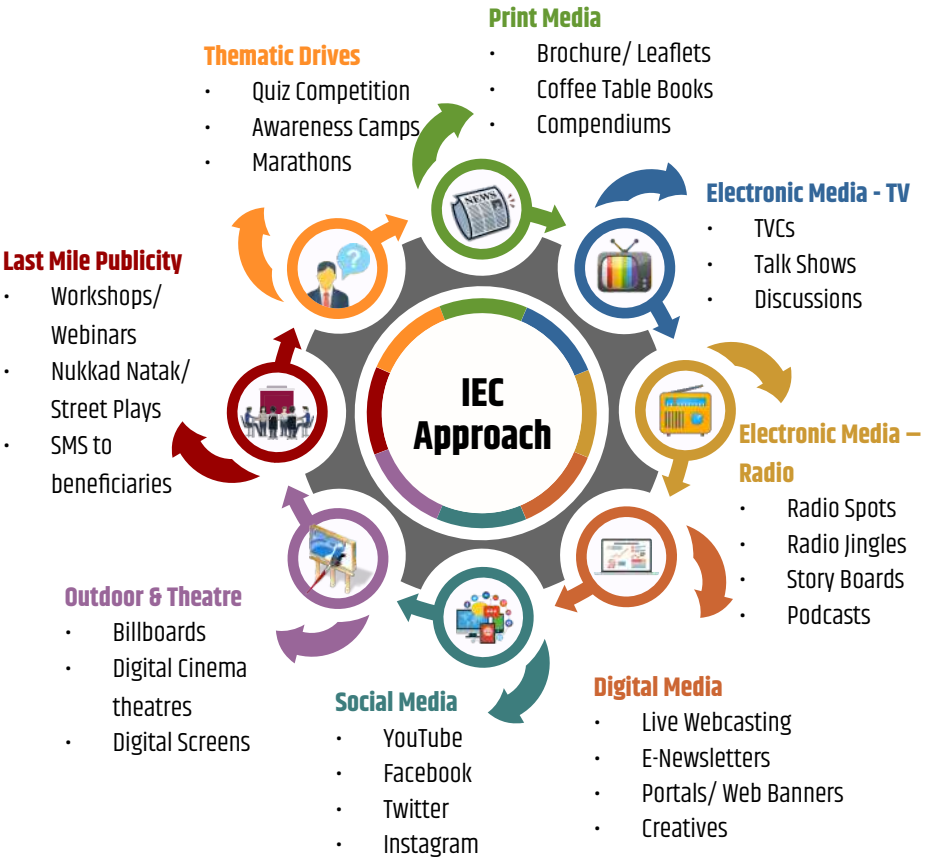


Figure 40: Multipronged IEC strategy

Unique methods were adopted for creating awareness at places with topographical challenges. In hilly regions, where any other form of communication was difficult due to the terrain, information was spread through vernacular newspapers and radio announcements. The Mission has been using an effective mix of both, the new media as well as the traditional media to engage with beneficiaries. In some regions, awareness was spread through Nukkad Nataks (street plays) and traditional methods of drum beats and other animated strategies to make announcements in smaller urban pockets.

From time to time, during the Mission, The Ministry has been launching IEC campaigns to create an interface for beneficiary interaction and facilitate a direct dialogue between them and all levels of stakeholders. In 2015, MoHUA launched the first campaign, 'Sabka Sapna, Ghar ho Apna' with an aim to enhance the awareness drive about the Mission, sharing the vision of 'Housing for All' with the whole country. The campaigns also traversed with the the journey of PMAY-U. They corresponded to the phase of implementation at which the Mission was. Subsequently, three more campaigns were launched: 'Sapne Sakaar

hote hue', '*Labharthiyo ki Zubaan Se*' and '*Khushiyon ka Aashiyana*' to create a platform for beneficiaries to directly share their stories, life transformations and interact with other potential beneficiaries. It was acknowledged that the Mission did not go for celebrity face, as each beneficiary was themselves a brand ambassador. In 2019, when the Mission reached the milestone of sanctioning one crore houses, 'A crore and more' campaign was launched that highlighted the achievements during the phase of the Mission. When the Mission completed delivery of 5 million houses, '*Ghar Hua Apna, Poora Hua Sapna*' was launched. Through this campaign, the Ministry shared the happiness of the 5 million beneficiary households who have built or acquired their houses under the Mission. The seeds of the campaigns fruition pinnacle of mobilisation through the initiatives taken by the respective States/UTs Government and the beneficiary households.

Social and digital media tools are being utilised to the fullest to keep both existing and potential beneficiaries and other stakeholders well informed on the progress of the Scheme. These social media tools also act as a platform for people to raise their grievances, if any. Dedicated human resources respond to those grievances and ensure they are redressed at the earliest. The HFA Mission has gone into lengths to organise training of the State IEC and Capacity Building experts on the use of social and digital media with an intent to engage with the people.

The era of mass marketing has veined and microtargeting was intrinsic to implementation of the communication plan. In this age of social media, when you are just a click away from any information, we identified that the social media route was the best to inform, educate and communicate with people and was cost-effective. Information dissemination through various mediums have played a crucial role in raising awareness about the Scheme, its components, its role and its achievements.

The Mission has dedicated social media pages on platforms such as Facebook (English and Hindi), Instagram, Twitter and YouTube, wherein posts are shared at regular basis pertaining to the Mission. In order to enhance the ownership and belongingness of the beneficiaries, the pages contain special messages on occasions of international, national and regional festivals. The video testimonials of the beneficiaries that are posted from the handles garner maximum attention and at the same time inspire us to work even more. Nothing is more satisfying than seeing the smiles on their faces. Identifying the fact that communication can never be one-sided, on our social media handles, the Ministry is open to comments from people about the Mission and the difficulties they face (if any) in applying for a home under PMAY-U. Every day, the Ministry gets numerous messages on Facebook and Twitter from people and we make sure their issues are addressed on time. The Mission has a dedicated social media team who caters to these problems and ensures compliance in every possible way. It has an impressive list of followers, especially on Twitter and Facebook. Every development, progress and achievement is shared on these platforms.

Other digital outreach mediums are shooting of television commercials and short films that have been displayed at several occasions at various places for a better reach to the masses. Social and digital media is among the many, but important components of information dissemination. However, having said that, it was also important to share the knowledge at ground level, knowing the fact that not many have access to internet and social media. Nukkad Nataks, radio jingles, PMAY-U quiz, etc., have been presented in colonies across the country so that more and more people come to know about the Scheme and are benefitted from it. The Ministry also undertook a SMS campaign which aimed at spreading awareness about the Mission and expanding the beneficiary base.

Television commercials have been shot and displayed, brief videos for movie theatres have been released too, which have acted as powerful tools for information dissemination. Information has also been shared via print media through pamphlets/ brochures, newspaper advertisements, blogs/ editorials by Hon'ble Minister, Secretary, MoHUA, and other top officials of the Mission. Regular updates about the Mission are shared to around 50,000 people through PMAY-U and LHP newsletters. The Mission has extensively used the MyGov platform for encouraging the outreach of the Mission, enhancing participation in events related to Angikaar and PMAY-U quiz. The platform also hosts a series of testimonials of the beneficiaries through the initiative of 'Post your House picture'.

The Mission has come a long way with all power mediums of communication explored at its best and the process is ever evolving. A special series of writing inland letters/ postcards to our PMAY-U beneficiaries, thanking them for making the Mission grow was initiated.

All these information dissemination tools and ideas have helped us take the Mission forward and they have played a crucial role in the success of the Scheme. Notably, via these mediums, PMAY-U beneficiaries themselves became the flag bearers of the Mission where they would orient and counsel prospective beneficiaries on availing the benefits. There are instances abound of how the success story of one beneficiary or community had a ripple effect and encouraged their social networks to demand a house under the Mission.

Bringing Banks to the Beneficiaries

The Ministry and States/UTs have made tedious efforts to bridge the gap of financial services between the beneficiaries and the banking sector. As of now, around 2.4 million beneficiaries have been brought under the umbrella of formal banking. This could be made possible due to the collective efforts of Banks, Centre, States/UTs/ULBs and the Real Estate Sector. It was the Mission's target to sensitise banks on enrolling maximum number of potential beneficiaries of the Credit Linked Subsidy Scheme (CLSS). In turn, the Banks and Housing Finance Companies acted to educate the buyers and provide respite from heavy interests and EMIs which make a dent in the pockets of India's EWS, LIG and MIG population. Several States/UTs have organised Loan Melas and camps in cities, in

Photo 1: Social Mobilisation and Stakeholder Consultations under PMAY-U

partnership with banks to bring the beneficiaries on board. Massive outdoor campaigns for the interest subsidy initiative through billboards, posters, advertisements through print and electronic medium, radio spots, etc., have been undertaken. For the CLSS vertical particularly, our biggest advertising medium have been the private developers who have continuously encouraged eligible home buyers to enrol in the Mission. This campaign was a WIN-WIN-WIN for the beneficiary, the bankers and the builders. Knowledge sharing and dissemination of methods for aspiring potential beneficiaries paved the way not only in stupendous performance compared to earlier subvention schemes but substantially reduced the role of middlemen, cronyism and favouritism.

Civil Society

Civil Society Organisations (CSOs) have given a fillip to social mobilisation and uptake of services in the Mission. As it is known, Affordable Housing is not just about providing shelter for low income groups, it involves participative social processes, changes, strengthening of communities and bridging the gap of access to services. States/UTs have proactively partnered with CSOs, corporate houses under Corporate Social Responsibility (CSR) amongst others.

There has been a significant role of CSOs in empowering families to build their homes or in moving to a better environment. Especially in the ISSR projects, slum dwellers are mobilised, counselled, oriented and educated on the benefits of housing projects. Community groups are formed and financial assistance for housing is also being provided. Organisations like Mahila Housing SEWA Trust, Gujarat, have been an integral part of housing projects, advocating the government policy to slum dwellers, bridging the communication gap between the ULBs and also providing holistic solutions. CSR initiatives have extended their support to the housing sector through financial assistance for beneficiary contribution in BLC houses, infrastructure support, livelihood opportunities, etc.

Change Management through Angikaar

As the Mission evolved, it was realised that sudden change leads to disruption of social systems. The Ministry realised that there is a need to address life transformation issues arising out of moving into a new house or a new neighbourhood. Angikaar, a campaign for social change management, was thus initiated by the Ministry in 2019. Angikaar aims to facilitate the PMAY-U beneficiaries in adapting to change through door-to-door awareness on best practices in water and energy conservation, health, hygiene, sanitation and financial literacy. Further, an enabled environment has been created through convergence with various Urban Missions and schemes of other Central Ministries. It is a unique initiative in the urban housing sector that embraces and brings into its fold welfare-oriented schemes of the State/UT Governments and Central Government. A campaign of this magnitude in the urban housing sector is a result of collective efforts and proactive participation of PMAY-U beneficiaries, States/UTs/ULBs and elected representatives. It is a first of its kind campaign

that includes proactive participation of PMAY-U beneficiaries, States/UTs/ULBs/ and elected representatives.

Figure 41: Convergence through Angikaar

Around 18,500 Angikaar resource persons were trained by about 2,200 specialists of CLTCs working in 4,500 cities of PMAY-U, acting as foot soldiers who helped propagate messages of the campaign. Various innovative measures and door-to-door activities were taken up to outreach nearly 20 lakh families. This continued with various activities throughout the year. Some of these include celebrating Republic Day, International Women's Day, Fit India Freedom Run, Cyclothon and 'Fitness ka Dose Adha Ghanta Roz' campaigns along with need assessments and financial outreach. Further, the Mission brought into its fold welfare-oriented schemes of Central Government and State/UT Government such as Ayushman Bharat, Eat Right India, Ujjwala, Ujala, Jal Shakti Abhiyan, FitIndia Movement, Poshan Abhiyan, Solar Mission and Financial Awareness Messages (FAME) through Angikaar.

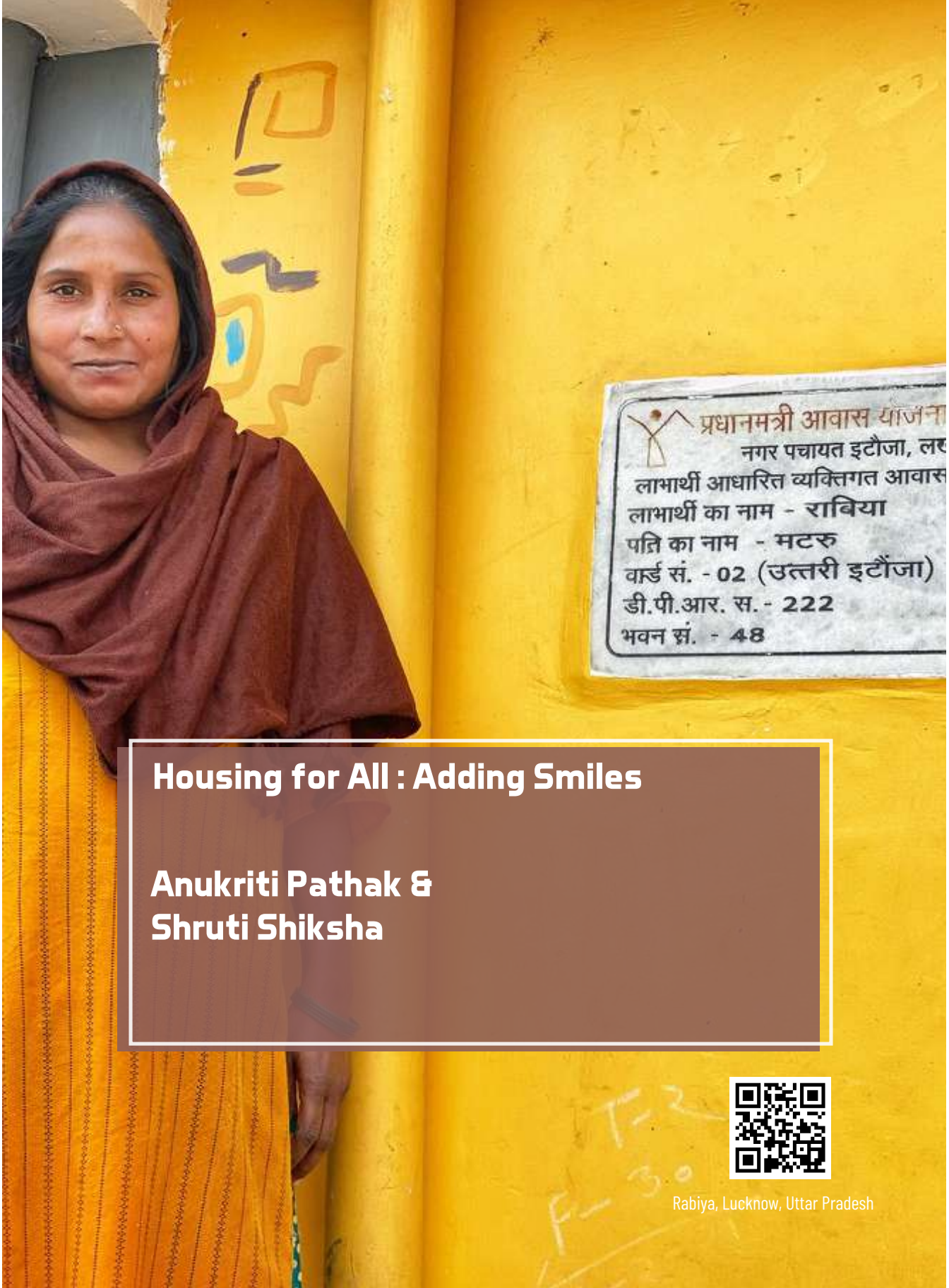
Conclusion

In conclusion, PMAY-U adopted a unique interactive communication strategy. The Mission opted a contrasting approach which was more rooted in the field and the people. The campaign on IEC keeps the beneficiaries both potential at the beginning of the Mission and then as happy recipients of houses. The Mission is an active instrument of democracy by adopting a 'bottom-up' approach at the grassroots of democracy where democratic rights and choices are often contested or negotiated. The PMAY-U- IEC strategy went beyond and evolved over the Mission period of six years, choosing the narrative of inclusive urban development. The end result is that it is through the 360 degrees campaign, including the stakeholders in a participatory and democratic manner, the Mission created a robust

knowledge and awareness stream which helped in social inclusion and fair selection. The smiles and transformational stories of millions of households are the rewards of a successful IEC strategy.

Housing for All : Adding Smiles

Anukriti Pathak &
Shruti Shiksha



Rabiya, Lucknow, Uttar Pradesh

Housing: A key driver of development

Housing is deeply intertwined with the day to day life and well-being of a person. It is much more than a shelter against nature. Economically, housing is one of the biggest investments undertaken by any person or family. Socially, housing provides a forum, a platform to boost one's self-esteem, enhance interaction with the society, family, friends and neighbours and more importantly, housing is also the deciding factor on how a family is perceived by the society. Psychologically, housing provides an emotional workshop, where one's basic identity is formed, perceptions are built. It provides privacy and safety against the world, enhances the sense of belongingness. Sociologically, housing is one of the fundamental ways in which the household claims right to the city through physical manifestations such as infrastructure services - basic civic and social and civically by becoming an active part of the city's working and machinery.

Access to housing provides ontological security, enhances overall mental and physical well-being. It provides a voice to the powerless in the seemingly uncertain atmosphere of a city. Such is the importance of housing in each person's day-to-day life and interactions. Undeniably, housing occupies the central role in directly influencing a range of outcomes from education, to health, to building social perception, to employment to social participation.

In fact, the need for a safe shelter is so basic that the human survival is critically dependent upon it. Although this is not the only role that shelter plays (Volkert, 2006) the capability of a household to be protected from dangers to one's health is directly dependent upon the standard of one's housing (Coates, Dermot, Anand, et. al., 2015). As the political thinking around the world advances and human being tends to occupy the centrestage while assessing developmental goals, the broader definition of well-being reflects upon ideals such as control, enjoyment, security, belonging and attachment (Coates et. al., 2015). The manifestation of all the parameters of well-being, either through welfare or libertarian lenses, is majorly occupied by housing.

Access to housing with basic infrastructure is added in the Bare Necessities Index (BNI) released in Economic Survey 2020-2021. It is a parameter to evaluate the access to bare necessities such as housing, water, sanitation, electricity and clean cooking fuel needed for a decent lifestyle. The BNI compiles 26 indicators across five dimensions: Water, sanitation, housing, micro-environment and other services. The BNI was produced for all States between 2012 and 2018, based on data from two NSO rounds, namely, the 69th and 76th on Drinking Water, Sanitation, Hygiene, and Housing Condition in India. The Survey shows the improvement in access to housing, water, sanitation, micro-environment and other facilities from 2012-2018. These improvements add to the success of the Mission, along with reform initiatives introduced by different States under this programme, in terms of transforming the lives of people and improving their health and well-being.

Framework for Assessment

Well-being draws on the wealth, knowledge, security, belonging and attachment. It can be altered and impacted by external and internal alterations/changes. On the other hand, housing is one of the first and largest expenditures from the disposable income of the households. Home ownership, according to multiple authors (Easthope 2004, Rakoff 1977, Saunder 1990), is believed to make a major contribution and control over key factors like privacy, safety, livelihood, ontological security, amongst others.

Central to the concept of well-being is that poverty is not stable, permanent or static. Households remain vulnerable to opportunities, shocks and stress – social, environmental and economical (Moses, 1996; Chambers, 1995). Responding to the transient nature of poverty, vulnerability too becomes a dynamic concept and central to the understanding of well-being of the beneficiary households. It thus, becomes justified to evaluate the impact of access to housing in tangible and intangible impacts.

This chapter is an attempt to capture the multifold impact access to housing has had on the millions of PMAY-U beneficiaries and their families. The chapter draws inspiration from real-life case studies and testimonies captured by the Mission over a period of seven years (2015-2022).

The Tangible Impact

Urban poverty has many dimensions which are multifaceted, interwoven and have multiple manifestations. Poverty gets materialised in the organisation of streets, distribution of urban services (water, electricity) and the overall physical canvas of the cities upon which these micro-geographies are etched (Parnell,2015). PMAY-U has targeted these micro-geographies where the households always had the aspiration but not the confidence for altering these geographies. Being a demand-driven Scheme, PMAY-U acted as a catalyst for the households to identify their housing needs. If the need was to overcome congestion, the Beneficiary-Led Enhancement vertical provided them with an option to add a room to the existing house, if the household wanted to reconstruct the house, the Beneficiary-Led Construction vertical is there to help them out. Further, through the AHP vertical, the household has the option to move altogether to another locality within the same Urban Local Body (ULB).

Contextually speaking, PMAY-U has impacted the lives of millions of beneficiaries in several different ways due to its transformative architecture. The reforms which have been undertaken so far have created a conducive environment for the overall growth of affordable housing sector in India. It all began with building the context for the need of affordable housing across the country and today, the result is such that already 61 lakh families are leading their lives in a permanent shelter with all amenities.

Smt Rachamma, a resident of Chamarajanagar, Karnataka, has been a witness to this transformation. She feels secured and safe with the social change that happened in her life after getting a pucca house. She and her family are living happily in their own home which has all basic amenities like water supply, electricity and most importantly, a healthy environment. Smt Rachamma's children are now married and she is happy that she was able to provide a home to them and their families.

Photo 2: Beneficiary : Smt Rachamma, Karnataka

Similarly, Smt Saraswati Kanhar from Odisha shares, *" I am very thankful to the Government to have given an opportunity to poor people like us to build a pucca house. After my husband's death, I had completely given up on the hope of living in my own house, but PMAY-U fulfilled that dream. The Mission has not only given me a permanent address, but a sense of security and respect in society too."*

Kutcha and dilapidated houses are not only vulnerable to extreme weather conditions but also have an impact on the overall well-being and quality of life of the household. Risks of animal and reptile attacks are more in such shelters. As of 2012, 14.99 million households in the country lived in congested condition, 0.99 million lived in non-serviceable kutcha house (Technical Action Group on Urban Housing Shortage, 2012). The low-income group families live in unregulated or informal rental accommodations, where quality of life is compromised. A large portion of the households spends 50% of their monthly income on housing. This leads to higher opportunity cost of access to housing and marginalizes savings.

Along with threats of external factors, a house with no access to proper kitchen, LPG gas connection, toilet, water and electricity facilities can increase the health problems in families. Further, lack of proper toilets leads to unhygienic neighbourhood and increases the

possibility of many airborne and waterborne diseases. Meanwhile, people, especially women are also exposed to smoke emissions from traditional chulhas leading to severe health issues.

Congested living conditions result in lack of concentration among the children too. It is noted that children living in congested conditions and along the busy roads are more vulnerable to toxic substances. Access to quality, affordable housing helps to create a stable environment for children by reducing frequent family moves and avoiding the negative impact of moving on educational achievement. Among its many benefits, a safe and hygienic house can also serve as a platform for supplementary education programmes, helping vulnerable children with better access to educational resources.

The success of every housing area is determined by its user satisfaction level (people living there). The quality of the house, its spaces within the unit, housing neighbourhood and green open space can directly influence the quality of life. Limitation of space, following high land cost in an urban areas, evaluation of the housing environment as a whole, including the green open space, needs to be studied as it affects the residents' satisfaction level.

A house does have economical, social, physical and environmental impacts, as explained earlier and all of them are interwoven. A person's happiness after getting a home is dependent on all these aspects, which can be well understood by Smt Komota Hojai Maibang's story.

Photo 3: Beneficiary : Smt Komota Hojai Maibang

She belongs to Assam and explains how the house had social, environmental, physical, human and economical impact on her and her family's life. Smt Maibang says that having a permanent address means they don't have to change their home frequently due to rent constraints, they are able to socialise more and invite guests at home with no hesitation. A fully functional kitchen and an open ventilated house minimizes the health problems. They no more face congestion issues at home as there is extra space for people and a separate living

and balcony area, has upped their standard of living quotient. The home has also changed their perspective towards their children's education, they are able to save money used for rent and use it for a better purpose.

The Intangible Impact

The housing sector has undergone massive revamp after the introduction of PMAY-U in 2015. Construction of such a large number of houses, as a result of any Government programme, is happening for the first time in the history of urban India. The initiatives taken under the Mission have given people access to decent housing, which subsequently enables to lead a dignified and safe life. It is an established fact that an adequate house is a key to safe and healthy environment.

Smt Anita Yadav, a BLC beneficiary from Madhya Pradesh's Dewas, shares, *"We were living a miserable life in our dilapidated kutcha house, in which water kept dripping from walls and roof during rains. Due to the broken walls, there was a constant fear that poisonous insects and snakes would enter the house. My new home has all the basic amenities and now we get more respect in the society."*

Photo 4: Beneficiary : Smt Anita Yadav

Such has been the impact of pucca houses in the lives of people, especially that of women. Every house acquired or built under the Mission is on the name of women beneficiaries or joint ownership where the name of the woman comes first. In the spirit of the core Indian philosophy of *"Grihswaminy"*, it is the woman who makes the house, a home. The success stories of the Mission are a testimony to the fact that ownership of a house not only empowers woman but also makes the house a better place for her family. With an asset such as a house, a woman has an enhanced sense of safety, more active role in household decision-making and also provides her with financial security.

Hon'ble Prime Minister firmly believes that a key to the house opens the door to many opportunities. With studies by NITI Aayog and field visits by us, it is quite evident that a house has had an impact on the entrepreneurship ability of the beneficiaries, especially of women. Starting from making garments to garlands, from pottery to making pickles, from tutors to running thrift shops, the beneficiaries have put every inch of their house for productive use. The initiatives make them self-reliant and financially secure too.

For Smt Rehana, who hails from Ballapura, Karnataka, the PMAY-U house is an accomplishment – the house through which she got social upliftment. *"I gained sense of ownership, accomplishment, respect in the society and secured life with the house. My family now lives without any fear as the house has all basic amenities. It is not congested, is free of unhygienic conditions, resulting in better living standards and less health problems. We also have a sense of dignity as no one is forced to go out to defecate or walk a mile to get water,"* Smt Rehana says. Since they now own a house, the family is able to save money for providing medical help to their differently-abled daughter.

A PMAY-U house has ensured an improved life with dignity and respect for Smt Roto Ampi of Arunachal Pradesh and her family. Due to the pucca house, they are not vulnerable to the extreme weather conditions and it also provides privacy to them. Smt Ampi was able to build a comfortable and spacious all-weather pucca house. *"With the right environment and basic amenities, the children are excelling in their studies. The quality of life has improved. Owning a pucca house has strengthened my economic background. I can now save for our future,"* she says.

Photo 5: Beneficiary : Smt Roto Ampi

Transforming India Through PMAY-U

It is an established fact that beneficiaries experience life transformation when they move into a new house and environment. In order to holistically address these issues, Angikaar, a campaign for change management launched by MoHUA, is helping build capacities of PMAY-U beneficiaries in adapting to the change through a 3Cs Strategy –

Convergence, Community Engagement and Communication. Through Angikaar, PMAY-U is simultaneously helping beneficiaries avail the benefits of other Centrally-sponsored schemes such as Pradhan Mantri Ujjwala Yojana and Ayushman Bharat so that reforms can be made in grass-root level and people adopt a healthier, cleaner and happier lifestyle.

When we talk about impact and change, we mean changing the entire eco-system in which a family used to stay prior to moving into a pucca house. The Convergence of Schemes have benefitted the families in every possible way. For a family which earns less than Rs 10,000 per month, the government schemes help a lot in taking care of their other necessities of life.

Being a widow and differently-abled, Smt Urmila, a resident of Haryana's Kaithal district, the PMAY-U home is a blessing. For years, she struggled hard to give a good life to her three children. *"My parents who took care of us during our worst times. With their support and the money I receive as pension from the Government, I was somehow able to make ends meet. The PMAY-U Scheme has changed our lives. The house is my prized possession. It gave me and my children a better and dignified life and an opportunity to dream big,"* she says. Ever since the family moved into their own house, their financial condition began to stabilise gradually. Her son is supporting the family by working in a factory on daily wages while her two girls are completing their education. The house has basic civic amenities like a kitchen, toilet, water and electricity facilities.

Photo 6: Beneficiary : Smt Urmila

PMAY-U works for the upliftment and development of society at large. Along with housing, the Scheme boosts the economy and provides employment opportunities owing to the ongoing construction activities at a large scale. As people get their own house, they are able to save on rent and utilise that money for other purposes. There have also been instances when a household is able to save on the construction expenses as they carry out the activities themselves.

As we travelled across States/UTs to meet our PMAY-U beneficiaries, we remember to have met two families in Uttar Pradesh who constructed their own house. The first family hails from Agra. As the beneficiary Satya Prakash suffered paralysis, his son took the responsibility of constructing their own house to save on the expenses.

The other house was in Mathura, where the entire family came together to build their dream house as the COVID-19 lockdown forced them to stay together for months. Smt Pawan Devi's husband and his family built and beautified the house together and they say that with utmost pride. Due to the lockdown, there was shortage of labourers and therefore they decided to take the responsibility in their own hands. Now, Smt Devi plans to start tuition classes from her home to support her husband in running the family as he had lost his job. She could take the step only after she moved into the pucca house.

The urban areas are more culturally diverse and are likely to be less safe and more socially fragmented than rural areas, where there is stability. Urban neighbourhoods contain a diversity of household types which are often fluid in their structure. This social diversity is likely to create tensions and the need for different survival strategies from those practised in rural areas (Wratten, 1995; Rakodi, 1993; Moser, 1996). Social relations in the society play an active role for the comprehensive development and also provide a sense of security and inclusivity in the neighbourhood.

Smt Parvinder Kaur, a PMAY-U beneficiary from Punjab's Kharad, says that moving to a city from a village has its own sets of challenges. However, if you have a place of permanent shelter, everything falls into place. *"We came to city for better opportunities. The PMAY-U house has given us a security and the courage to think big. We are now concentrating on our child's future and investing for his better education. He can concentrate on his studies without worrying about any adjustments,"* Smt Kaur says.

India is predominantly an agrarian country, with around two-thirds of the population residing in rural areas and having their own socialised circle. Influence of urbanisation resulted in a paradigm shift from rural to urban living and changed the fabric of the country. Urbanisation now is a continuous process, resulting in constant moving away from the agrarian economy. This shift, however, was unplanned and the cities lacked basic services adapt to this change. The colonies evolved with infusion of various cultures but with no permanent shelter. Therefore, the people residing in these colonies became susceptible to various social threats.

In case of dwelling in a society where social relations are compromised in order to avail bare minimum lifestyle, lack of inclusivity can be observed. These social threats include reputation of the family in their relatives and neighbourhood, security and safety for women and children, a neighbourhood which is inclusive in nature and where an individual can have positive peers. A safe house is considered a driver to strengthen the social status of a family. A safe house is the keystone for human upliftment, enhancement, empowerment and confidence to look forward for their bright future. The ability to select a particular choice of

housing need helps every beneficiary/section of the society in their social upgradation. The initiative helps in maintaining the cultural integrity of the family and allows them to get a home wherever they are comfortable, thus creating a sense of unity and togetherness.

Initiatives like these and many others, such as the process of social auditing, a humanitarian step to not only involve formal organisations but also beneficiaries and other stakeholders in order to get their feedbacks is helping the implementation of the scheme by providing different insights and parameters to evolve and improve continuously. Smt Jigmi Pulmo from Leh explained the hardships of growing up in a poor family, having limited access to resources and exposure to domestic violence. After getting benefitted by the Scheme, Smt Pulmo gained sense of ownership, accomplishment, and respect in the society and a secured life. *"I can live without any fear of domestic violence,"* she says.

Smt Guddi Devi, a PMAY-U beneficiary from Varanasi, Uttar Pradesh, shares, "For me, my house is my prized possession. It gave me and my family a direction to think big in life. While I got self-employed as I moved into my own home, my daughter started working to make her future better. Along with studies, she is also pursuing her dreams of becoming a karate champion. She plays for national level and practices at home.

Photo 7: Beneficiary : Smt Jigmi Pulmo

Photo 8: Beneficiary : Guddi Devi

In the hustle-bustle of the cities, people often spend their lives striving for money to afford a decent house and living standard. The demand for housing is high and the affordability is marginalised, which compels people to lead a substandard life. Urban areas are characterised by a greater degree of commercialisation. People need higher income to survive in cities. Common land, clean water and fuel are rare in urban areas. The need to earn more often results in huge debts. Borrowing, normally at usurious rates, may lead to long term indebtedness with disastrous results.

It is very important to take into account the condition of a citizen living in the city, because an unplanned city is inefficient for future growth and it exploits the available natural resources. Ensuring creation of asset for the urban poor is one of the major challenges that any city faces. Construction of housing is a regular phenomenon in the city but due to lack of identification of actual beneficiary, most of the cities are unable to meet the gap of demand

and supply. Indian cities have been witnessing a two-sided problem – one of people living in slums and ghettos fighting for their survival daily on the contrary there are huge housing towers and gated societies with multitude of facilities lying vacant and locked. The role of the government is very crucial in this context. The role of being a provider as well as a facilitator.

With PMAY-U, the government is ensuring to provide assistance to the urban poor by providing subsidy to move into their own house and also helps in establishing a connect with the private sector to ensure people get their dream home.

Smt Vijayalaxmi, Medchal from Telangana is one beneficiary whose economic base got strengthened after she received joint assistance from Central & State governments. The single mother owns a pucca house with basic infrastructure facilities, which enables her to save for the bright future of her daughter.

Photo 9: Beneficiary : Smt Vijayalaxmi

Owing to the guidelines set by the Mission, India is witnessing a structural shift in housing demand. In a first, there is an enhanced spectrum of first-time home buyers under the CLSS vertical of PMAY-U. Even the millennials (single person households) are its beneficiaries. The Mission acknowledges diversity in housing demand across various income groups of the country, and for the first time it covers the households of Middle-Income Group, having annual income of up to ₹1.8 million.

Conclusion

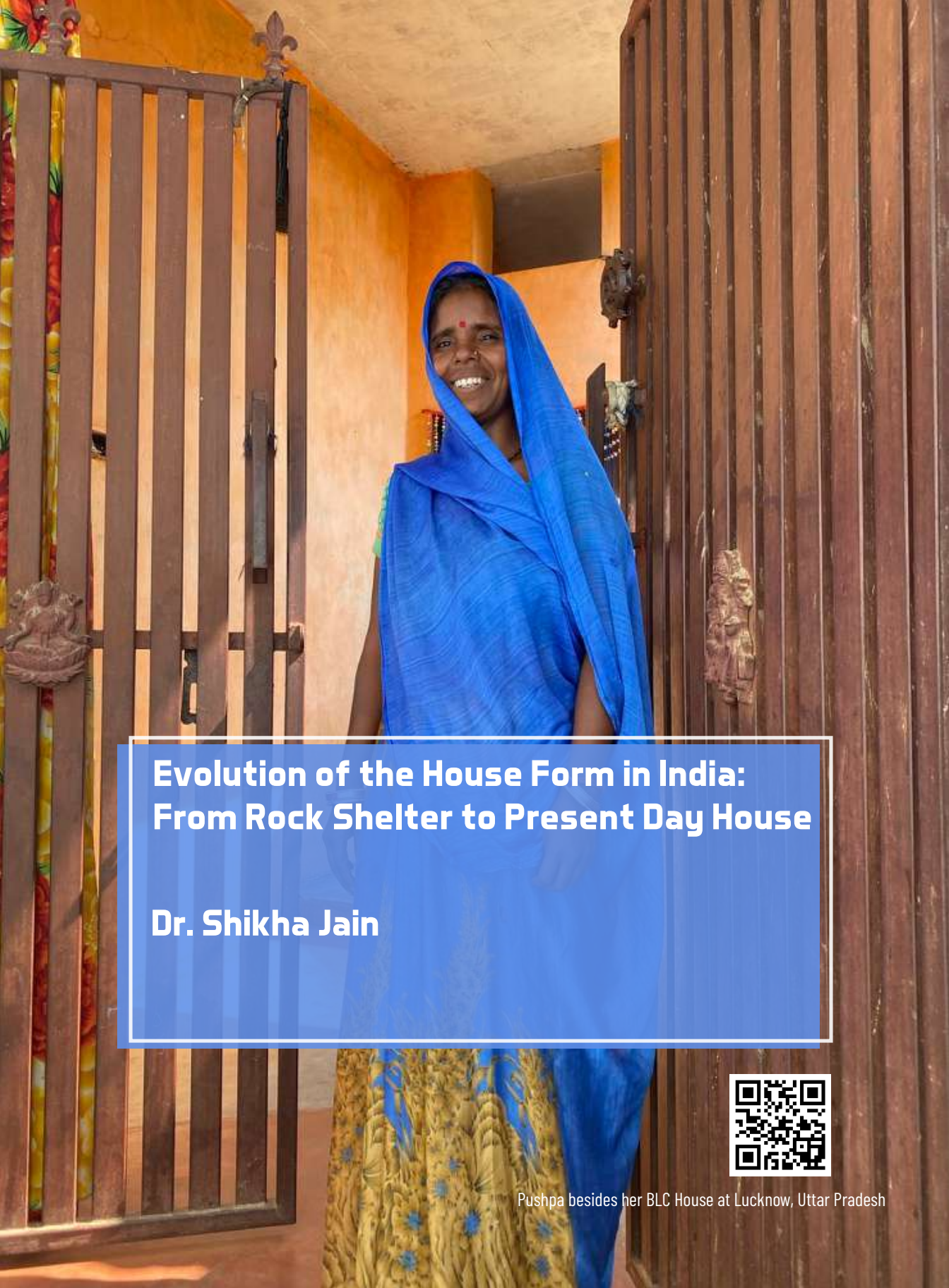
Every word said by these PMAY-U beneficiaries counts. For if it wasn't for this scheme, many would still be struggling for a proper housing – which is the basic need of any person/family. In the past, schemes for foundation for housing programmes were laid but they lacked an inclusive approach. PMAY-U gave people the platform to dream big. It isn't just a mere housing scheme. The success stories of the beneficiaries are a testament to the fact that the scheme has helped them in achieving economic stability in their lives and with that, they can focus to achieve other aspirations as well.

Owning a house has evolved from just a symbol of pride to an asset, helping people achieve a sense security and stability in life. The name in front of the house is enough to instil that confidence in people, which, of course, leads to a much secured life. PMAY-U is paving its way as a model inclusive housing scheme with maximum participation at beneficiary level. This novel thought of engaging beneficiaries as major stakeholder and providing them a liberty to build their homes in a way they want is how this scheme is acting as a bridge to shift gear the perspective of housing scenarios in urban India.

PART THREE
Perspectives in Housing

Evolution of the House Form in India: From Rock Shelter to Present Day House

Dr. Shikha Jain



Pushpa besides her BLC House at Lucknow, Uttar Pradesh

Introduction

The house form of India is an immense repository considering the entire corpus of settlements through the country's centuries-old history, with its various cultures and civilisations, along with diverse physiography of the Indian subcontinent. Basic human settlement in any region primarily emerges as a response to natural forces and the immediate environment and further evolve in design with customised adaptations to the local cultural values. Hence, to analyse a physical house form and its various transformations throughout India, it is important to understand the surrounding environment and the cultural values of inhabitants that structured all aspects of their life at a particular time. In the Indian context, house forms are spread across the expanse of the country in different settings that range from the mighty Himalayas in the north to the desert and plains in the northwest, rugged Western Ghats and Arabian Sea to the west and coastal expanse of Indian Ocean to the south and Bay of Bengal to the east. A cohesive narrative of India's diverse dwelling typology within the framework of its millenia-old socio-political history and diverse geography is an enormous exercise. This chapter is an attempt to provide an overview of Indian house form in its varied cultural landscapes that evolved through the centuries producing innovations and adaptations in each different context or historical period.

Broadly, we may categorise house forms of India under two main types, one is the Vernacular house form that emerges as a sustainable solution in various physiographical regions with use of local materials and techniques that have been surviving for centuries. This is often temporary in nature using available organic materials and has survived since time immemorial with the tribal communities across India. The second one can be termed as Historic house form which is attributed to the various historical periods, architectural styles and artwork prevalent in different phases of India's history. Both these house forms present a wide variation based on their locations and geographical contexts across the country and can collectively be classified as Traditional house forms if they show continuity in terms of use, materials, techniques and design for a substantial period of time as per cultural traditions.

In terms of material usage, generally the house forms of India get categorised as kutcha house, semi - pucca house and pucca house. A kutcha house uses local materials and is more temporal in nature requiring reconstruction periodically as per need. As already mentioned, vernacular house form is largely kutcha in nature or at times semi - pucca where more permanent materials may have been used like stone for foundation and base while the roof may be of thatch. Pucca house is usually of more permanent material such as timber, stone and bricks with similar roofing materials. Historic houses from different eras with varied architectural style fall under this material category. The transformation from kutcha to pucca house is also indicative of the house owner's social status and affluence as obvious in the more permanent historic houses of the elite in the society in any period. In fact, it is easy to understand the transformation from an open space or 'bara'/'wada' of a kutcha house to a pucca house with a courtyard and surrounding spaces of 'tibara' and 'chaubara' found in houses of northern India. (Fig. 1 and Fig. 2).

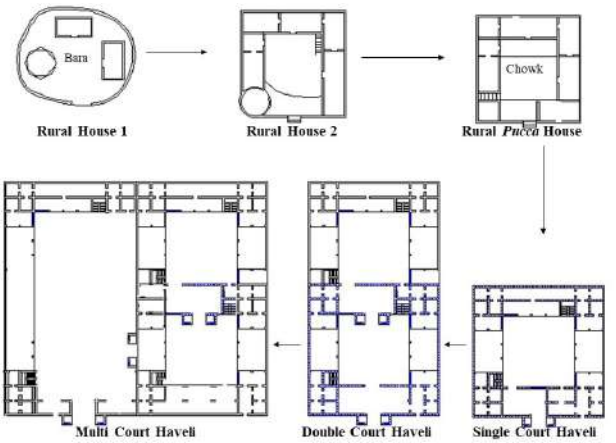


Figure 42: Transformation from kutcha to pucca house in a rural settings

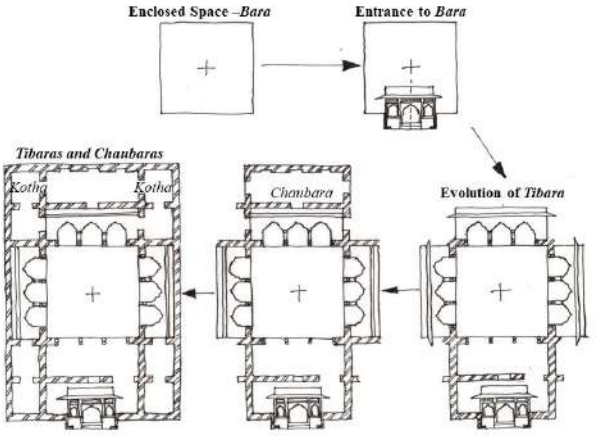


Figure 43: Transformation from an enclosed space (bara) to a pucca house with a courtyard

Vernacular House Form

As per Census 2011, there are a total of 645 tribal communities across India and each has its own variation of house construction adapting to local climate, materials, tribal culture and rituals. While these house forms themselves are temporary in nature, the tradition of making these houses stands from time immemorial. Few tribes such as the Nagas, Gonds, Bhils and Todas are associated with the migration of humans to India. It is postulated that construction of first vernacular house form in India was of a similar nature. At present, there is no single data source that records all different tribal houses across India, though a number of these have been studied in detail by various researchers. Ministry of Culture, Government of India has also set up Zonal Cultural Centres that house 'Shilpgram' where tribal houses of various communities are constructed such as the West Zone Cultural Centre at Udaipur.

Dakshinachitra, a museum under a private trust in Chennai exhibits traditional house forms of southern India. North-eastern region of India has maximum variations in tribes and tribal houses. René Kolkman, a professional architect in Amsterdam has studied homes of 37 different ethnic groups in Assam, Meghalaya and Arunachal Pradesh. His study shows the variations among the shapes, sizes and layouts with 34 individual house-types[1].

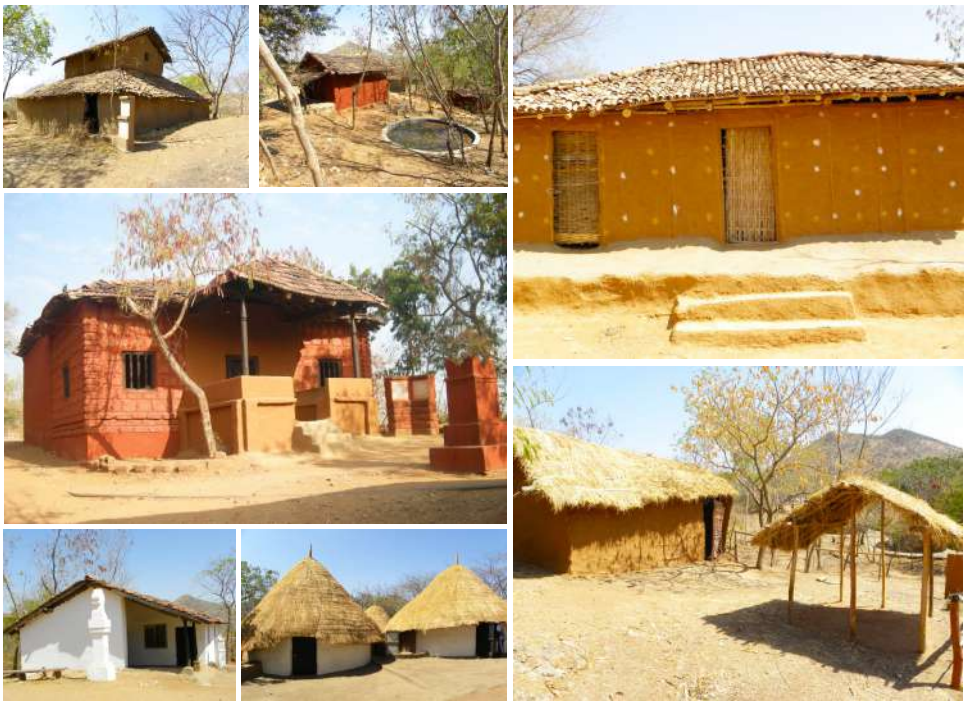


Photo 10: Vernacular House Form in Western India
Source: WZCC, Ministry of Culture

A brief overview of various tribal groups and their vernacular homes across India is outlined below:

Table 1: Vernacular House Form of Tribal communities in India

Geographical Zone	Community/Tribe	House Form Type
Northern Region Jammu & Kashmir Ladakh Himachal Pradesh Uttarakhand	Bakarwal, Balti, Beda, Gaddi, Garra, Mon, Purigpa, Sippi, Changpa, Gujjar. Khasha, Lamba, Lahaulas, Pangwala, Swangla, Beta, Beda Bhot, Bhotias, Buksa, Jannsari, Raji, Tharu	Stone houses with rubble boundary, usually double storied with sun baked mud bricks on upper floors, sloping roof with slate. Kath Kuni construction technique in Himachal Pradesh. Gaddis and Bakarwal use stick and mud hut called Dera with water holes for cattle, though now they use stone and mud also.

[1]René Kolkman and Stuart Blackburn, *Tribal Architecture in Northeast India,* Brill Publishers

Geographical Zone	Community/Tribe	House Form Type
North Eastern India Arunachal Pradesh Assam Manipur Mizoram Nagaland Sikkim Tripura	Apatanis, Abor, Dafla, Galong, Momba, Sherdukpen, Singpho, Nyishi, Mishmi, Idu, Taroan, Tagin, Adi, Monpa, Wancho, Chakma, Chutiya, Dimasa, Hajong, Garos, Khasis, Gangte, Karbi, Boro, Borokachari, Kachari, Sonwal, Miri, Raba, Garo, Naga, Kuki, Meitei, Aimol, Angami, Chiru, Maram, Monsang, Paite, Purum, Thadou, Anal, Mao, Tangkhul, Thadou, Poumai, Hajong, Jaintias, Lakher, Pawai, Lakher, Pawi, Synteng, Lushai Kachari, Kuki, Mikir, Sema, Ao, Chakhesang, Konyak, Lotha, Phom, Rengma, Sangtam, Bhutia, Khas, Lepchas, Limboo, Tamang, Bhil, Chaimal, Halam, Lushai, Mizel, Namte, Mag, Munda, Riang	Most of these tribes construct houses with bamboo, mud and thatch. Nagas have unique elongated or at times circular houses. Garo houses are called Nokmong. Space for cattle is important and a number of tribes such as Apatani and Abor build houses on stilts where lower part is used for animals. Hearth/ fireplace is usually located in the centre of these houses and the front is often decorated with items of ritualistic significance such as a Buffalo face outside Naga house.
Eastern Region Bihar Jharkhand West Bengal Odisha Chhattisgarh	Santhals, Asur, Khond, Hajong, Ho, Parhaiya, Rabha, Savar, Bhumij, Bhutia, Chik Baraik, Kisan, Kora, Lodha, Kheria, Khariam, Mahali, Mal Pahariya, Oraon, Gadaba, Ghara, Kharia, Khond, Matya, Rajuar, Bathudi, Bathuri, Bhottada, Gond, Juang, Kolha, Khayara, Koya, Munda, Paroja, Saora, Shabar, Lodha. Birhors, Bhumij, Bedia, Ho, Kharwar, Mahli, Parhaiya, Banjara. Agariya, Bhaina, Bhattra, Biar, Khond, Mawasi, Nagasia, Binjhwar, Halba, Halbi, Kawar. Baiga, Birjia, Chero, Kharwar, Tharu	Santhals have unique Jhanti house with bamboo and shrub sticks (hunter gatherer) later evolved into Kumba - mud houses (agrarian) with mud, grass mixed with murram (gravel) and saal logs or bamboo poles which were used as column and beam. House form varies as per construction Burud Khunti Ora (central post) and Ath-Chala (eight sloping roofs) Raacha Orah (courtyard house)
Central India	Baigas, Bhils, Bharia, Birhors, Gonds, Katkari, kharia, Khond, Kol, Murias, Korku, Mawasi, Pardhan, Sahariya, Bhaina, Bhunjia, Dhodia, Rathawa, Warlis, Dhanka, Halba, Kathodi, Kokna, Koli Mahadev, Pardhi, Thakur, Gond, Kharwar, Sahary, Parahiya, Baiga, Agariya, Chero	Gonds have rectangular two-storied structures of timber frame with bamboo walls daubed with a plaster made of water, clay and cattle dung (material valued for its cooling and insect-repelling properties) and roof covered with grass/ teak leaves/ bamboo.
Western India	Barda, Bamcha, Bhil, Charan, Dhodia, Gamta, Paradhi, Patelia, Dhanka, Dubla, Talavia, Halpati, Kokna, Naikda, Patelia, Rathawa, Siddi, Dubia, Naikda, Siddi,Varli, Gawda, Damaria, Dhanka, Meenas(Minas), Patelia, Sahariya, Naikda, Nayaka, Kathodi.	Bhils have linear house built with loamy soil, mud bricks, wood, and bamboo shafts often with an outer courtyard. The tribals in Gujarat have conical roofs and circular houses. A single pillar supports the roof which is lined by bamboos inside. Bhunga house of Kutch is circular in plan with a thatched roof. Locally available soft stone is chiselled to form rectangular blocks with mud mortar; bamboo and straw is used for roofs. These are decorated with mirrorwork. In Maharashtra, Warli tribe decorate their clean houses with warli paintings while mandana is done in Rajasthan.

Geographical Zone	Community/Tribe	House Form Type
Southern India in Tamil Nadu - Nilgiris	Todas Adiyan, Barda, Gond, Bhil, Iruliga, Koraga, Patelia, Yerava, Hasalaru, Koli Dhor, Marati, Meda, Naikda, Soligaru. Arandan, Eravallan, Kurumbas, Malaiarayan, Moplahs, Uralis, Irular, Kanikaran, Kattunayakan, Kurichchan, Muthuvan, Andh, Sadhu, Bhagata, Chenchus (Chenchawar), Gadabas, Goundu, Jatapus, Kammara, Kattunayakan, Kolawar, Kolam, Konda, Manna Dhora, Pardhan, Rona, Savaras, Dabba Yerukula, Nakkala, Dhulia, Thoti, Sugalis, Banjara, Kondareddis, Koya, Mukha Dhora, Valmiki, Yenadis, Sugalis, Lambadis, Kadar, Kotas, Malayali.	Toda houses are truly unique– rectangular in plan, with a barrel-vaulted roof that reaches down to the ground. Constructed from bamboo that is fastened with rattan and thatched. They make mural rock paintings to decorate the entrance. Thick bamboos form the basic pent structure and thin bamboos are framed with dried grass to complete the basic circular shape of the Toda hut. Round circular homes with thatched roofs called Chuttillu or Middillu are found in coastal Andhra.
Andaman and Nicobar Islands	Oraons, Onges, Sentinelese, Shompens	Circular and stilted huts with thatch and bamboo

Historic House Form

A wide range of house forms are recorded throughout India's historical journey, starting since the times of hunter-gatherer to the present day. Secular architecture did not always receive the same importance as iconic public architecture. It is difficult to find physical evidence of house form in India for a large span of time between the historic Mauryan period to the Early Medieval period as most of the houses might be constructed in timber and were destroyed with time. Archaeological, archival and architectural records can be collated to put together a transformation of the historic house form of India as chronicled below.

Cave Shelter of the Lithic Human (30,000- 3000 BCE)

Earliest caves of hunter gatherers with their rock paintings are evident at the World Heritage Site of Rock Shelter of Bhimbetka. These are in the Central Indian mountain ranges of Vindhyas in the state of Madhya Pradesh. Vindhyan Range is a sedimentary sandstone escarpment running from east to west that roughly divides northern India from the southern peninsula. Natural clusters of more than 700 rock shelters are integrated with the Vindhyan landscape spread over the upper parts of the hills and exhibit a history and evolution of humankind. Similar rock shelters with cave paintings are present all across with more than thousands of lithic period sites in India. They are markers of the first house form as a natural rock cave shelter which was embellished with rock paintings depicting the home owner's activities of hunting and the lithic human's understanding of the natural surroundings.

Harappan House of the Sindhu Saraswati Civilisation (3300 BCE- 1300 BCE)

One of the most advanced and earliest house form of India is observed in the Harappan settlements dating back to around 3000 BCE. Built within grid iron town planning system, the houses were constructed of stone and mud bricks as one to three-storeyed structure with courtyards in the centre, connected to a common drainage system. More than 1000 archaeological sites of Harappan period are spread in the region of northwestern India mainly Punjab, Haryana, Gujarat and Rajasthan showing examples of this house form. Dholavira, a recent Harappan site inscribed on India's World Heritage List, shows excellence in urban planning with fortification and defence mechanisms, architectural design in terms of gateways and residential areas, a water management system, art and technology. It covers all three phases of the Harappan period settlements.

The Vedic House (1700 BCE- 500 BCE)

"If we rely on Vedic texts, we are in the presence of a type of house that is extremely rudimentary, composed of an armature of posts, connected at the summit by transverse beams onto which a thatched covering is attached. The walls are woven mats. Neither stone nor brick are used."

(Excerpted from the summary of *The Vedic House* by Louis Renou with a preface by Michael W. Meister; http://dept.arth.penn.edu/meister/vedic.html)

It was in the Vedic period when the word 'griha' (Sanskrit for house) emerged in the Indian vocabulary and principles of house construction were written down. Texts of Puranas and Upanishads from this period clearly reveal that the house form of a common man was more of a vernacular kind with huts of thatch and bamboo. Ritual literature from this period provides rare glimpses into the process of building and even into the organisation of house interior. Terms used to denote a house vary in these texts. The most common is griha ; agâra also is used, but the more specific term is shâlâ, upon entering a new house. The word that occurs most frequently in this series, however, is vâstu, designating both the house and its site and establishes the use of science of Vastushastra in Indian construction.

House Form from the Maurya to Early Medieval Period (322 BCE – 12th century CE)

While there is not much evidence of the Mauryan period house forms except a few archaeological remain of cells, some records of house form in the later Buddhist period during the time of Satvahana and Shungas can be derived from the carvings at places like Sanchi which show barrel vaulted timber roof structures and huts. The concept of cells for Buddhist monks are evident at various monastery sites which incorporated these 'viharas' for living purpose. *Maha Prajnaparamita Sastra*, chapter XLV, mentions the term grha for 'houses' among the 'material benefits' granted by the Bodhisattva. It says that accordingly, "girha (house), such as harmya (dwelling), rajakula (palace), prasada (temple), etc., built of earth, wood or precious objects, to protect from sita (cold), usna (heat), vata (wind), vrsti

(rain), caura (thieves)". These evidences are clear records of the house form for this period which was also crystallised into rock cut caves across India, the most renowned ones being Ajanta and Ellora in Maharashtra. It was the particular nature of basalt rocks in Western Ghats that allowed flourishing of rock cut architecture in abundance in the region. There is not much record of secular architecture of the Early Medieval period where present - day India was divided into several kingdoms. There are no remains of houses from the Gupta period after this till the early Medieval kingdoms by the end of 10th century. Most archival data indicates use of bamboo, mud, thatch and living in these temporary houses.

Photo 11: Stone carving on Torana gateway, Sanchi Stupa (3rd Century BC)

House Form from the Late Medieval to the Early Modern Period: Havelis, Wadas, Rajbaris, Nalukettu, Agraharams, Chettinad (16thcentury CE- mid 19th century CE)

One can locate occasional evidence in the remains of forts and fortified settlements but it is largely the iconic palace structures from the earliest phase of this period that have survived. Few houses such as fort commander Jaimal's house in Chittor gives an indication of stone masonry construction that may have been used for houses of the nobles and commanders. Primarily, this construction was restricted for a few higher officials while the larger public lived in village huts in the surroundings, mainly depending on agrarian economy. It is only with later development of towns from 15th century onwards that we find intact walled settlements with permanent row courtyard houses. One of the oldest Late Medieval period site showing houses of a Brahmin settlement is the 13th century abandoned town of Kuldhara near Jaisalmer. Other historic cities such as Ahmedabad with its timber havelis and Jaisalmer with its stone carved havelis exhibit highly ornamented courtyard

houses dating from 15th - 16th century. Post - 16th century, the country witnessed a rise in dominance by the Mughals, Rajputs, Marathas, and the Sikhs and the house form across various kingdoms evolved its own stylistic vocabulary with haveli as the primary one in northern and northwestern India.

Etymologically, the term 'haveli' originates from a Persian term haowala; which was related to a piece of land. Later on, the land along with the dwelling was called a haveli. The term itself signifies possession of land and a social status (Jain 2004)[2]. The traditional practice of possession of land as a status of the ruling person has been ingrained in Indian mind since agrarian times and is present till today. The location and the type of haveli was determined by the owner's social, political and financial conditions, that is, the caste, occupation and relation with the ruler. Hence, a social/ political classification is more relevant for determining the typology of a haveli. This caste classification can be further validated by the fact that all havelis were named and recognised by the owner's name that also reflected his caste. Havelis often varied from a single courtyard house expanding to an assemblage of multiple courts subject to the higher status and wealth of the owner or an increase in number of family members. Havelis of Nawabs in Lucknow in Central India or the noble houses in southern Telangana, that were predominantly influenced by Islamic architecture, used courtyards for their rituals and were adorned with arches, carved screens in stone as well as Urdu calligraphy.

TS Randhawa's (1999) work on the Indian courtyard house compares this medieval house form in different regions of India[3]. He describes the havelis of northern India, Rajbaris of West Bengal, Maharashtrian wada, Nalukettu in Kerala and Chettinad in Tamil Nadu. Bunt community of Karnataka called their traditional houses guthu mane which means 'home of prestige'. Agraharams for Brahmin settlements in Tamil Nadu, Kerala, Karnataka and West Bengal are another house form from this period. Manduva logili homes found in Andhra Pradesh are characterised by an inner courtyard with rooms around or a large hall that stretches across the house. Usually made of red bricks and featuring a well thought drainage system, the homes are adorned with wooden pillars of teak or rosewood.

Be it the havelis of northern India, the nalukettus of Kerala or the wada homes of Maharashtra and other traditional homes, all house plans are structured around an open central space of the courtyard. It was the most essential space in most of these house types. However, it is the nature of use, rituals, materials and formal composition that determines the transformation of this generic courtyard plan to specific regional identities. Most of these homes also have a granary, stable, cowshed, prayer room and sometimes even a temple and a well as per the occupation and caste of the owner in different contexts. The variations of this archetype relates to the significance of determinants such as caste, place or topography and available materials and technology. The havelis of northwestern India vary largely in terms of materials such as brick construction in Punjab and Haryana, stone in Rajasthan, Uttar

[2] *Jain, Shikha, Havelis: A Living Tradition of Rajasthan,* Shubhi Publishers, 2004
[3] Randhawa, TS, *The Indian Courtyard House,* Prakash Books, New Delhi, 1999

Pradesh and Madhya Pradesh and timber in Gujarat. Wadas of Maharashtra are primarily timber construction while rajbaris in West Bengal are in stone and timber. Chettinad homes of Tamil Nadu have a distinct cultural identity which reflects in its architecture, characterised by their use of teak and marble with beautiful pillars. Kerala houses usually have two courtyards, one inner and the other outer, along with gabled roof and clay roof shingles to combat the heavy monsoons. It also needs to be understood that these courtyard houses functioned within their contextual clusters and city planning context that varied from walled cities in the north including housing clusters termed as katras in Punjab, mohallas in Delhi and Lucknow, pols in Gujarat, chowkris in Jaipur or the Brahmin agraharas in concentric temple towns of southern India.

Impact of Colonial House Form and Regional adaptations (19thcentury CE- Early 20th century CE)

With the advent of European travellers and companies such as British, Dutch, Portuguese and French in India at various times from 16th century to 18th century, resulted in introducing their style of architecture in the regions they interacted with. The Portuguese influence in architecture is identifiable in the housing typology of Goa and Daman and Diu, made of laterite stone and mud walls painted with colours made of natural dyes. The residential areas exhibit bright coloured facades of the houses and covered porches. French architecture is observed in Pondicherry, some parts of Malabar Coast as well as along Hoogly at Chandernagore in West Bengal, which also has Dutch mansions in areas like Seerampore. Colonials experimented with various architectural styles, popularly termed as Neoclassical, Art Deco, Indo-Gothic, Indo-Saracenic, etc.

The British East India Company had established their administrative control across India with Kolkata as a centre. The term 'bungalow', meaning a house with a sloping roof and huge verandas, became popular as every nobles' dream house in India by the 19th century and has its origin in West Bengal. Its adaptation across India resulted in several hybrid forms including haveli-bungalow and other such combinations in the 19th and 20th century. This major impact to Indian house form during British period is evident in the city and cluster level where walled cities extended to new areas of Civil Lines with lavish bungalows made on the British Model. There were huge gardens in front and back of the house, a porch with British planning and without any courtyard. Introduction of bungalows transformed the house form of India completely as the primary space of courtyard was completely removed.

Post-Independence House Form (1947 onward)

Post-Independence period saw new materials and new ideas with impact of modernism and use of glass and concrete for urban housing. Chandigarh and Ahmedabad set the trend where contemporary Indian architects exchanged ideas with international architects, creating a new vocabulary for Modern India. On the other hand, the British period Town Planning acts got crystallised into official planning documents leading to zoning[4] and a

[4]Jain, Shikha, 'Loss of Locus in the Indian Home' *in Traditional Dwellings and Settlements Review, Vol. 16, No.1, Post Traditional Environments in a Post Global World: Ninth International Conference, December 14-18, 2004, Sarjah/ Dubai, UAE, 2004*

Photo 12: Post-Independence House Form (1947 onward)

house form that catered more to the western planning with row houses and absence of courtyards. Most of the post-independence cities today present this house form vocabulary. Out of the search for appropriate forms, new hybrid residential forms have mushroomed in Indian cities within the parameters of indigenous tradition, remnant colonial zoning (which still dictates residential setbacks, for example), the desire for modern comforts, and increasingly globalised construction technologies. Such hybridisation is a result of an inherent need to establish identities that simultaneously link tradition and global trends via custom-made residences and individual architectural expression. A person's innate desire is for a house with an image that reflects his or her entire persona, and that encompasses

traditional roots, an ever-widening modern outlook, and even memories assembled from their travel ventures.

However, there are some cases and places where Indian house's regional diversity and cultural identity is sustained as the locals continued to build in the vernacular forms and some regional sustainable techniques were evolved by architects like Laurie Baker and other locally practicing architects in India'.

Photo 13: Post-Independence construction based on modernist architecture

Ritualistic Significance and Meaning in Indian House Form

Traditional rituals in house form across India are prevalent in both vernacular form as well as historic houses and continue even in the present – day modern ones. These rituals are grounded in the agrarian life which was in complete rhythm with nature. Most festivals and the rituals followed by the people were bound with seasonal changes. In an agriculture based society, the fairs and festivals like holi, diwali, gangaur, basant panchami, teej, etc., were associated with sowing and harvesting time of crops. Later on, these festivals became part of the religious rituals associated with various Gods and Goddesses and continue in the urban houses too.

Significance of a courtyard space has been discussed in a dwelling as a symbolic brahmasthan, as a climatic requisite and as a social space, but an analysis of ritual behaviour explains that the evolution of a courtyard house is equally important. The formal resemblance of a typical Indian courtyard dwelling plan with that of a Vedic altar is striking. Kapila Vatsayan describes the origin of Indian architecture in Vedic altars. According to her 'The various aspects of the ritual of yajna and the prescribed vidhi became the solid conceptual foundation of architectural ground plans throughout the country over a period of 12-14 centuries[5].

The centre absorbs and disperses all contradictory energies. Also, the expansion of bindu is stabilised in a square, which is called a muladhar (literally root base). This view is reflected in a square court of a courtyard house. Spatial structure of a dwelling unit, if analysed at a local level, begins with the location of the centre and demarcation of the territory (marking of four corners) to define the place. This determines the generic core of any courtyard house. Even in case of an irregular plot, the central chowk (court) is always square or rectangular with the built form as a residual of the plot size and the court, thus establishing a chowk as the primary space. Assuming the growth of a dwelling unit from inside outwards, a courtyard evolved as a basic space for a traditional family unit.

The origin of this urban form from the rural prototype is evident in the form and etymological roots. The rural yard called bara (literally an enclosed opening in an agrarian dwelling to demarcate the territory) was the origin of 'chowk'. Incidentally, it coincides with the Arabic term baha, which also means open space. Etymologically, chowk is a Hindi term meaning 'a central space of gathering that has four corners.' In the Indian context, this term is used for any gathering space at the level of a city, a cluster and inside a courtyard house. The significance of the social centre as opposed to the physical one is revealed in an interview with a courtyard house resident. Although residing in a modern apartment, the family members call the living room as 'chowk' as it is a social centre of gathering for the family. In the Hindi dictionary, one of the meanings of this term chowk is bada vedi, i.e., a big altar used for Vedic fire rituals. This indicates the ritual associations of this space.

Traditionally, ritual activities in a courtyard house have been of three kinds: daily rituals of family members, rituals related to birth, marriage and death of family members and seasonal rituals linked to festivals. In a typical Hindu dwelling, fire rituals are performed in the centre of the chowk, clearly demarcating it as the hearth space. Performance of the ritual of Bhumi Pujan before the commencement of construction and Griha Pravesh or Vastu Shanti before entering a new house also recognise the central space of a dwelling. Tanseem Choudhury (1992), in her research on Muslim dwellings, mentions that before moving into a dwelling, a mullah or two madrassa students are called to recite the Quran in the courtyard. In interviews with Muslim haveli residents, it was found that they invite acquaintances for a Quran Khawani recital of verses from Quran at the time of laying the foundation stone. The centre of the court is converted into various altars (Havan-Kund, mandap, etc.) related to specific ritual. The centre is also demarcated during festivals and ceremonies of the courtyard house with various flooring patterns called mandanas (made with a mixture of red earth and cow dung).

Most of the religious ceremonies mentioned in the texts such as 'Vastu-pujan' and 'Griha Pravesh' are still observed in a modern-day house construction. Vastu - pujan ceremony is performed on an auspicious day for beginning construction work. This is

[5]Vatsayan, Kapila (ed.),*Concepts of Space. Ancient and Modern,* IGNCA, Abhinav Publications. New Delhi, p.73, 1991

Table 2: Timeline of historic house form of India

Time Period	Geographical Zone	Historical Phase	House Form Type
10,000 BCE-7000 BCE	**Northern Zone** Jammu, Kashmir, Ladakh, Uttaranchal **Central Zone** Madhya Pradesh, Uttar Pradesh **Western Zone** Rajasthan and Gujarat **East and Northeast Zone** Bihar, Chhattisgarh, Odisha, Jharkhand, Meghalaya and Manipur **South Zone** Andhra Pradesh, Karnataka, Tamil Nadu, Kerala	Lithic period (Palaeolithic, Mesolithic, Neolithic)	Natural cave shelters with Rock Art eg. Bhimbetka
7000 BCE to 3300 BCE	**Northern Zone** Kashmir, **Central Zone** Uttar Pradesh **Western Zone** Rajasthan and Gujarat **East and Northeast Zone** Assam, Bihar, Meghalaya, Manipur, Tripura **South Zone** Andhra Pradesh, Karnataka, Tamil Nadu	Later Neolithic phase and Chalcolithic period.	Circular and rectangular thatched houses made of mud and reed.eg. Burzahom, Kashmir
3300 BCE to 300 BCE	**North-Western India** Punjab, Haryana, Rajasthan, Gujarat, Delhi	Sindhu Saraswati period (Early, Mature and Late Harappan Phase)	Grid-iron urban planning with courtyard houses in baked bricks or even in local stone in specific site
1700 BCE to 500 BCE	**North, Northwestern and Northeastern India**	Vedic period	Timber posts and beams with thatched coverings and mats
600 BCE to 325 BCE	**North, Northwestern and Northeastern India**	Mahajanpadas, Magadha, Jainism and Buddhism	Continued to live in temporary huts though fortifications existed
500BCE to 200 CE	**Southern India**	Sangam period	No record of houses
325BCE to 185 BCE	**Northwestern, Northeastern, Northern to Southern India except Peninsular tip**	Maurya period and Satvahanas	Grihas and viharas made in bricks/ stone/ timber & rock cut architecture. Houses for commoners likely of timber but no remains are evident
300B CE to 1200 CE	**Southern India Kerala region**	Chera Empire	No evidence of house form remains
300 BCE to 1070 CE	**Southern India and Eastern coast**	Chola Empire	No evidence of house form remains
250 BCE to 1345 CE		Pandya Empire	No evidence of house form remains

Evolution of the House Form in India: From Rock Shelter to Present Day House

Time Period	Geographical Zone	Historical Phase	House Form Type
230 BCE to 220 CE	**Southern, Western and Central India** Andhra Pradesh, Telangana, Maharashtra, Gujarat, Madhya Pradesh and Karnataka	Satvahana Empire	Houses as indicated in ancient carvings like Sanchi show barrel vaulted timber roofing and thatched huts
185 BCE to 75 BCE		Shunga period	
60 CE to 240 CE	**Northwestern India and some parts of Central and Eastern India**	Kushana Empire	
280 CE to 550 CE	**Northern to Southern India except Peninsular tip**	Gupta period	Temporary huts of bamboo and mud were largely prevalent for houses though other iconic architecture is in stone
600 CE to 1200 CE	**Southern, Eastern and Western India**	Early Medieval period with multiple regional kingdoms Pala, Chalukya, Western Chalukya, Rashtrakuta, Hoysala and Kakatiya Gurjara-Pratihara	No evidence of house form remains though 13th century onwards stone constructed houses are evident in places like Kuldhara near Jaisalmer.
7th to 1947 CE	**Northwestern India**	Rajput Kingdoms	
1206 CE to 1687CE	**Northern, Northwestern, Northeastern and Central**	Islamic Sultanates – Delhi, Gujarat, Malwa and Deccan Sultanates	Havelis as courtyard houses of noble made in brick and stones.
1228 CE to 1896 CE	**Assam and Northeast**	Ahom Kingdom	Brick houses 2-3 storeys
1336 CE to 1646 CE	**Deccan Plateau -Karnataka and lower south**	Vijaynagara Empire	No evidence of houses
1526 CE to 1858 CE	**Northern, Northwestern, Northeastern upto Deccan Plateau in south**	Mughal Empire	Havelis, rajbaris, wadas, nalukettu, chettinad houses
1674 CE to 1818 CE	**Deccan, Maharashtra and expanded all across India**	Maratha Empire	
1716 CE to 1849 CE	**Northwestern India**	Sikh Confederacy and Empire	Havelis and courtyard houses made of lakhori bricks
1757 CE to 1947 CE	**Almost entire areas of India**	Company Rule and British Raj	Bungalows with huge gardens and porches (no courtyard)
Post-Independence beyond 1947	**India (all regions)**	Modern and Post Modern period	Plotted housing, apartment blocks in brick and concrete with other innovations in materials

associated with the symbolic act of converting the ground into the extent of manifested universe. Auspicious days were also selected for different stages of construction such as laying of entrance stone and door lintel. Some of these practices are still followed in contemporary construction in India such as distributing sweets (ladoos) on laying of RCC roof, or not casting the roof on a Saturday. The masons still observe prayers and do not work on the Vishvakarma Day, which falls twice a year.

Conclusion

House form of India has changed from the earliest humans who lived in this subcontinent to the various kingdoms and empires that left their mark as architectural testimonies of different time period, technology and styles and, finally the emergence of modern India with its own architectural idiom. India's rich heritage, its centuries-old history and diverse geography presents a very rich diversity of house form that needs to be understood in various contexts and referenced for future designs. Ideally, this needs to be addressed through comprehensive documentation and multidisciplinary study of the various house forms of India from an interdisciplinary approach including archaeological, architectural, anthropological, historical, cultural and climatic perspective. While there are several records of varied house forms of India in specific regional contexts and periods, an overall dictionary of all these forms is yet to be collated. It will possibly be a useful reference tool while evolving sustainable house designs for future in different regional contexts within the country. It is also important to study each house form within the setting of its surrounding cluster and the settlement as a whole.

Traditionally, an Indian courtyard dwelling has been a direct outcome of social, cultural and religious conditions of the society. The architectural form was a direct response to the social customs and traditions. With passage of time, British interventions and post-independence assimilation of western lifestyle, the typical Indian house transformed into a conglomeration of western comforts and traditional living.

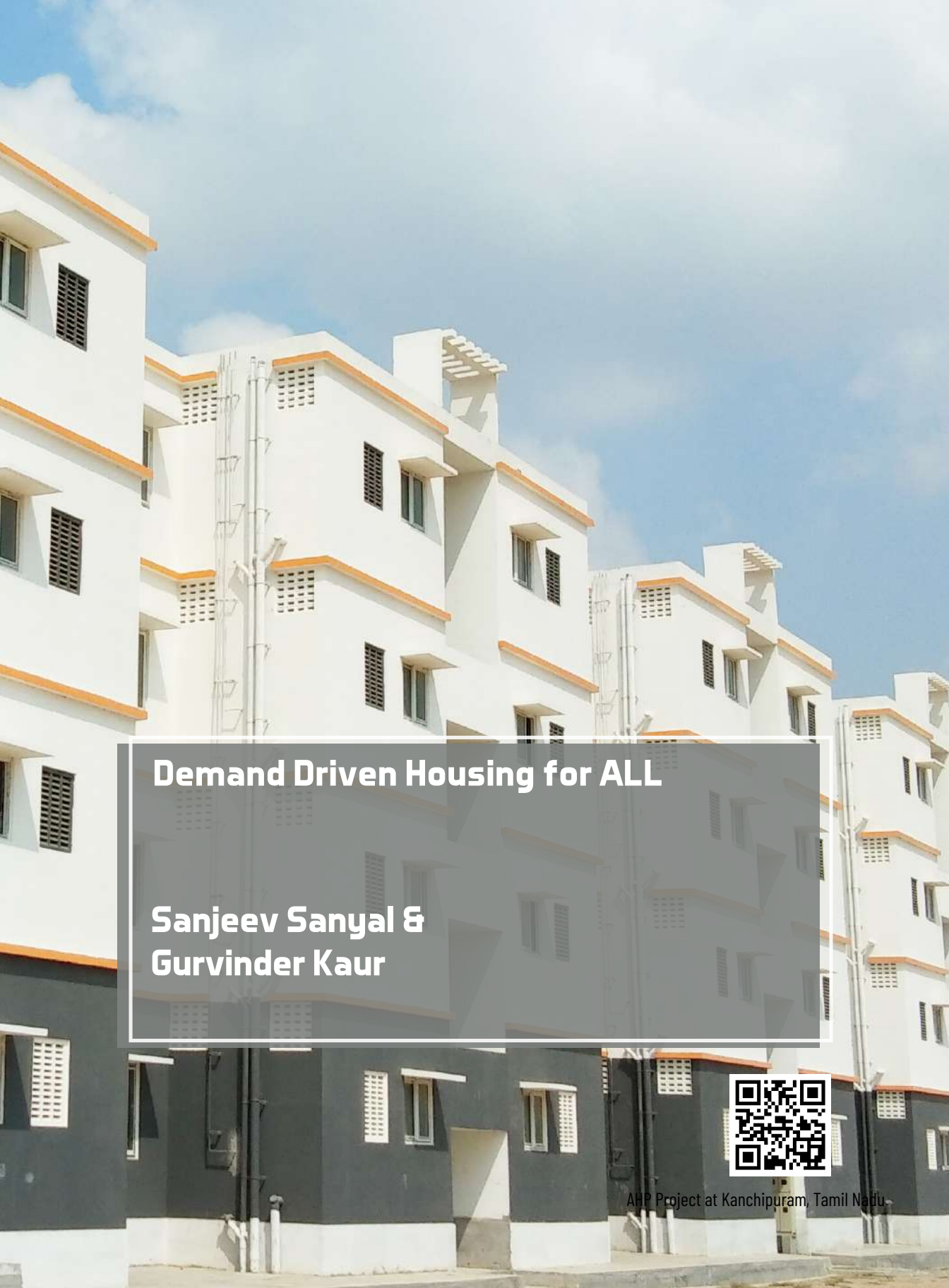
In the present context, the search for a true 'Indian' house form oscillates between modern functionalism and regional nostalgia. Researchers and architects have been debating regarding the courtyard form and its continued relevance to the present cultural condition of nuclear families. Dwelling forms in India owe their heterogeneous character to a process of cultural assimilation that has occurred over centuries. Historically, a traditional Indian courtyard dwelling developed in response to such socio-cultural conditions, but with colonial British interventions and post-independence acclimatisation to Western lifestyles, a middle-class Indian house has been transformed to reflect selective adoption of Western modes of living, alongside continued presence of traditional behaviours and rituals. Residents of such homes perpetually seek a balance between custom and newly adopted conveniences.

The current zoning laws for residential plots are based on the British pattern that was adopted by Town Planning Departments of Independent India. The narrow row plots with

strict front and rear setbacks rule out the possibility of a courtyard. Despite the acceptance of western modes of life, majority of Indians are still bound in traditions and rituals. An architect has to design for clients with traditional minds. In such circumstances, an understanding of traditional forms can provide indigenous design solutions for contemporary residential architecture. Can we achieve an ideal definition that projects the Indian identity beyond time and style for today's India? It is definitely possible to bridge the East-West hiatus in the Indian context, if contemporary designers can perceive the traditional Indian forms beyond stylistic imagery and interpret the behavioural, ritualistic, traditional – cum – modern mindset of the owner and the family who needs to continue their traditions even within their modern present day westernised home comforts.

Demand Driven Housing for ALL

Sanjeev Sanyal &
Gurvinder Kaur



AHP Project at Kanchipuram, Tamil Nadu

With an aim to provide affordable 'Housing for All', the flagship housing programme Pradhan Mantri Awas Yojana (PMAY-U), encompasses two distinct components, Urban and Rural, focussing on providing low cost pucca houses to the poor in both urban and rural areas. Among these, PMAY-U has been a bold experiment done in the demand driven organic urbanism, which contrasts clearly against the outcomes of traditional spatial planning approach adopted by the previous housing schemes.

Addressing the diverse housing demands across the different segments of growing urban population, PMAY-U offers a bouquet of options to those seeking housing assistance. These options are In - situ Slum Redevelopment (ISSR) for construction of houses for eligible slum dwellers on the land under the slums, Affordable Housing in Partnership (AHP) which extends central assistance for Economically Weaker Section (EWS) housing projects done by states, through its agencies or in partnership with the private sector, Beneficiary-led Construction (BLC) where financial assistance is provided to EWS households for construction of houses on beneficiary owned land or enhancing the existing houses and lastly, Credit-Linked Subsidy Scheme (CLSS) for providing interest subsidy on home loan to EWS/ Low Income Group (LIG)/ Middle Income Group (MIG) beneficiaries for purchase/ construction/ enhancement of a house.

Among the various verticals of the Scheme, BLC vertical has been the most popular as it accounts for more than 60% of the houses sanctioned under PMAY-U. Through its robust demand - driven flexible design, BLC scheme has contributed in revitalising the urban landscape of cities through widely dispersed construction of houses, as against clusters of multi - storeyed houses constructed by the previous scheme Jawaharlal Nehru National Urban Renewal Mission (JnNURM). Being a bottom-up initiative, BLC scheme has a greater coverage, scale, inclusivity and outreach, and it successfully addresses the concerns observed with the earlier top-down housing initiatives. This chapter elaborates on the demand - driven design of BLC vertical of PMAY-U, which underlines a change from spatial planning approach adopted by earlier housing schemes to an organic 'self-organising' city approach.

Evolutionary urbanism vs. Hard-wired design

The debate around hard-wired urban design versus evolutionary organic urbanism is prevalent in countries across the globe (Portugali (2000), Alfasi and Portugali (2007); Andersson and Moroni (2014), Moroni (2015), Buitelaar et al. (2014), Buitelaar et al. (2018)). A spatial planning strategy relies on a top-down approach of governance by providing cookie cutter solutions to the beneficiaries. On the contrary, cities developed with organic urbanism adopt a bottom-up approach which results in a more sustainable and resilient outcome, in congruence with people's demands and requirements, unlike in traditional planning framework (Urhahn Urban Design (2010), Buitelaar et.al.(2014)). Traditional urban planning practices are rather based on rigid rules and long bureaucratic procedures, and may completely miss out on the unique needs, priorities and preferences of the target beneficiaries, resulting in sub-optimal outcomes (Twersky et al. (2013),

Adams et al. (2002), Samsura et al. (2010)). This is often seen when constructed houses under the traditional urban planning schemes are left vacant or in delinquent condition. Notable urban activist Jane Jacobs in her seminal work 'The Death and Life of Great American Cities' (1961) also counters the orthodox city planning and rebuilding approach and infers that the outcomes of Government planned housing projects have been poor and they seldom aid the cities around them.

Urban housing schemes: A drift from 'top-down' approach towards 'bottom-up' approach

It is noteworthy that the previous housing programmes like Basic Services to Urban Poor (BSUP) under JnNURM were based on principles of traditional top-down planning approach where housing projects were decided by the Urban Local Bodies (ULBs) according to the City plan- 'Every city under the mission was expected to formulate a City Development Plan (CDP) as per their policies, and financing plans. Based on the CDP, housing projects were identified; and the ULBs prepared DPRs for undertaking the projects in the identified spheres.' However, the present scheme of BLC under PMAY-U is a drift away from the earlier planning strategy towards an evolutionary bottom-up approach where ULBs prepare a city-wide housing project on the basis of the demand of housing submitted by the beneficiaries – 'Beneficiaries desirous of availing assistance for construction/ extension of house are required to approach the ULBs with the land ownership documents and a building plan. Upon validation of individual applications, ULBs prepare an integrated city-wide housing project in accordance with the city development plan and demand assessment for housing.'

The demand - driven nature of BLC vertical under PMAY-U is supported by an exhaustive coverage of all statutory towns as per Census 2011 (and towns notified subsequently), where all eligible families/ beneficiaries with a housing demand (and their own land), have been brought under the ambit of the Scheme. BSUP programme under JnNURM, on the other hand, targeted construction of merely 1.2 million houses in selected 65 mission cities. Thus, the implementation of PMAY-U is seen to be at a scale much larger than all the previous urban poor housing schemes, both in terms of investment and the number of beneficiaries. The total investment in the projects under PMAY-U during 2015 to 2022 has been ₹8.31 trillion, which is nearly 22 times higher than the investment in projects under JnNURM and RAY (2004 to 2014). In terms of beneficiary households, nearly 10.2 million houses have been grounded for construction during 2015- 2022, which is 12 times higher than the number of houses grounded during the period 2004- 2014. Out of these, the construction and delivery for 6.2 million houses has already been completed.

JNNURM and RAY: Sub-optimal outcomes in top-down approach

Despite the implementation of BSUP (JnNURM) programme in selective cities, the scheme was plagued with higher inoccupancy rate resulting from undesirable location of houses (distant from their present residences and workplace), poor quality of construction,

BSUP at Jakkampudi Village in Vijayawada Municipal Corporation (Phase-I) in Vijayawada under JnNURM in Andhra Pradesh

BSUP scheme at Thiruvananthapuram, Phase-III under JnNURM in Kerala

and inadequate availability of supporting infrastructure and living conditions (CAG Report on performance of JnNURM, 2012). Towards the completion of JnNURM (extended till 2017), around 224 thousand houses constructed under JnNURM all over the country were unoccupied. The mismatch between demand and supply of urban housing stock can be inferred from the high rate of inoccupancy[1] observed for the constructed houses in spite of housing shortage of 18.7 million estimated by the Technical Group on Urban Housing

Basic services to urban poor at Ranchi, Jharkhand under JnNURM in Jharkhand

Rehabilitation of Slum Dwellers at Durgapur in Asansol Urban Area under JnNURM in West Bengal

Photo 14: Multi- storied standardised houses constructed under BSUP (JnNURM)

[1] Census 2011 reported 10.1 per cent of the urban houses to be vacant.

Shortage – 2012. Since the emphasis of the scheme was largely on multi-storeyed standardised houses constructed on government land, the scheme ignored the choices and needs of the beneficiaries. In many cases, the houses were constructed on the periphery of the city, making daily commute for job into the city difficult for the beneficiaries[2]. Thus, relocation of the urban poor to the city - periphery resulted in reduction in their livelihood opportunities, severed their cultural and social ties to the city and raised issues relating to their social security. This led to a huge disincentive and reluctance in the beneficiaries to occupy the constructed houses under JnNURM. In fact, as on February 2021, 105 thousand dwelling units constructed under JnNURM were still unoccupied. As part of the special efforts being undertaken to encourage their occupancy, these houses are being rented out to migrant workers in cities under Affordable Rental Housing Complexes (ARHCs) initiative.

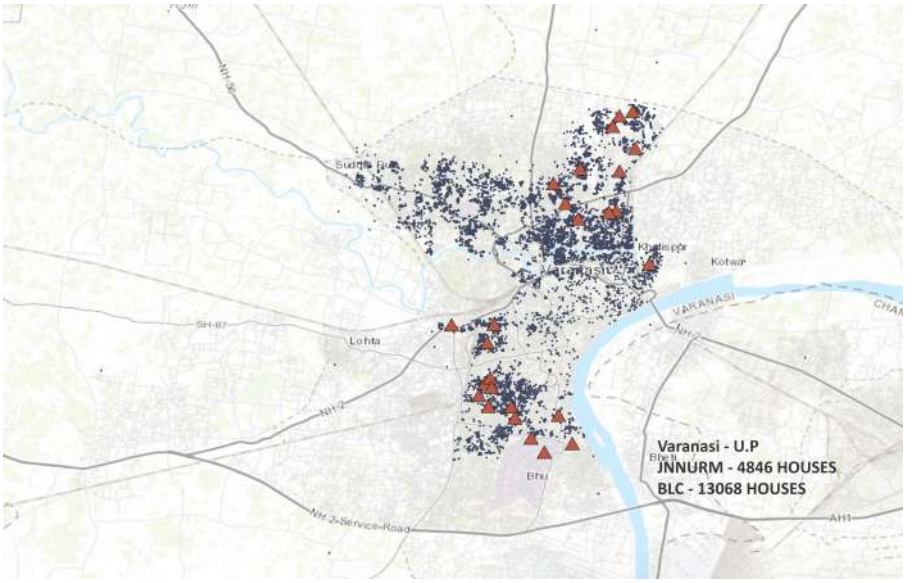
BLC PMAY-U: An Experiment in Evolutionary Organic Urbanism

In stark contrast to the erstwhile housing schemes, BLC under PMAY-U gives the beneficiaries freedom to decide the location, quality of construction and design of the house, thereby increasing their level of satisfaction. Especially the freedom to choose their desired location, in proximity to the beneficiaries' existing residence, social community networks, work place or any other place of preference (where the individual owns land), enhances beneficiary welfare and is a key parameter influencing the outcome of the Scheme. Since the Scheme entails demand- driven construction on beneficiaries' own land, the issues related to inoccupancy do not arise. The evolutionary organic approach of BLC has therefore, led to widely dispersed construction of houses within the cities, as per the beneficiaries' preferences and availability of land. Maps 1 to 5 depict spatial distribution of houses constructed under BLC (marked in blue) and those under JnNURM (marked in red) across the sample of five cities, Varanasi, Raipur, Chennai, Agartala and Imphal. As may be seen from these maps, BLC houses are more dispersed all over the cities, relative to the JnNURM houses, which are concentrated as few clusters of multi-storeyed houses (each marking represents a project of multiple hundreds of JnNURM houses). Wide dispersion of newly constructed/ extended BLC houses all across the length and breadth of the cities has contributed to urbanisation of the city as a whole and transformed the urban landscape of the city.

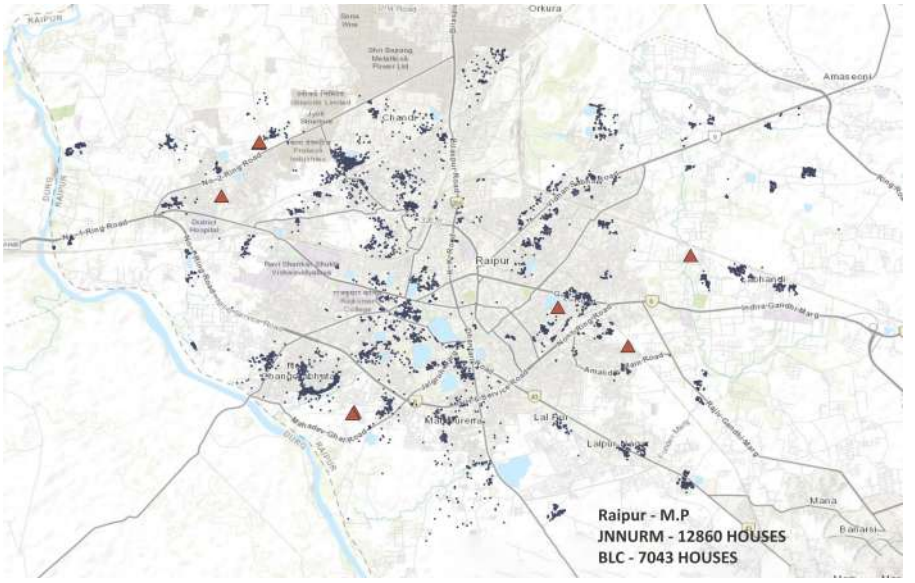
Development of city neighbourhoods

Several support infrastructure schemes of various Central ministries have been converged with PMAY-U to ensure availability of basic amenities to the urban poor beneficiaries. The houses constructed under PMAY-U are provided with a toilet, alongwith access to water and electricity. Under the umbrella of Angikaar several PMAY-U beneficiaries have acquired gas connection under Pradhan Mantri Ujjwala Yojana, LED lights under Ujala Yojana. Provision of basic services for each household leads to an enhancement in the living

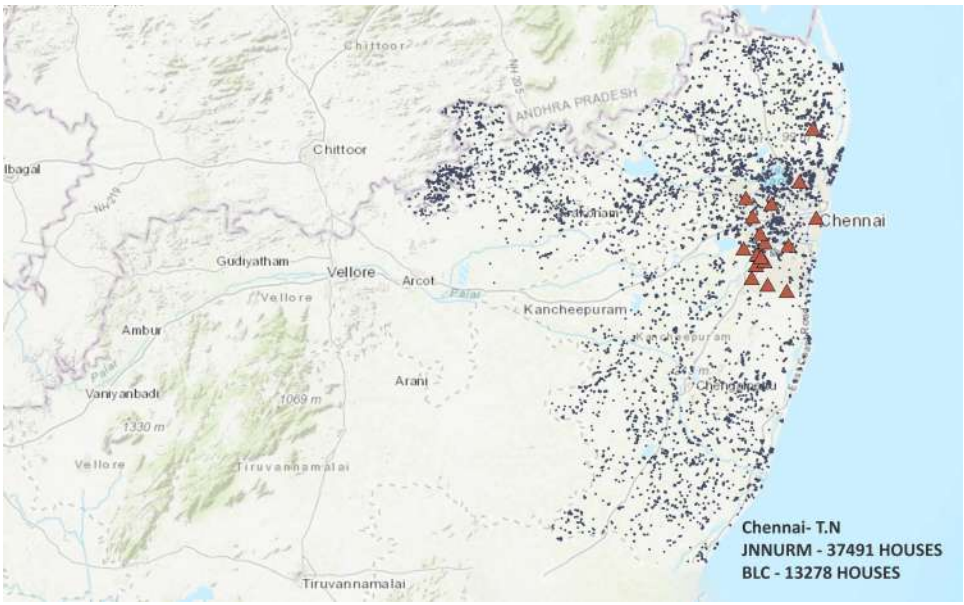
[2] Lok Sabha Starred Question no. 256* answered on May 11, 2016



Map 1: Varanasi, Uttar Pradesh- 22,654 BLC houses have been sanctioned, 17,434 have been grounded and construction of 11,535 BLC houses has been completed.



Map 2: Raipur, Chhattisgarh- 11,239 BLC houses have been sanctioned, 7,756 have been grounded and construction of 4,717 BLC houses has been completed.



Map 3: Chennai, Tamil Nadu- 24,598 BLC houses have been sanctioned, 21,133 have been grounded and construction of 12,477 BLC houses has been completed.

conditions of the beneficiaries, resulting in better management of common areas and open spaces. This would also invariably steer development of a complete range of economic activities and livelihood opportunities, leading to development of the neighbourhoods.

Moreover, construction of an independent house on one's own land empowers the individual with a sense of ownership and responsibility which was missing in the earlier schemes. This is a key element for integration of urban poor into the city, as it enables them to get better access to physical and social infrastructure, and maintain social connect with the city community.

Photo 15: PMAY-U Beneficiary : Alirajpur, Indore (Madhya Pradesh)

Photo 16: PMAY-U Beneficiary : Kalavad, Jamnagar (Gujarat)

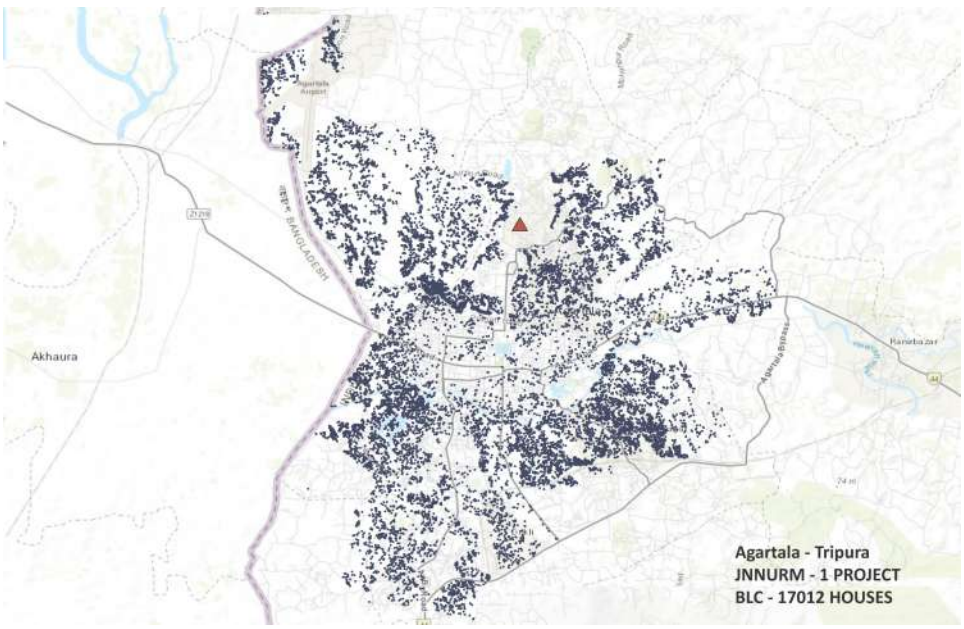
Photo 17: PMAY-U Beneficiary : Pakur, Jharkhand

Photo 18: PMAY-U Beneficiary : Krishna district, Andhra Pradesh

Photo 19: PMAY-U Beneficiary : Chitradurga, Karnataka

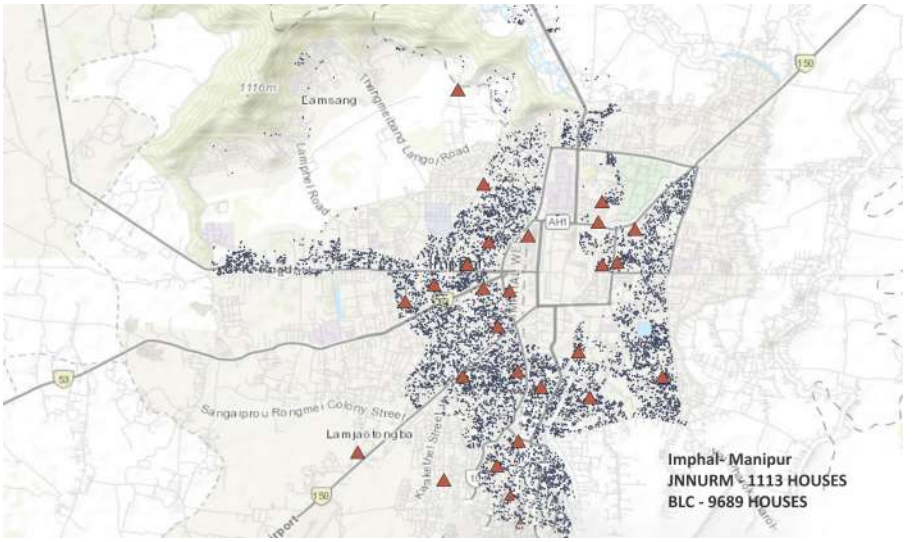
Transforming urban landscape of North-East India

A striking achievement of PMAY-U has been its successful implementation in the North-East, due to its demand-driven approach. The inherent flexibility in the design of BLC component of PMAY-U provides a scope to address special housing needs of North Eastern region. Resilience of houses to seismic activity, maintaining vernacular architecture of houses, climate specific construction on a difficult terrain, urban water and waste management and urban congestion are few of the housing issues prevalent in North-East states. These have been addressed by BLC Scheme through its' provision that decision regarding the location, design and construction material of the houses is taken by the beneficiaries as per their local needs and aspirations. As seen in Map 4 and 5, BLC houses (blue markings) are widely dispersed across the entire cities of Agartala and Imphal, in contrast to concentrated clusters of houses under JnNURM (red markings). This would play a key role in the inclusive development of NER through the development of city neighbourhoods, infrastructure and economic opportunities by various forward linkages. Agartala, in particular, has been a huge success story of PMAY-U with more than 16,000



Map 4: Agartala, Tripura- 35,009 BLC houses have been sanctioned, 22,477 have been grounded and construction of 16,240 BLC houses has been completed.

completed BLC houses and around 22,500 houses at various stages of construction.



Map 5: Imphal, Manipur- 13,715 BLC houses have been sanctioned, 9,654 have been grounded and construction of 156 BLC houses has been completed.

Photo 20: PMAY-U Beneficiary : West Kameng, Arunachal Pradesh

Photo 21: PMAY-U Beneficiary : Papum Pare District, Arunachal Pradesh

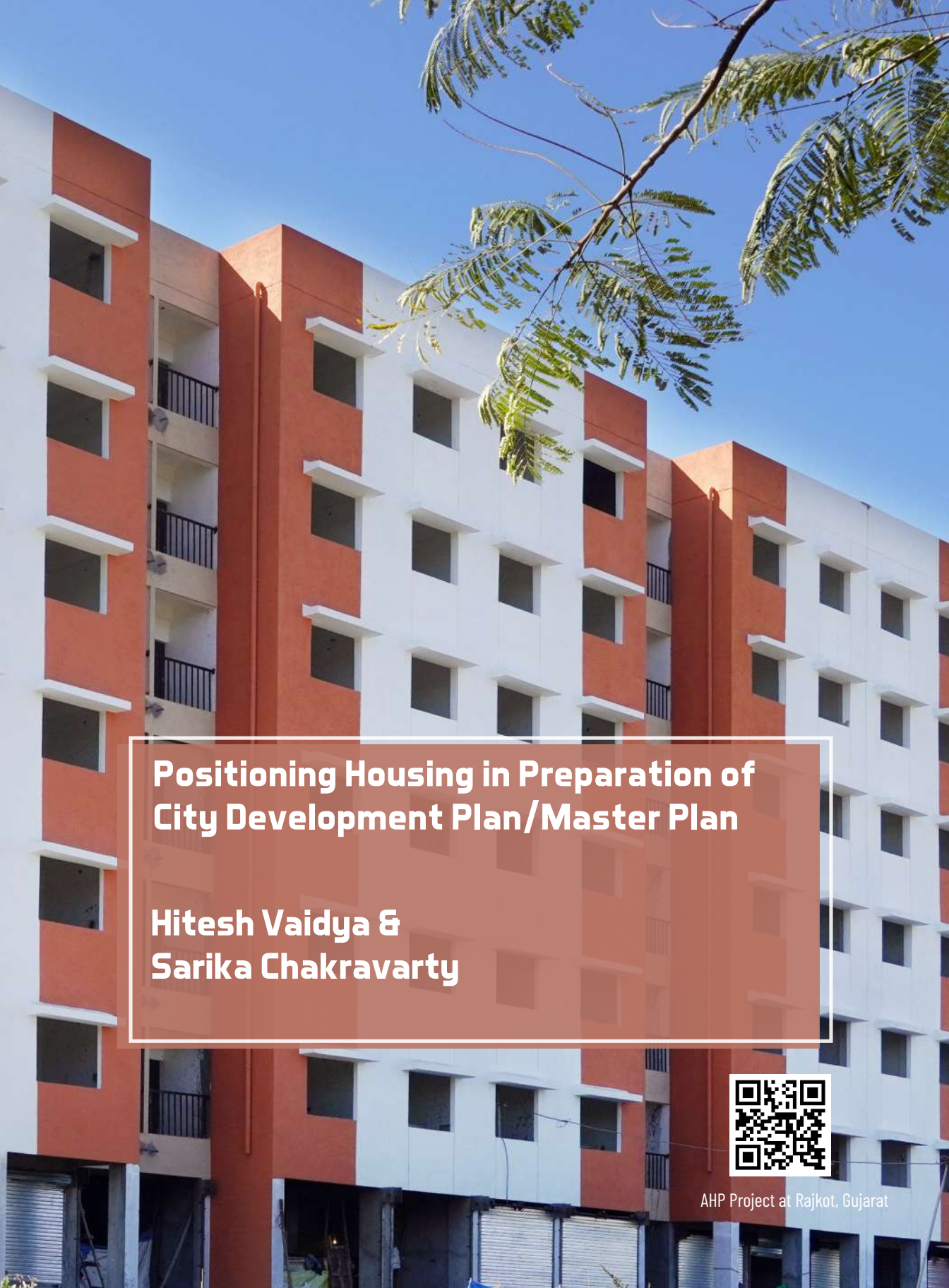
Photo 22: PMAY-U Beneficiary : Karbi Anglong, Assam

Conclusion

The erstwhile housing programmes (JnNURM/RAY), based on the principles of systematic urban planning design, were unable to cater to the heterogenous housing demand of urban poor, thus, accumulating a huge pool of vacant houses constructed under these schemes. The present Scheme PMAY-U has been a novel experiment done in the Indian housing sector, adopting a bottom-up organic demand approach for the development of houses for urban poor. Implementation of the Scheme over the past 7 years has offered some critical learnings. As seen in the maps presented in the chapter, demand for housing tends to be lot more dispersed than that projected by urban planners. Moreover, in a diverse country like India, offering standardised solutions for heterogenous housing needs leads to sub-optimal outcomes. As discovered from the experience of JnNURM, making people to relocate and occupy the standardised houses is very difficult. On the contrary, since the houses built under an organic approach like BLC, are the result of the needs and demands made by individuals, hence ensuring occupancy of these houses is not a concern. Therefore, the success of PMAY-U paves way for a possible shift in the urban policy design to ensure direct participation of the beneficiaries in the decision-making process.

Positioning Housing in Preparation of City Development Plan/Master Plan

Hitesh Vaidya &
Sarika Chakravarty



AHP Project at Rajkot, Gujarat

Background

A master plan is a long-term perspective plan that sets a vision for comprehensive development of a city as an economically and socially vibrant, inclusive, sustainable, and resilient urban area. It facilitates planned development of a city by assessing its present condition and providing a holistic framework for development through a set of policies, strategies, and regulations. In India, master plans are blueprints to coordinate urban development over 20 year periods, for the projected population. The elements commonly addressed in most plans are demographics, economy, housing, transportation, public services, environmental conditions, and existing land uses. Amongst its other obligations, matching the supply of housing with its demand has been the most daunting for most master plans, particularly concerning affordable housing supply. This can be attributed to the fact that with increasing urbanisation, demand for (affordable) housing is constantly increasing. Also, housing development and later its occupation needs to be in tandem with parallel development of land, infrastructure, transportation, and economic opportunities. The spatial co-relation between housing, job centres, health, and education infrastructure is critical to make the available housing stock occupiable. The master plans should, therefore, consider housing development not as solitary development but as strategically located self-sustained 'Complete Neighbourhoods', with equitable access to amenities, work, and recreational spaces essential for a good quality of life.

The policy for development of housing in a planned manner with specific targets and timelines within the city master plan could act as a major tool for influencing the efficiency and equity of urban areas, besides their direct role in provision of shelter. Housing industry (especially the Affordable Housing segment) also has a multiplier effect on the economy as it supports more than 250 ancillary and allied industries. This chapter focuses on existing limitations and recommendations for positioning housing at the centre of master planning and city planning policies for socio- economic development and sustainable future of cities. It is based on an inductive approach explaining housing and its relationship to population growth, migration, and informal sector, and concludes with major recommendations to integrate housing in the master plans, and national, state, and city-level planning strategies.

Milestones in Global and National Housing Agendas

"Access to decent, affordable housing is fundamental to the health and well-being of people and the smooth functioning of economies", is embedded in the United Nations Universal Declaration of Human Rights. Other milestones in the global housing agenda that acknowledge 'Housing for All' as the foundation for sustainable urban development include the Vancouver Declaration for Human Settlements (1976), the 'Global Shelter Strategy for the Year 2000' (1988), the Istanbul Declaration, and the Habitat Agenda (1996), and more recently the 'Global Housing Strategy' (2013).

The United Nations charter also identifies adequate housing as a fundamental human right, defining it as "the right to live somewhere in security, peace, and dignity" through the security of tenure, adequate conditions, protection against forced evictions, and access to affordable housing. Housing has also been explicitly articulated in Goal 11 of the Sustainable Development Goals (SDGs), "Make cities and human settlements inclusive, safe, resilient and sustainable" and is a key component of sustainable development across all of the goals. Good housing drives access to basic services, contributes towards inclusive growth, and supports the development of a sustainable future; directly impacting at least 14 of the SDGs. The New Urban Agenda (2016) reaffirms the objectives of SDGs in achieving sustainable cities and urbanisation.

Despite the well-intentioned global housing agendas, cities in developing and advanced economies alike, are struggling with the dual challenges of housing their poorest citizens and providing housing at a reasonable cost for low- and middle-income populations. Over 880 million people were living in slums in developing countries in 2015, up from 792 million in 2000 and 689 million in 1990. The housing challenge the world is facing today is likely to persist with six out of every ten people expected to reside in urban areas by 2030.

In India, as per Article 21 of the Constitution of India, 1950, "no person shall be deprived of his life or personal liberty except according to procedure established by law". To fulfil this commitment of the Constitution, 'access to housing' becomes a de facto fundamental right for 'protection of life and personal liberty of a person'. The National Urban Housing and Habitat Policy (NUHHP), 2007 identifies "Affordable Housing for All" as a key focus area and seeks to promote partnerships between public, private, and cooperative sectors to achieve its objectives of accelerated development of housing and creating adequate housing stock both on rental and ownership basis. It also aims at increasing the supply of land by facilitating accessibility to serviced land and affordable housing.

Housing at the Centre of Planning

Growing need to provide adequate housing to millions of households in urban areas can be attributed to the increasing level of urbanisation in India. During the decade 2001-11, urban population of India grew at a CAGR of 2.8%, increasing the urbanisation rate from 27.81% to 31.16%. Further increase in the level of urbanisation in India is predicted by National Commission on Population (NCP) (38.6% urbanisation by 2036) and the UN (India's urban population size will nearly double between 2018 and 2050, from 461 to 877 million). This population growth in urban areas would exacerbate housing shortage which was reported to be 18.78 million households in 2012 by the Technical Group (TG-12) on Urban Housing Shortage. A mammoth 96% of this shortage pertained to housing needs of the urban poor (EWS and LIG) and reiterated the need for increased affordable housing supply in urban areas.

The increase in urban population is predominantly due to natural population growth and in-migration from rural/ other areas due to better employment opportunities and access

to facilities/ activities, that the urban area offers. Inevitably, this results in increased demand for affordable housing (particularly in the rental segment). Formal housing mechanisms have failed to respond to this ever-increasing demand for affordable housing, not only for families from lower economic background but also for the demographic of students, young single working men and women, circular workers, etc.; leading to proliferation of unplanned settlements – unauthorised colonies (UCs) and slum/ JJ clusters.

The predicament of urban poor living in the unplanned settlements without tenure security and access to basic urban services, in conditions detrimental to the physical well-being of a person; has been the focus for policymakers, administrators, and urban managers which again came to the forefront during COVID-19 pandemic. The norms of hand washing and social distancing were impossible to follow in these settlements due to their inadequate infrastructure and high density. Insecurity of tenure finally manifested in the mass exodus of the urban poor from cities towards their respective villages. This brought to light the need for decent rental housing at an affordable rate near their work sites. In response to the housing need of urban migrants, the government has now renewed its commitment to providing housing for all and is now focussing on supplying affordable rental housing. However, synchronising housing supply with the pace of urbanisation and increasing the supply of typology – diverse and tenure – diverse affordable housing in urban areas, should be the basic premise of all housing policies and urban development frameworks in India and not just a kneejerk reaction to a pandemic. A multi- scale framework for sustainable policies, at macro (national), meso (region, city), and micro (neighbourhood) levels considering the economic, cultural, social, and environmental dimensions of housing is required to position housing at the centre of urban development frameworks.

Provisioning affordable housing supply in master plans

Housing supply in the urban areas would be through new housing development in the greenfield areas and regeneration of the brownfield areas. Land being a State subject (as per Article 246, Seventh Schedule of the Constitution of India), master plan is the statutory document responsible for allocation of land uses including that for affordable housing. With the intent of strategic planning, master plans should seek to achieve optimal utilisation of land and spatial efficiency by guiding higher housing growth (density allocation) in areas close to public transport, employment centres, etc. The approach for rehabilitating slums on tenable lands should be through in situ upgradation practices. This would have a definite advantage of maintaining the work-live association that the slum dwellers have with their present dwelling location. In addition to these, the following measures can be actioned by master plans through policies, strategies, and regulations to develop affordable housing and ensure the supply of housing matches with the demand profile.

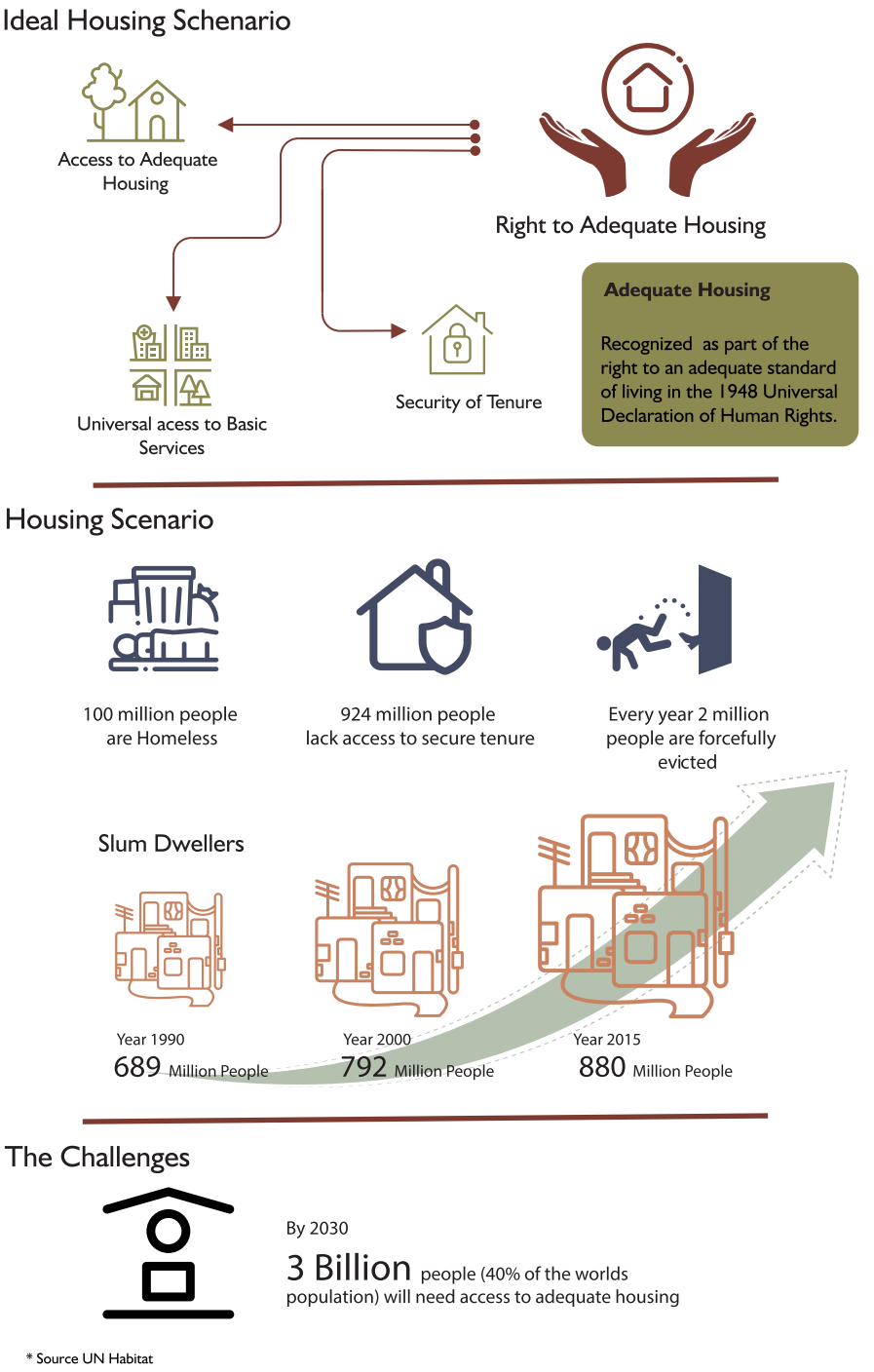


Figure 44: Global Housing Schenario

Redefining the Role of the Government

The National Housing and Habitat Policy (1998) rightly emphasised the need for the Government to create a facilitating environment for growth of housing activity rather than itself taking on the task of building houses. However, this shift in the role has not yet taken place and the Government/ public agencies continue to play the role of a provider. A paradigm shift in the housing supply scenario should be encouraged, with the private sector leading the development/ redevelopment of housing, while public agencies play the role of a 'facilitator' through policy and strategic interventions and largely focus on ensuring that a bulk of the housing supply caters to affordable housing needs of the economically weaker households. As a 'developer' of housing, public agencies should only construct affordable housing (both rental and ownership format) to safeguard the housing interest of the economically weaker households.

Setting up housing data observatories

All master plans must undertake measures to ensure data - driven demand - responsive supply of housing by setting up housing data observatories at city level. This would help develop an understanding of the demand profiles – number of affordable housing beneficiary households, household composition, income/ affordability, tenure preferences, tenure length, households with dependent persons with disability, etc. Demand surveys can be conducted to collate this information. Subject to the risk of limited digital penetration, e-platforms may also be set up for the beneficiaries to register themselves and express their housing need. The e-platforms can also be used to disseminate details about the available housing stock in the city. The housing data observatories can also include information on locations of employment centres, public transport nodes, etc., and a precise inventory of existing housing stock and planned new supply, including prices.

Promoting rental housing for the urban poor

Most large metropolitan cities across the world maintain a large and diversified rental housing stock providing residents and migrants with housing that is affordable (low entry and exit cost), offers tenure flexibility and geographical mobility. With high cost of land and construction in urban areas, buying a house is generally beyond the means of most urban migrants. Satiating the demand for rental housing (market - rate or subsidised) through the formal housing supply mechanisms is therefore required. This would also curb the growth of unplanned settlements in an urban area.

Rental housing supply in an urban area should be diverse in its typology. Based on demand profiling, rental housing can be provided in form of either dormitory units for single-member households or dwelling units for occupation by family households. Flexibility in the size of rental housing can also be promoted by construction of 'Expandable Homes'. In many global cities like London, the size of an affordable housing unit is based on 'per capita habitable floor space' – bigger the household size, bigger is the size of the dwelling unit

allotted to the beneficiary household. Expandable housing units would enable this provision by ensuring congestion – free dwelling units that provide a good quality of life for the inhabitants as the family size grows. Rent of such units can be based on the carpet area.

In order to increase the supply of rental housing in urban areas, the States should adopt the Model Tenancy Act, 2020 to balance the tenant - landlord rights and ensure fast track dispute redressal. This would greatly enhance the rental housing market by creating an enabling, accountable and transparent environment for renting premises, and encourage more private properties (including vacant properties in the city) to enter the rental market.

The master plan could also mandate that all unsold public housing inventory should be let out on a rental or rent-to-own basis. The tenure lengths of affordable housing should be flexible. However, an upper limit could be fixed on the maximum tenure length, giving the beneficiaries adequate time to climb the housing ladder and avail the housing options available in the open market.

For privately-owned vacant houses, a higher property tax could be levied on them to encourage their occupancy. For example, in Paris when the vacant stock reached around 7.5% of the residential stock, the city council proposed to increase council tax rates from 20% to 60% on rentable values on vacant properties. On similar lines, in Vancouver when vacancy rates reached 6.5% of the total housing stock, the government introduced a vacant house tax. London also charges premium tax for empty homes. In addition to this, the city also has a 'buy to leave' policy wherein a dedicated fund was created to buy-back unoccupied houses in prime location from the owners.

Allocating public land for affordable rental housing development

Land cost is prohibitive to development of affordable housing in urban areas. In metropolitan cities such as Delhi, land cost accounts for 70%- 80% of the total project cost. With high prices of land within the city, low-income housing projects are being developed at 'leapfrogged locations', which offer land parcels at suitable price points for such developments. The leapfrogged locations are generally located in the peripheral areas of the city, threaten to sever the ties of beneficiary household and their location of work, leading to rejection of such projects. An Affordable Housing project should be located within a reasonable distance of work places and be connected adequately by public transport. Master plans can identify strategically located idle land parcels owned by public agencies for construction of affordable rental houses. Instruments like Transferable Development Rights (TDR), additional development rights, etc., can also utilised for incentivising development of affordable rental housing on private land.

Technology deployment for time-bound housing delivery

For improving productivity and efficiency in construction, innovative technologies and speedier construction techniques should be utilised. Environment-friendly construction activity can be ensured by using sustainable building materials and techniques for

construction activity. The master plan incentive use of such technologies by way of permitting additional built-up area, waiving of certain charges, etc.

Other strategies to support Affordable Housing supply

Making housing credit accessible to urban poor who are employed by the informal sector of economy is a challenge that is beyond the scope of a master plan. Banks and traditional housing finance companies are averse to providing credit to low-income customers due to absence of requisite documents, collateral to mortgage as well as prior credit history. This calls for concerted efforts for financial innovation to design products that understand the financial reality of the urban poor and the risk of default involved thereof, and, in turn, make lending to such sections viable.

In order to guide construction of houses that are adequate in terms of privacy, space, security, lighting and ventilation, basic infrastructure, etc., technical guidance can be provided by Urban Local Bodies (ULBs) for model houses on various plot sizes.

Conclusion

Master planning policies should be geared towards progressive realisation of the right to adequate housing for all and align themselves with global obligations such as the SDGs. Provision of housing that caters to the diverse housing needs of all economic classes, should be the central theme for all urban planning frameworks such as master plans and development plans. Housing development should be holistic in nature and well- supported by the development of land, infrastructure, transport, and economic opportunities. Housing should be orchestrated with urban planning strategies proposed for development of the city such as extension, infill, in – situ upgrading, and regeneration, to ensure optimum utilisation of the underlying land.

Land cost is a major deterrent in the supply of affordable housing in urban areas. Since master plans are land- based plans, spatial efficiency in locating affordable housing near work centres, transit nodes, etc., should be achieved by utilising vacant public lands near such locations. The tenure format of affordable housing should focus on the supply of both ownership and rental housing. However, rental housing is felt to be best suited for the housing needs of circular workers and migrants. An enabling institutional framework would also be critical for making affordable housing sustainable in urban areas.

SDG Goals and Public Interventions in Housing: A Global Perspective

Partha Mukhopadhyay

Kaveri M Kumbar & Family besides their BLC House at Davanagere, Karnataka

Introduction

How can better housing help to achieve Sustainable Development Goals (SDGs) and what role does public policy have in facilitating this process? Beyond a physical unit, a house needs to be looked at with respect to its condition, the extent of services provision, and its location vis-à-vis education, health facilities and work opportunity. This is collectively called 'housing' in this chapter. The core argument in this chapter is that the nature of support for housing provision can substantially affect its ability to meet broader SDGs. Providing a slum resident with a palace in the middle of a desert will not advance SDGs.

SDGs and Housing

The role of housing, i.e., the living environment, in combating COVID 19 has been made amply clear over the past year. In particular, the link between SDGs and housing goes beyond target 11.1, i.e., 'ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums'. Housing has a role to play in addressing multiple SDGs, as illustrated in Table 1.

Goal	Linkage to Housing
Goal No 1:No Poverty	The link to these three goals is through the impact of access to livelihoods. Non-availability and/or poor location of housing may lead to exclusion from remunerative employment or livelihood. Conversely, it can also enhance productive livelihoods and make the transition out of poverty secure.
Goal No 2:Zero Hunger	
Goal No 8:Decent Work & Economic Growth	
Goal No 4:Quality Education	Education is a key contributor to social and economic mobility and the location of housing can determine the quality of schooling that a young person will receive. The nature of home and community environment also affects the demand for further education.
Goal No 3:Good Health and Well-being	The presence of clean water and sanitation in one's house and neighbourhood is an integral contributor to good health and well-being, which in turn prevents loss in income from negative health shocks.
Goal No 6:Clean Water and Sanitation	
Goal No 5:Gender Equality	Poorly located and serviced housing disproportionately increases the burden on women and girl children, who will be tasked with ensuring availability of water or forced to drop out of school, if it is located far away, or care for a family member, who is ill due to poor quality water.
Goal No 7:Affordable and Clean Energy	A shift from peripheral high-rise to neighbourhood improvement can reduce embedded energy in construction as well as reduced transport energy demand. Cleaner energy for lighting (e.g., LED lamps), cooling, e.g., energy efficient fans, or heating and rooftop solar energy and water heaters can all be retrofitted to reduce energy use. Piped gas for cooking is easier in neighbourhood improvements.
Goal No 13:Climate Action	
Goal No 10:Reducing Inequality	Affordable Housing options can reduce spatial inequality, raise income growth among the poor and encourage productive migration.
Goal No 16:Peace, Justice and Strong Institutions	Good housing can foster strong stable communities that help to organise and claim legitimate citizen rights.

Table1: How is Housing linked to SDGs beyond SDG 11 (Source: Author Analysis)

Linkages to Life Outcomes

In addition to the above links to life outcomes via SDGs, it is also important to consider two other roles that housing plays in providing access to a city of opportunity and in ensuring a supportive community. These are:

a) Is housing affordable in a city that is economically vibrant, or does the vibrancy and concomitant urban planning and public intervention (or lack thereof) make it too expensive for those who work in it (Florida 2017)? This is not just a possibility, rather it is a common reality for major urban economic centres, resulting in peripheralisation, as people spend more time commuting to reduce housing costs, paying in time instead of money.

b) Do city neighbourhoods reinforce behaviour linked to upward mobility, e.g., attending school and/or looking for employment?

Global Perspective

To what extent do public interventions in housing in different countries meet the above objectives? Research specifically focused on the SDG impact of different types of housing interventions, across contexts, is limited and thus one has to glean these effects from case studies of specific projects and by linking household impact to possible progress towards (or away from) SDG goals. For this, it is useful to group interventions into new housing, rental support and neighbourhood improvement.

New housing – Large apartment blocks

Post-war, in what are now Organisation for Economic Co-operation and Development (OECD) countries, the standard housing intervention was to build large apartment blocks concentrating the poor in particular locations, Cabrini Green in Chicago being an iconic example. Oddly, this reproduced the 19th century tenement buildings (since reformed due to their unsanitary conditions) that housed a large number of immigrant workers and families. The French also built large apartment blocks in the banlieue, the suburbs of cities like Paris. Indeed, while Cabrini Green was situated near downtown Chicago, most such developments were on the periphery.

New housing – Low/ mid-rise

Countries like Brazil also moved people into new housing, but usually not high-rise tenements. Its programme, Minha Casa Minha Vida (MCMV), provides new housing and tries to make it affordable with a mix of direct subsidies and low-interest loans, etc., which vary by income. However, since these are located outside the city centre, in places that do not have municipal services, there is also the additional public cost of providing infrastructure

services and the private cost of commuting. In Rio de Janeiro, for example, 53% of the MCMV units between 2009 and 2013 were built in the West Zone, 50 kilometres from the city centre, an expensive and long (up to four hours) commute (Linke 2018, Magalhães 2016). These initiatives are thus unable to reach the poorest among the eligible.[1]

In South Africa too, the emphasis on "free-standing, individually owned units" has meant that though more than 3.5 million free homes were built since 1994, most are peripheral, not only making it difficult to access work, but also reinforcing historical divisions of racially segregated townships. People, thus, often trade improved houses for units closer to the centre that are lower quality, but more convenient.

New housing – Land

In other countries, like Colombia, instead of new houses, low cost serviced land is made available but again, the land is on the periphery with the same problems as above and the additional cost of construction, offset by the benefit of an expandable house in the future.

In India, all three have been being used. Lallubhai compound in Mumbai exemplifies peripheral tenement housing, as do Delhi's new resettlement houses in Narela, Bawana and Bapraula[2]. Many Pradhan Mantri Awas Yojana (PMAY) (and earlier JnNURM) schemes involve low/ mid-rise housing, especially in smaller cities. Finally, until recently, Delhi provided tiny plots of peripheral land as resettlement, as in Savda Ghevra[3].

In these international examples of housing interventions, services were provided to greater or lesser degree, but peripheral locations limited their effectiveness. This tyranny of the periphery is well documented in Williams, et. al. (2021). The same is true for other Indian examples too. As for neighbourhoods, most of the large apartment block housing for the poor in the United States (US) and the banlieues of Paris have not turned out localities of mobility. This is also true of many Indian projects, with the possible exception of older sites and services projects in Mumbai and Chennai (Owens, et. al. 2018).

Rental support

Once the limitation of large public housing projects was realised, policy shifted to rental support, which allows families to rent in their chosen area, subject to affordability. In the US, this is implemented through Section 8 vouchers. Rental support leverages the city to

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[1] *Within the MCMV programme release also, there is also the possibility of self-help cooperatives, but this is used in a relatively small number of projects (Osborn 2013).*

[2] *Lallubhai compound is a resettlement development with about 70 buildings and over 9,000 tenement apartments, typically about 25 square metres each.*

[3] *These are only 16 square metres in size. Older resettlement areas like Jahangirpuri have more reasonably sized sites and basic services, but new sites are unviable, with limited services.*

provide housing, instead of just houses. This has three major benefits, viz. (a) it disperses poorer families throughout the city and therefore hopefully helps in integration, (b) it locates them in a community that supports upward mobility and (c) it uses the existing housing stock of the city. Rental support is not widely used in developing countries. In South Africa, where there is limited use, even though the rents are income linked, "inflation and rising utility costs make them increasingly unaffordable to poor households, heightening the risk of evictions" (Salenson et. al. 2021, emphasis added).

Raj Chetty, and his colleagues in the opportunity insights team have analysed in granular detail (https://opportunityinsights.org/) how people who grow up in different parts of the same city can have very disparate life outcomes, even when otherwise comparable, ab initio. This recent research has reinforced the change in US housing policy towards rental support[4].They find that the variation across neighbourhoods within cities is often more than the variation across cities[5]. In the United Kingdom too, recent work (Gibb, et. al. 2020) shows that many areas are clustered away from employment hubs and residents cannot find jobs without social networks[6] or affordable public transport and adequate access to child care. The COVID 19 pandemic has exacerbated these problems, indicating the need for adequate funding and authority to local governments to execute customised programmes for such areas. Another finding is that people may not choose high opportunity neighbourhoods, partly due to the lack of information and partly because they may be socially intimidated, in the same way that a villager may be uncomfortable walking into a large corporate hospital. To address this, Seattle, a metropolis in western US, is counselling section 8 voucher recipients and it appears to be increasing moves to neighbourhoods that are likely to be high opportunity (Capps 2019).

In India, though research on the issue has been limited, it does appear that residents in disadvantaged locations have poorer life outcomes. Krishna (2017) finds that Bengaluru's slums restrict mobility, with success defined by government employment in clerical positions or sales persons in the private sector and very few in the high-end service sector. More broadly, while urban residents do have better upward mobility prospects, these are still

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[4] *See https://www.huduser.gov/portal/investing_people.html*

[5] *This is not just in terms of income but also with respect to other measurable parameters, such as the proportion attending college, the share of persons who have experienced incarceration, etc. They find that on average "a child from a low-income family raised in San Jose or Salt Lake City has a much greater chance of reaching the top than a low-income child raised in Baltimore or Charlotte. However, there are neighbourhoods within Baltimore and Charlotte that have higher rates of upward mobility than the average neighbourhood in San Jose or Salt Lake City" (emphasis added). These and other findings can be found in their publications listed at https://opportunityinsights.org/paper-category/neighborhoods/*

[6] *The predominance of people who lack educational and digital skills in some neighbourhoods diminishes the confidence of others to face the job market, i.e., community networks are unable to mutually support job searches.*

poor and ever present risks of downward mobility leads to a precarious existence, especially for the historically disadvantaged castes (Iversen, et. al. 2016).

However, if housing supply lags demand in a city (more common in countries like India than in the OECD countries), low investment in new housing might exacerbate the shortage, unless the rental support also generates new housing supply. Thus, in India, rather than rental support, the approach to rental housing involves new purpose-built facilities for renting. But this strategy runs the risk of replicating the spatial inequities inherent in the peripheralisation that characterises new housing.

Neighbourhood Improvement

Instead of facilitating individuals to move out of neighbourhoods, developing countries often try and improve neighbourhoods by providing better infrastructure and expanding access to social services such as health and education, through awareness building and conditional cash transfer initiatives[7].

In Brazil, the Programa de Aceleração do Crescimento (PAC) Favela, or growth acceleration programme in favelas, is similar to erstwhile programmes around environmental improvement (upgrading) of slums in India, but at a much larger scale. In South Africa, old townships such as Soweto have seen both improved incomes and infrastructure services, they still remain considerably under serviced compared to the rest of the city, and one fifth of those in large metros areas live in precarious accommodation[8]. However, even with substantial investment, it is possible that there may be sub-optimal choice of projects (e.g., the cable car in Rio) because of insufficient consultation with the community (Magalhães 2016). In Asia, a much cited example of neighbourhood improvement is the Kampung Improvement Plan (KIP) in Indonesia[9]. It was especially successful in Surabaya, Indonesia's second largest metropolitan area, where it was implemented with a high degree of local participation. Over 1976-90, the total cost of the KIP in Surabaya was USD 40 million, of which USD 13.5 million was contributed by roughly one million beneficiaries (Das 2008, 2015).

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[7] *In the US too, recognising that simply facilitating movement cannot be a widespread solution, programmes such as HOPE VI and Choice Neighbourhoods are trying to transform neighbourhoods with public housing projects into mixed neighbourhoods, but the results have been variable. It is unclear what kind of interventions can improve the neighbourhoods, though reducing the spatial concentration of poverty and enhancing school quality should help.*

[8] *There is also a process of formal titling but this is being done on a case by case basis and therefore can take a significant amount of time. See Robey (2020)*

[9] *Kampungs are low-rise, high-density neighbourhoods, roughly comparable to informal settlements and/or urban villages (it means a village (similar to desa), as opposed to kota, a city). The KIPs covered 200 cities in an effort to improve services like water, drainage, waste management, tree plantation, electricity and footpaths.*

However, the most extensive example of neighbourhood improvement to provide Affordable Housing is perhaps the organic, private-led transformation of 'urban villages' in China, especially in Guangdong Province. Du (2020) has analysed how this underpinned the iconic growth of Shenzhen.

One hurdle to improvement is that, because of historical reasons, informal settlements cannot conform to the standard town planning regulations of the city. To address this, Brazil created the Zone of Special Social Interest (ZEIS), which allows favelas so designated to be regulated according to a more flexible set of zoning rules, which facilitate upgradation. In principle, it is similar to the dispensation given, for example, to historical neighbourhoods in Europe, where density, street widths, etc., may be quite different from the modern city. In Surabaya too, the city introduced regulations to protect the kampungs (villages) and encourage mixed-use activity, providing a supportive environment for small business and home industry. China has adopted a policy of benign neglect for most urban villages, unfortunately only until such time as their land is needed for urban transformation (Smith 2014).

Lessons

This tour d'horizon shows that new housing interventions in large cities often end up on the periphery, making the city of opportunity more inaccessible. Moreover, poor neighbourhoods also have strong negative effects on life outcomes, affecting upward mobility. This is especially the case for neighbourhoods of concentrated poverty, such as resettlement colonies or public housing projects. In developed countries, the focus has thus shifted to offering rental support to enable households to afford neighbourhoods of opportunity. However, this approach is rare in developing countries, where, neighbourhood improvement, especially with community involvement, like the KIP in Surabaya, may be better suited, but examples of such interventions are sporadic.

This is especially important in countries like India, where the urban form is characterised by spatial intermixing of low income settlements, which means they already have some access to livelihoods, etc., but they lack basic services, an issue that has become even more pressing post the pandemic (see Box 1). Indeed, reflecting Rolnik, it has exposed "the limits of the current policies, programming linked to informal settlements… and outlines the urgent need to escape the trap of bracketing of informal settlements as an 'issue' within itself, delinked from the dynamic and ever-changing processes of urbanisation" (Bhide 2020). The global experience seems to suggest a focus on existing low income settlements in cities and improving their access to livelihoods, physical and social infrastructure and invest in social services so as to reinforce positive behaviour, such as seeking education and employment. In this context, it is useful to briefly consider India's housing interventions.

Box 1: COVID-19 and Informal Housing

Informal settlements are dense and lack adequate water and sanitation, making it difficult to adopt physical distancing and hand washing, two of the three non-pharmaceutical interventions (NPIs) recommended at the start of the pandemic. Further, residents, possibly with lower immunity due to poor nutrition and healthcare were likely to be highly susceptible to the virus, an issue with national implications, due to the virus' transmissibility. Informal livelihoods are also affected by the periodic urban lockdowns imposed to control the pandemic, negatively affecting progress towards SDGs.

Certain countries, like Argentina, used community quarantine, where no one was allowed to enter or leave, increasing the chance of infection within the slum, while Brazil temporarily resettled at-risk groups to government-managed facilities and also suspended MCMV mortgage payments. Many countries made arrangements for provision of hand washing stations as well as increased the supply of subsidised or free food (cooked and otherwise) to these communities (World Bank 2021).

Many cities in India saw both public and community responses to provide access to both cooked food and food grains, whose supply was expanded beyond those registered in the public distribution system. In Dharavi, the iconic slum of Mumbai, there was a spurt of cases early in the pandemic, but the local government responded with both treatment for those affected and widespread testing. The community leadership too worked in tandem with the state to limit the spread of the pandemic (Kaushal and Mahajan 2021). While surveys in Mumbai do find a high rate of infection in the slums, deaths have been relatively limited, possibly due to both the younger age profile of residents, as well as government interventions and actions of various CBOs active in these neighbourhoods.

Pradhan Mantri Awas Yojana (Urban) – Prime Minister's 'Housing for All' Scheme

The scale of Prime Minister's 'Housing for All' Scheme in India is unprecedented. More than 12.2 million houses have been approved and more than 6 million completed, and construction has started on the rest. The central government has spent USD 13 billion, with average support to the beneficiary varying between about USD 2,500 to about USD 3,200, depending on the method of support, of which there are four verticals. They are: (i) interest subsidy on commercial housing loans or CLSS given for about 2.4 million homes, (ii) ISSR, yielding about 433 thousand units, (iii) AHP, i.e., mixed developments with at least 35% of the units being offered to economically weaker households, that has produced over 2.09 million units and the core innovation of the Scheme, (iv) BLC, where the household is supported to build its own unit in situ (subject to satisfying land ownership/ possession requirements, which is less of an issue in secondary cities) that accounts for over 2.2 million of 5 million completed houses and nearly 7.3 of the 12.2 million approved houses. The proportion of BLC sanctions to total houses approved under all four verticals of the Scheme, by city size. While it is used less in the larger cities (In a third of the largest cities, the share of BLC is less than 10%), it is the preferred method in most other cities. In half the cities

between 300 thousand and 1 million, the share of BLC is over 60%, above 70% in over half the cities between 100 thousand and 300 thousand and it is over 80% in three-fourths of the cities below 100 thousand. The last two categories of cities, i.e., below 300 thousand, comprise nearly 72% (85%) of all (BLC) houses approved. BLC is an innovation from rural housing, enabling the household to build at its current location. It facilitates acquisition of an upgradable asset and does not displace the household, retaining its social network and access to livelihoods. Using convergence under initiatives like 'Angikaar' and innovative and comprehensive state specific initiatives such as 'JAGA' in Odisha (see Box 2), it is also possible to enhance services in these locations. Its limited use in some of the largest cities does, however, restrict its potential as a gateway to opportunity.

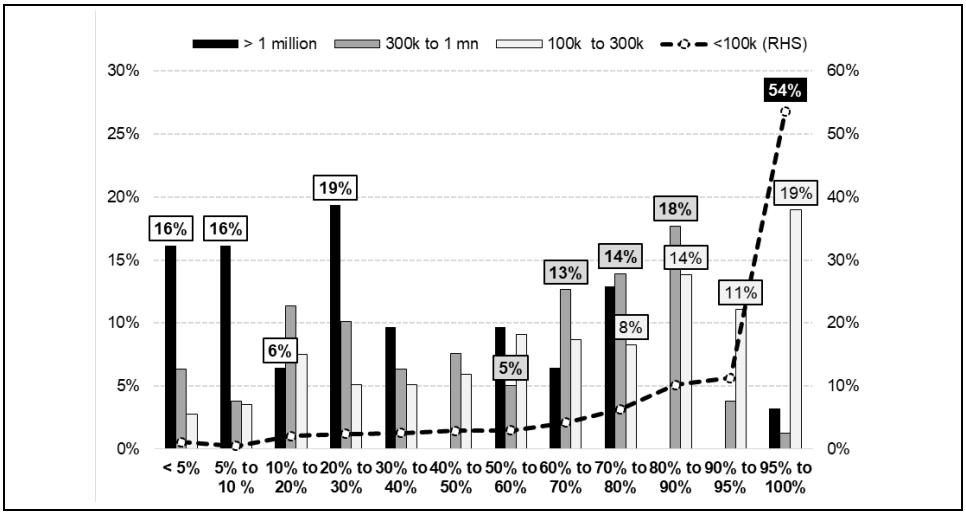


Figure 45: Distribution of share of Beneficiary Led Construction (BLC) by city size
Source: Author analysis based on data from Ministry of Housing and Urban Affairs

The other methods of intervention in PMAY-U are, however, not as innovative. The effect of CLSS is to improve the affordability of commercial home finance for the middle and lower middle income households, and it accounts for 13% and 24% of the USD 13 billion support respectively. AHP has the same shortcomings as that of public housing projects like MCMV, and while spatial segregation in India is not too high at the moment, AHP may increase it, especially in the larger cities where it is more prevalent. ISSR, while it preserves the location of houses and may improve services, provides a constricted non-upgradable house to the beneficiary, and thereby restricts upward mobility.

Box 2: Angikaar and JAGA – Houses to Housing

Angikaar is a campaign by Government of India, which builds on the 'Housing for All' Mission to enable families and communities to adapt to living in their new units through social behaviour change and create awareness on best practices in water and energy conservation, health, hygiene and sanitation. In addition, it seeks to converge benefits with various other missions and ministries. These include urban infrastructure through AMRUT, sanitation via SBM (Urban), and livelihoods using DAY-NULM, in addition to health insurance and childhood nutrition, solar electrification and electricity connections, use of LPG for cooking, water conservation, etc.

States too have their own novel initiatives. JAGA mission in Odisha is an excellent example of progressing from houses to housing. Odisha first took a policy decision to provide in situ land rights in 109 cities, in over 2000 informal settlements, with nearly 1,70,000 households. By March 2021, it had granted land rights to around 60,000 households, which allowed them to access support from PMAY(U), under the BLC method, to improve their houses. Concomitantly, the state government has started participatory slum upgradation, investing in street lighting, electricity, drainage, road, water toilets to improve service provision in these settlements. These projects are implemented by the local bodies through slum development associations, reminiscent of the KIP in Surabaya.

Source: Ministry of Housing and Urban Affairs (2020), Chakrabarty (2020), CUPG (2021)

Thus, the major and important gain from India's housing intervention may be in the use of BLC in secondary cities, which mitigates development of poorly serviced informal settlements, as such cities grow, thus ensuring that the mainstay of India's urban transformation would be cities without slums.

Sustainability and BLC

One underexploited opportunity of PMAY-U is making BLC construction more sustainable. At a systemic level, BLC is likely to be much more energy efficient than other options. First, it is well located and therefore reduces additional transport demand, compared to peripheral high-rise and even mid-rise developments. Second, the nature of building materials used reduces embedded energy demand. Third, energy in use for single unit designs is usually lower than high rise structures. However, this aspect could be further enhanced by supporting beneficiaries with design elements to increase resilience, longevity and liveability without cost increases, which has not been done extensively so far. Nevertheless, there is still substantial opportunity to intervene, e.g., in energy efficient

lighting such as in Rajkot (Khosla, et. al., 2019), retrofits such as reflective paints, insulated corrugated sheets, etc., and in the provision of basic infrastructure to these, often informal, neighbourhoods.[10]

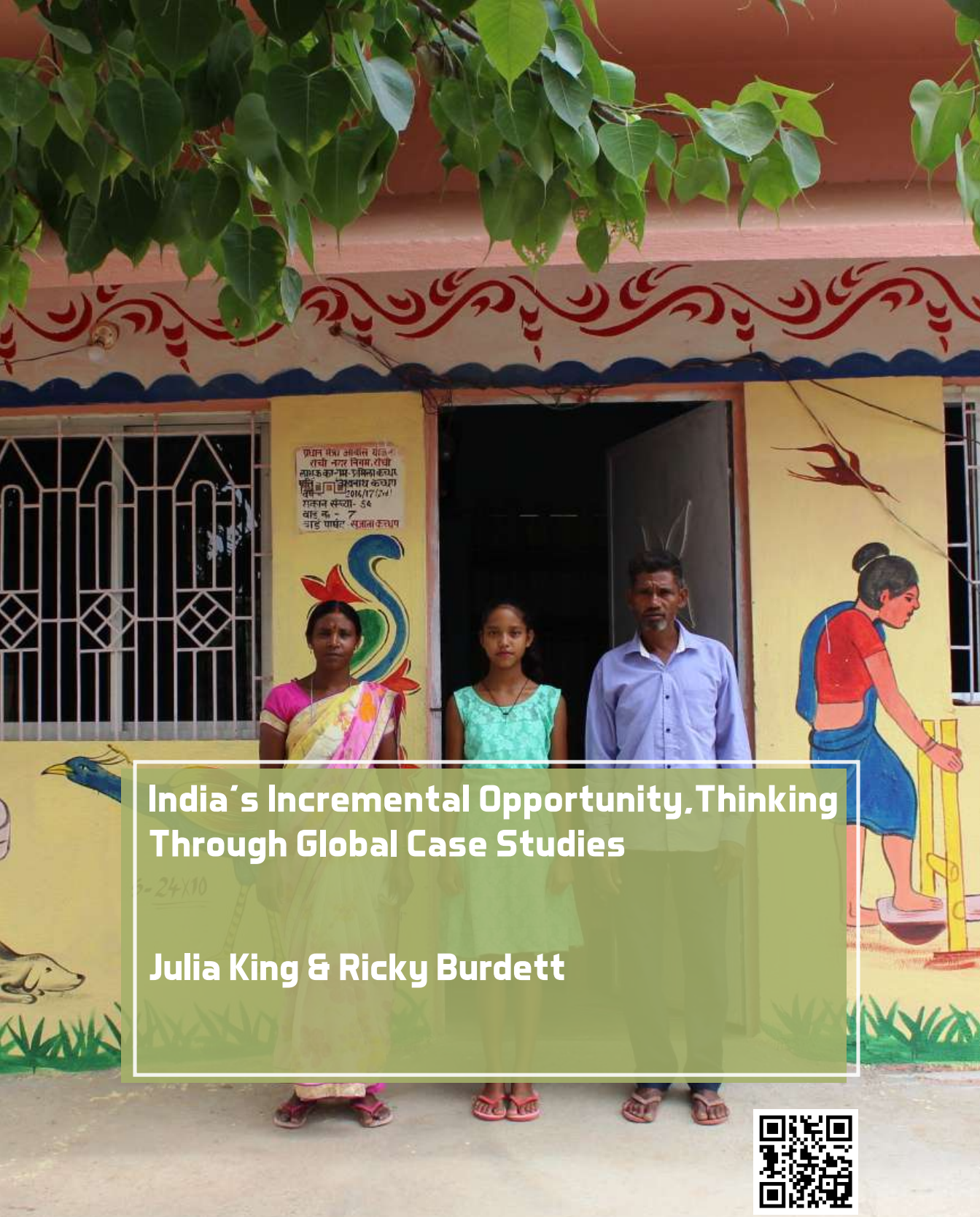
Conclusion

The learnings from global housing interventions emphasise the centrality of Affordable Housing, beyond the house in effecting positive changes in life outcomes. It is, therefore, necessary to intervene comprehensively, beyond the four walls and roof, by integrating basic services, social infrastructure and facilitating access to livelihoods; otherwise, the investment in houses alone will prove infructuous in helping to attain a number of SDGs[11]. One way of minimising the complementary investments in developing countries such as India is to invest in in situ improvement of the existing housing stock along with incremental investments in physical and social infrastructure. BLC method of PMAY-U Scheme is an excellent illustration of how this can be achieved, especially if it is converged with other support to co-ordinate neighbourhood-level improvement. It is also a method that allows the neighbourhood and household to upgrade as the community develops – an important consideration in a developing country. Expanding this method more widely to the largest cities in India would be the next step in expanding the access of cities of opportunity to all.

The author acknowledges the support of Sharonee Dasgupta, Sama Khan, Asaf Ali Lone and Mukta Naik and very helpful comments from the reviewers of this chapter.

[10] *There are several groups working on these issues such as sustainable low-cost building design, material choices, use of daylight, orientation, etc. These include Micro Home Solutions in Delhi, Urbz in Mumbai and CURE, which works on common decentralised services in Agra and Delhi. See, for example, Roychowdhury (2020).*

[11] *This area would benefit from more focused research, though these effects are only observed over a period of time.*



India's Incremental Opportunity, Thinking Through Global Case Studies

Julia King & Ricky Burdett

Pramila Kachhap & Family besides their BLC House at Ranchi, Jharkhand

The Urban Pull

India's rapid urbanisation, like many cities of the global south, is characterised by physical growth paralleled by, and accommodating for, an exponential population increase. This growth is predominantly driven by rural to urban migration motivated by an aspiration to gain access to the benefits of the city: education, healthcare, jobs, and housing. However, these migrants find it hard to make a claim, participate in, or fabricate new formal and informal institutions which would deliver the capacities required to obtain these benefits for themselves and their families. A large portion of these migrants begin city life in makeshift homes in unplanned slum clusters or by integrating into congested inner-city areas. Today, makeshift homes and neighbourhoods accommodate significant population of a few Indian cities. The result is an urbanism caught between basic subsistence, poverty at one end and global economies alongwith world class city narratives at the other. An urbanism which is simultaneously failing and succeeding, global and local, cosmopolitan and parochial. Many Indian cities hold all these prospects at the same time which is what makes them complex, diverse, and dynamic and a challenge for urban governments. This calls for new understanding of urban process, and the tools and instruments of urban governance, including those related to housing.

Photo 23: Unplanned slum clusters in Mumbai/ Source: Julia King © 2014

The Incremental Opportunity

Much of India's urban population lives and works in informal settlements. These settlements are often the cumulative result of small amounts of capital drawn from local economies to support a spectrum of housing types typically found in self-built, working class communities. Starting with precarious and temporary building materials such as bamboo and tarpaulin to more permanent structures through the addition of load bearing walls, roofs, foundations and even the incorporation of infrastructure these houses grow, incrementally, over time. Once the house can grow vertically, this enables space for income generating activities such as shops or rentals and finally, into a multi-storey home delivering a better, safer, healthier, and enriched living environment.

Figure 46: Savda Ghevra resettlement colony, New Delhi. Source: Julia King © 2011

Incremental development in this context is a move through three loose categorisation of housing types, common throughout India, but with local interpretations and references typically known as: 1. Kutcha: houses made with temporary building materials such as bamboo and tarpaulin; 2. Semi-pucca: houses with brick walls but corrugated tin roofs (cannot take loads); and 3. Pucca: houses made of reinforced concrete and load-bearing brick walls and roofs. However, the process of incremental change over time extends beyond the structure of a dwelling(s) to small scale everyday interventions such as external washing structures, soakaways for water management, borewells, ground water pumps, addition of water butts and containers, and platforms which often encroach into the public realm learning from the traditional otla (semi-private zone) structure and the consolidation of steps and ladders into staircases. This piecemeal, incremental mode of city making is not only the single largest generator of new affordable housing units globally but also a potential tool for governments to deliver housing in context of rapid change and scarce resources. It is estimated that between 20%- 70% of developing countries urban housing stock has been developed incrementally and the rural share is assumed to be even higher.

Photo 24:T Camp, New Delhi. Source: Julia King © 2016,17

The potential for incremental housing as a realistic, affordable, sustainable, and inclusive policy solution for delivering on India's housing needs is already recognised by the Government of India, PMAY-U is India's flagship affordable housing policy. More commonly referred to as the 'Housing for All' Mission, it is the largest attempt to deliver affordable housing at this scale in India and one of the largest globally. Unlike earlier 'one-size fits all' approach, PMAY-U is implemented through four methods or 'verticals'. Of these four verticals, with 60% of housing units, the most successful has been the 'Beneficiary-led Construction' which is in effect incremental housing. If incremental methods are going to dominate government housing action, it is imperative to make sure the right policies and capabilities are put in place to deliver climate-appropriate, resource-efficient, safe, healthy, comfortable, and affordable, especially for the urban poor. With this emergent policy in mind, the objective of this essay is to discuss how incremental housing has been used by communities and the state to drive. Affordable Housing globally, with an aim to offer insights which can inform, improve, and inspire incremental approaches to housing in the Indian context and elsewhere.

The word 'incrementalism' (also called gradualism) was first coined by Charles Lindblom in his article "The Science of 'Muddling Through'", and was used in policy and decision-making theory as a method of working using small (often unplanned) steps or changes. It was quickly picked up as a way of describing the built environment in the 1960s

when western architects started travelling abroad and documenting unplanned settlements. Most famous was John FC Turner, who based his ideas on the observation that in emerging or developing cities, rapid growth of the urban population had occurred faster than the formal housing market resulting in an incremental, informal and piecemeal, housing stock. Turner famously said he was 'de-schooled as an architect' when working in Peru in the 1960s. His study of housing focused on the process of home making as opposed to the end product, the house. During his time in Peruvian barriadas, the squatter settlements often on land occupied without titles and legal recourse, he saw the key role residents played in city and town making. Turner saw the occupation of land as resourceful rather than an urban problem and argued that enabling communities to build and develop locally was a solution for lower income groups housing needs. He identified this piecemeal, incremental housing as a process of building which is self-built or self-initiated and gradually extended and adapted by the inhabitants to suit their own requirements. Turner argued that this self-built process was more successful at meeting the demands of rapid urbanisation than the state or market. For Turner, incremental housing was affordable because it enabled households "to synchronise investment in buildings and community facilities with the rhythm of social and economic change".

Turner's work has often been understood as an anti-state position, given he was also an anarchist. In many ways the term 'self-built' in itself describes a failure of the system and/or market to deliver on housing. But for Turner it was the autonomy of individuals to build freely and without prejudice what mattered. He saw the role of the architect or planner as a mediator between the subsidiary role of the state and local productive action. During the 1970s, his self-help approach was adopted as a housing strategy by the World Bank and the United Nations which got rolled out around the world. Often called 'site and service' schemes, these were top-down initiatives where planned and serviced (or semi-serviced) housing plots were handed over to be locally administered and determined. This gained traction thanks to the work of Peruvian economist Hernando de Soto. He claimed that the main objective of tenure policies was to provide sufficient security of tenure to stimulate land development and housing construction. He even argued that to solve the housing crisis embodied in the burgeoning squatter settlements was to simply provide tenure which would be a sufficient incentive to trigger incrementalism in the form of housing investment by the residents themselves. This positive relationship between home ownership and investment is a central tenet of mainstream development economics. However, a counter-argument is that security of tenure in low-income housing settlements depends less on legal status and more on matters of perception by residents regarding the probability of eviction, the availability of services, and the passage of time. Research on informal housing in Brazil found that there was relatively little relationship between security of tenure and housing improvements. The research found that saving capacity, access to work, stable incomes and construction skills were as important to housing investment as secure tenure. This builds on an alternative position in development circles whereby the more "consolidated" constructions are in the absence of title deeds. This increases personal security, which translates into tenure security through a de facto presence. Here, supportive networks within the community are a key factor in developing an environment suitable for house upgrading.

Since Turner, it has been increasingly acknowledged that the term 'self-built' is misleading as housing is rarely literally built by the home owner or the resident but rather built by a network of local labourers. Urbanists Matias Echanove and Rahul Srivastava who operate out of Dharavi in Mumbai call it 'homegrown'. They articulate a process of incremental home-making that engages with a network of actors from local builders, labourers, artisans and masons, material suppliers, finance and even brokers. Often in these cases no formal plans or contracts are signed with the client relying on trust and reputation. Whilst many of these actors operate on the margins and work precariously, they cannot be dismissed as simply informal. These actors are central to the broad project of city-making and work across construction practices and planned and unplanned regimes.

It is important to recognise that incremental housing is not synonymous with informal housing. Much of the world's 'formal' housing stock has been procured and delivered incrementally. The question for policy makers from places with large volumes of informal housing catering for low-income groups is to learn and build on these incremental strategies which have delivered housing at scale in a way that the state and private sector have been unable to achieve. As such this paper focuses on incremental housing and how it relates to the delivery of genuinely affordable housing. The hypothesis is that 'incrementalism' encourages the contributions of people to shape and affect their environments by being active participants in the process of making 'place' through incremental improvements, additions, and developments and celebrating the importance of 'tinkering'. Arguing that opportunities are opened up which are lost in large scale, one-stop projects; setting incrementalism against master planned urbanism which is characterised by one-stop, large scale, hierarchical, inflexible, highly capitalised and centralised 'city-making' projects.

Photo 25: Informal housing with material supply shops, New Delhi. Source: Julia King © 2015

From Self- Build to State-Led

Incrementalism as a state-sponsored design strategy got its first major test in 1965 when Peru's architect turned President Fernando Belaunde Terry initiated an experimental social housing project to the backdrop of mass informal urbanisation (called barriadas) in Lima. The project, PREVI 13, brought together 13 internationally known architects and 13 Peruvian architects to propose designs for low-rise, high density social housing units that could grow incrementally, in other words accommodate future transformation as an antidote to large social housing blocks. Although the project never lived up to its hype, in 1974, 500 units were completed and are today examples of successful incremental change. Architectural writer and curator Justin McGuirk noted this success writing, "PREVI marked the shift from a dogmatic modernist approach to housing the poor to one that capitalises on the evolutionary, organic nature of informal settlements.[1]"

Indian architect Charles Correa was one of the people who designed and built a scheme for PREVI and was generally a proponent of the incremental approach as a strategy to deal with India's housing shortage. One of his most famous housing schemes was Belapur, a low-cost housing project in Navi Mumbai (completed in 1983). Belapur was designed as small clusters of low-rise, high density courtyard houses built such that each family could extend and adapt their own house independently. Today the original houses in Belapur are barely visible yet the central courtyard feature remains intact. Just like PREVI, this was an attempt to formalise and improve on what was already happening. Correa was trying to design a type of subaltern urbanism – more than just an incremental ontology, this was the celebration of the production of urban spaces outside the logic of formal planning paradigms.

Contemporary Incremental Models

One of the most celebrated contemporary social housing projects, merging both modernist ideals and self-built incremental strategies, is by a Chilean architectural practice Elemental (fronted by Alejandro Aravena) and their housing project in Iquique, Quinta Monroy. When originally occupied in the 60s, Quinta Monroy resembled the kind of ad-hoc squatter settlements observed by Turner in Peru. Over time the small clusters of housing began to grow in size and population. The result was a dense knit of housing with small rooms, limited light and ventilation and little public space. Elemental were invited by the Ministry of Housing and Urban Planning (MINVU), who were seeking inventive design solutions for the social housing mission "Vivenda Social Dinamica sin Deuda," (Dynamic Social Housing Without Debt) capable of addressing issues of scaleability, buildability and marketability. Aravena's incremental approach sought to balance the limited government housing subsidy with the resident's own productive capacity and sweat equity echoing De Soto. The central tenant of the proposal was to use the government subsidy to mass produce

[1] *PREVI never realised the second phase of the project which hoped to roll out the scheme at a large scale. For this reason, is has largely been viewed as a failure.*

"half a house" with the other half to be incrementally extended by the homeowner. The design of low-rise blocks predicted self-built expansions, leaving roofs and balconies empty. Today all but one of the original 93 houses has been expanded beyond their original framework. In most cases, these extensions have exceeded what the architects imagined. It has been reported that up to 11 people live in one house[2]. Furthermore, without any kind of oversight, much of the extensions have been built with recycled and cheap materials such that the settlement risks returning to the overcrowded conditions which the intervention had intended to ameliorate.

A more recent example of incrementalism can be found in Egypt's new town, 6th of October, known as "Build Your Own House". Covering an area of 5,000 hectares and occupied by approximately 1.1 million people with population projections of 6 million by 2027, this scheme attempts to deliver high density, multistorey incremental housing. Unlike Quinta Monroy, the contractor in this case was the owner-occupier, who would bid for the work. Once successful, the owner-cum-contractor would receive a 150 sq.m serviced plot of land for which they would pay 10% of the cost of land upon commencement of the project. The rest of the financing was at 0% interest paid annually over a seven-year period and included access to loans and subsidies. The scheme provided the beneficiaries with complete technical drawings for a range of approved prototypes for multi-storey incremental housing, occupying 50% of the plot area, to match the financing options and with designated support by the local municipality. The intention here was to support construction and oversee quality to avoid the pitfalls of previous self-built projects. Despite delivering in terms of housing units, this initiative has had limited success attributed mostly to its peripheral location, delay in infrastructure and service delivery and lack of jobs. Elsewhere, it is not only the state who sees the value of incremental housing but also the private sector. In Mexico, CEMEX, one of the largest building material suppliers, sees the incremental housing market as untapped. CEMEZ have been working on developing schemes specifically to support incremental housing through time sensitive means and linked to technical assistance.

What these cases foreground is that incremental housing success is more than getting the number of units delivered. It is also about ensuring long term, sustained investment in terms of community support, capital, security, and well-being. Incremental housing construction is typically not guided by, and difficult to ensure that it is meeting, building norms and safety codes, acutely important considerations for multi-storey developments in seismic regions. For incremental housing to be successful, a holistic approach to support needs to be considered over time to mitigate against construction outside of the regulatory or planning gaze. This will require institutionalising forms of operation and maintenance processes via a network of urban practitioners and actors, both formal and informal. PMAY(U) recognises the need to broaden the role of state housing support through a series of reforms to ensure the sustainability of affordable across the four verticals. These include administrative, fiscal, financial, regulatory, and social reforms with the aim to ensure continuous delivery of affordable housing. More work will be needed to see if these reforms

[2] *ibid*

can maintain 'Housing for All' initiatives going forward. The following section will discuss the kinds of challenges and opportunities presented by incrementalism with the Indian context in mind.

Applying Incrementalism to India

Co-production

The incremental extension of housing infrastructure by small scale operators and householders has been shown to deliver at scale. 'Housing for All' and 'Build your own Home' are successful examples of hybrid delivery configurations. However, these systems often rely on 'co-production' which requires regular, long-term relationships between state (or any intervening agency) and organised groups of citizens, where both make substantial resource contributions. In practice, the viability of co-production requires the state and private sector organisations to recognise and value community-driven approaches and local entrepreneurialism fully involving or empowering them along the entire policy, delivery, operation, and maintenance continuum. More needs to be done here. For example, unlocking the potential of local contractors who navigate complex socio-political terrains mediating between labourers, masons, community leaders, state agents, and the residents. Valorising and investing in these actors would strengthen and allow incremental processes to scale in a sustainable way. This could require, among other interventions, to invest in accreditation processes, accountability to ensure safety and regulatory frameworks are met, and skill development across the entire construction chain. These efforts need to be paralleled to make sure that building codes reflect and do not penalise ad-hoc, unplanned investments. Unlike the 60s, urban settings today have incredibly dynamic land markets and citizen flow. In this, infrastructures and people can arrive (and go) quickly. This can create a new temporality, that can conflict with the 'politics of patience' – the slow and high social investment process required by community-led planning and maintenance. This will require housing investment to be sensitised to the hugely variegated conditions in time and space to fully support urban livelihoods and asset formation.

Social Capital

Incremental modes of city making such as adaptation, consolidation, and retrofitting can transform lives, particularly in contexts with limited resources and outside the gaze of urban renewal programmes. Incrementalism enables forms of social and spatial experimentation to emerge that allow for the gradual consolidation of resources over time. However, without attending to other systems (jobs, health, education, finance) improvement will be limited. Furthermore, self-built additions can be accompanied with detrimental effects if there is no oversight. In case of Quinta Monroy, many of the extensions encroached on public land and the subdivisions resulted in acute overcrowding. In many ways the settlement today has replicated the penurious conditions that existed before it was redeveloped. Paralleled by a decline in social capital, the community networks that sustained Quinta Monroy previously have degraded. Over time this has meant there is no mechanism,

formal or informal, to address emergent problems. Supporting incremental housing requires long term community support to ensure that quality of buildings and public space, safety and social cohesion are not lost. Quinta Monroy could have benefited from being paired with subsidies for improvement over the course of time, and a regulatory hand to make sure that those with more resources do not overextend. Without this Quinta Monroy runs the risk that the reconfigured, planned settlement returns to a state of informality whilst incrementalism unfolds. This serves as an important lesson for the Indian context to think about housing in the round and to invest not only in the bricks and mortar in the first instance but in the long term and the communities and networks that sustain these processes.

Post- networked infrastructure

The complex and dynamic informal supply chains through which urban dwellers access services in emerging cities engages with formal and informal processes in various and complex ways. In this sense, infrastructures are not 'formal' or 'informal' but rather highly localised, hybrid configurations within and outside of regulatory and planning frameworks. For example, informal networks of pit latrines and septic tanks are serviced by vacuum trucks which discharge into municipal drains and municipal water supply is often distributed informally through local actors. The global applicability of the modernist centralised networks has been questioned by a growing body of scholarly work produced from cities in the global south, arguing that infrastructure scholarship should not impose structural / western ideals but "recognise the contexts they come from, understand why they have emerged, and then reassess whether the network is the most feasible (and not just the most theoretically desirable) mode through which to reach the outcomes we want".

Previous incremental schemes like those rolled out by the World Bank in the 1960s and 70s were site and service schemes serviced by centralised networked infrastructure (water, sanitation, and electricity). With rapid urban expansion municipalities today have struggled to keep pace and in many cases the kind of land available for affordable housing, and occupied by low-income households, is too difficult and or too expensive, for various reasons, to network. Informal squatter settlements that have acquired infrastructure outside of the state and market provision have done so through extensions to existing infrastructures, improvised decentralised systems, and various forms of labour-intensive systems. Stitching together incremental housing subsidies with the kind of infrastructures needed to support them will require states to move away from the modern ideal of infrastructure provision of larger centralised networks towards more localised, hybrid configurations of diverse (centralised and decentralised) technologies, actors and organisations.

Conclusion

Incremental housing as a strategy starts with the position to see people as active producers and not consumers of the city. For incrementalism to be successful in the kind of complex, dynamic and diverse urban environments we have today, our understanding of incrementalism needs to move away from tenure and materiality towards a broader

understanding of the process and actors involved and how this relates to the wider city. Urban geographer Colin McFarlane offers a useful framework for this, an assemblage. For McFarlane seeing housing practices through the lens of assemblages reveals housing as the "coproduction between those who are housed and the variant technologies that do the work of housing", including "architecture and bricks and mortar, sanitation and communication technologies, too, but also housing policies and practices, mortgage lending and insurance, credit scores, and all the other lively 'things' of finance". It is therefore particularly fitting to conceptualise the under-researched flows of finance that sustain incremental housing practices and, more broadly, a relational perspective for the city.

Incrementalism is an idea that mediates between urban theory, the spatial organisation of the city, and the experiential position of living in a city including economic and political agency. Moving away from the physical form, architecture is seen as an agent through which social and economic structures emerge. The challenge for architects and planners lies in a Catch-22: on celebrating the natural, emergent order of things, which has taken place outside the formal guidance of (master) planning – what role can an architect take without removing him/herself completely, or impeding the very thing being celebrated? In asking how settlements, neighbourhood and cities are made, and how to add to them 'incrementalism', amplifies the importance of city making as a collaborative shared process.

Evolution of the Housing Sector in India: 1947- 2015

Pritika Hingorani, Shilpa Rao &
Dhaval Monani

BLC House in Lucknow, Uttar Pradesh

Introduction[1]

India's journey to provide housing for all its residents has been a long and commendable one. From 1947, with widespread poverty and the vast majority of the population living in rural areas, India is now the world's third largest economy with bustling cities that attract talent from across the country and the world. The journey was always going to be a difficult one. In these 75 years, India's economic geography has changed. Housing is no longer just a roof over one's head but also a means to access opportunities in urban labour markets. This chapter lays out the history of the housing sector in India as it has evolved to meet a changing economic base and a vibrant private sector.

Overview of Housing in India: 1947-2015[2]

1950s-60s: Housing provision dominated by the State

In the two decades post-Independence, the State dominated housing provision. This was partly due to the development consensus of the time, but also reflected the pressures of having to rehabilitate millions displaced by Partition, and of having to address widespread poverty. At the time, housing was largely considered to be a social or welfare good, and was not seen as an asset. This resulted in a focus on direct subsidy programmes and public institution building. The First Five Year Plan (1951-1956) allocated approximately 34% of the total investment in the economy to the housing sector.

In the early years, the state constructed rehabilitation colonies, and 'model' towns like Chandigarh and Bhubaneswar, which combined housing with physical and social infrastructure. Housing in these cities was planned, but had little room for private markets. Private housing largely developed on urban peripheries and was unregulated. The 1952 Subsidised Scheme for Industry Workers and Economically Weaker Sections (EWS) was the first major housing programme which targeted industrial workers and their families, who were employed in mines and private factories. Similarly, the 1956 Housing Scheme for Plantation Workers required that plantation owners provide and maintain housing of certain specifications for their workers. In addition, public sector undertakings, the railways, defence and the postal services, all invested in employee housing. The 1954 Low Income Housing Scheme provided loans to public bodies, educational institutions and hospitals to build rental housing stock for their underprivileged employees. This was an early and important attempt at creating a rental housing stock, which has unfortunately not been replicated since. Over time, the focus shifted to ownership, and these institutions started

[1] *The authors would like to acknowledge and thank Vibhav Mariwala and Anushka Bhansali for their research and editorial inputs. Mariwala and Bhansali are, respectively, Senior Analyst and Analyst at IDFC Institute.*

[2] *Sections of this chapter are adapted from Hingorani, 'Revisiting Low Income Housing: A Review of Policies and Perspectives*

incentivising their staff to buy/build their own homes, as seen in the creation of “societies" for bureaucrats and company employees. We see the phenomenon in many Indian cities where Public Sector Undertakings (PSUs) incentivised their employees with highly subsidised mortgages, and the government allotted land under these special provisions (for example by providing housing on collector land in Mumbai.) This phenomenon can be best termed a semi-private market intervention.

The core problem in this period was 'affordability,' arising from the high cost of construction, low incomes and lack of access to finance. Therefore, the government tried to reduce the 'cost' of housing via large subsidies or direct price controls. There was no overarching housing policy until 1988, so in this period housing was provided under a wide range of different programmes, each targeting different socio-economic groups. While initial programmes spanned all income groups, by the Second (1956-1961) and Third (1961-1966) Plans, priorities shifted to focus on the poor.

There was also a considerable focus on slum clearance. The 1956 Slum Clearance and Improvement Scheme was designed to clear slums and rehabilitate residents in government built housing. However, construction never kept pace with demolition, leading to displacement and net destruction of housing stock. In 1961, the Rent Control Act (RCA), which protected renters, struck a lasting blow to the country's nascent rental housing sector.

This was also a time of institution building. The government constituted the state housing boards, the Ministry of Works, Housing and Supply (today's Ministry of Housing and Urban Affairs), the Central Public Works Department (CPWD), the National Building Organization (NBO) and the Town and Country Planning Organization (TCPO). These laid the foundation for the public housing sector; the Centre increasingly passed execution responsibility to the states although funding still came from the Centre. The housing stock developed by various organisations was inaccessible to the general market for nearly 50 years, but more recently their land values have been unlocked.

The outcomes were modest. Public sector provision could not keep pace with demand, both for a lack of funding and due to implementation issues. Moreover, housing often did not reach target beneficiaries and was misappropriated by or sold to higher income groups. Since housing was seen only as shelter, and cost was an issue, homes were constructed where land was cheap with little thought to connectivity. Slums and other private, illegal housing grew; these were located closer to jobs. This has continued to be an issue, with limited coordination between housing and transportation investments.

1970s-80s: Government as facilitator

The subsidy driven approach adopted during the 1950s and 1960s was a heavy burden on the exchequer. In the 1970s and 1980s, there were several important pivots. Firstly, the focus moved from subsidies to cost recovery and cross subsidisation. Secondly, slums began to be seen as housing solutions, resulting in the government focusing on slum

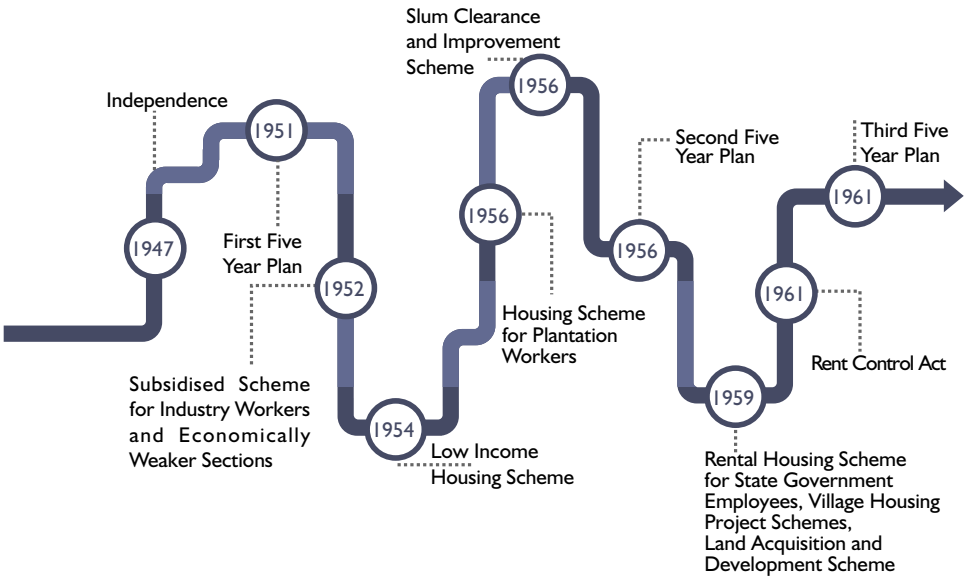


Figure 47: Housing provisions between 1950s-1960s

upgradation and the provision of tenure and services to existing slums. The 1972 Environmental Improvement of Urban Slums (EIUS) Scheme was designed to provide water, sanitation, drainage, pavements and other basic services and infrastructure to slum settlements[3]. This represented a change in the perception of housing as not only as a welfare good, but as a means to access job opportunities.

The focus on slum upgradation did not achieve its aims, and instead pushed the problem down the road. Squatters established tenure and set a precedent. Private markets were not developed enough, nor were the mortgage markets, to encourage in situ slum rehabilitation. With access to some basic services, an informal market thrived for slum properties which led to rent seeking activities. The ecosystem of rent seeking and vote banks made it lucrative for participants to keep the status quo.

Each Plan in this period marked an important departure from previous thinking. The Fourth Plan (1969-1974) emphasised the need to use planning to encourage the systematic development of urban areas[4]. The Fifth Plan (1974-1979) encouraged a cross subsidisation approach, whereby schemes for High Income Groups (HIGs) could cross subsidise homes for lower income families. The Sixth Plan (1980-1985) focused on the need to invest in infrastructure and sanitation in order to encourage residents to further invest in their homes[5]. It suggested that programmes should be designed to meet beneficiaries capacity to pay. The Sixth and Seventh Plans (1985-1990) highlighted the need to involve communities in project

[3] *This programme continued well into the 1990s and implementation has largely been in the hands of state governments.*
[4] *ibid*
[5] *ibid*

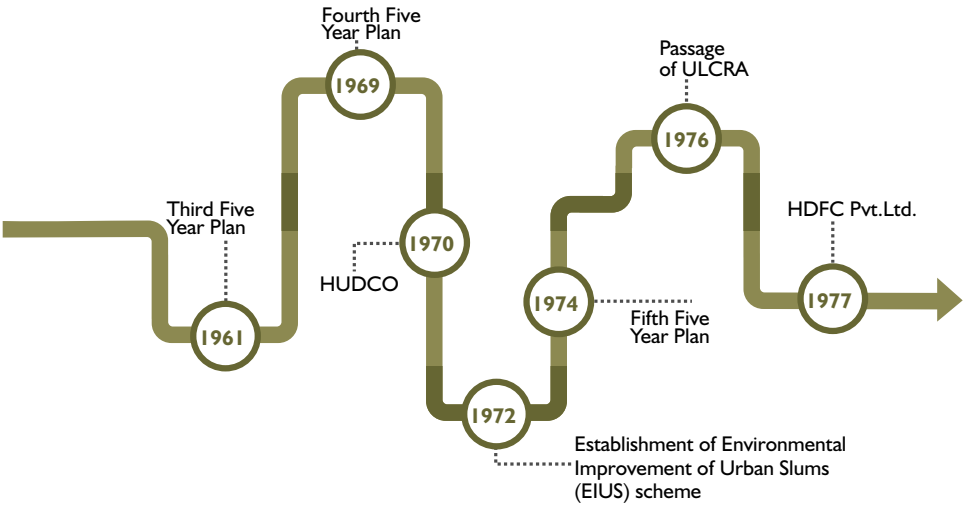


Figure 48: Housing provisions between 1970s

design. The 1988 National Housing Policy was informed by the Seventh Plan's recommendation to take an integrated approach to housing, looking at land, finance, technology, poverty alleviation and other aspects as a holistic approach to the housing problem. Finally the Eighth Plan (1992-1997) and Ninth Plan (1997-2002) suggested a change in the government's role from that of provider of housing to facilitator. This was an important shift in thinking which lay the foundation for housing programmes and subsidy design in the decades to come.

In keeping with the theme of "market facilitation", this period also saw the establishment of housing finance institutions, which would transform the sector over time. This included the Housing and Urban Development Corporation (HUDCO) in 1970, the Housing Development Finance Corporation (HDFC) in 1977 and the National Housing Bank (NHB) in 1988. Over time, HUDCO's role evolved more to focus on providing financing for non-commercial urban infrastructure. The establishment of HDFC was a historic event in the opening up of housing finance markets in India. By making mortgages accessible (albeit for the middle to upper middle classes), it hastened the process of home ownership for many. Until then, only public sector employees had access to low-cost financing directly from their own employers. Access to finance in the open market led to a drastic increase in construction in cities and consequently enhanced access to housing while showcasing a viable business model in a new secured asset class for lending institutions. At the same time, NHB was established as a wholly owned subsidiary (then) of the Reserve Bank of India (RBI) and became the apex regulator of the Housing Finance market in India. NHB has since played a pivotal role in the development, promotion and financing of the mortgage market , a model unique to India and one that played an important role in building a vibrant private sector led retail finance market.

Outcomes for this period were mixed. Despite the focus on slum upgrading, evictions continued, as did the appropriation of limited formal sector housing stock by Middle Income Group (MIGs) and HIGs. Slum upgradation, in many ways, created disincentives for in the whole chain private sector involvement and blocked valuable real estate. While attempts were made to take a more integrated approach to housing, programmes remained fragmented. As a result, they never addressed the housing shortage at scale, even as demand grew exponentially. In hindsight, delivering incentives directly to beneficiaries may have reduced rent seeking opportunities. However, the biggest success of this period was the deepening of the housing finance market, particularly for the middle to upper income groups. Access to housing finance opened up new market segments and incentivised private developers to cater to this vastly expanded market. What HDFC essentially provided was "leverage" for both the buyer and seller, which until then had not existed in a tangible way. Access to financing also resulted in a rapid increase in asset prices and made them more liquid. This rapid expansion also shifted the focus of the private sector away from the low income segment.

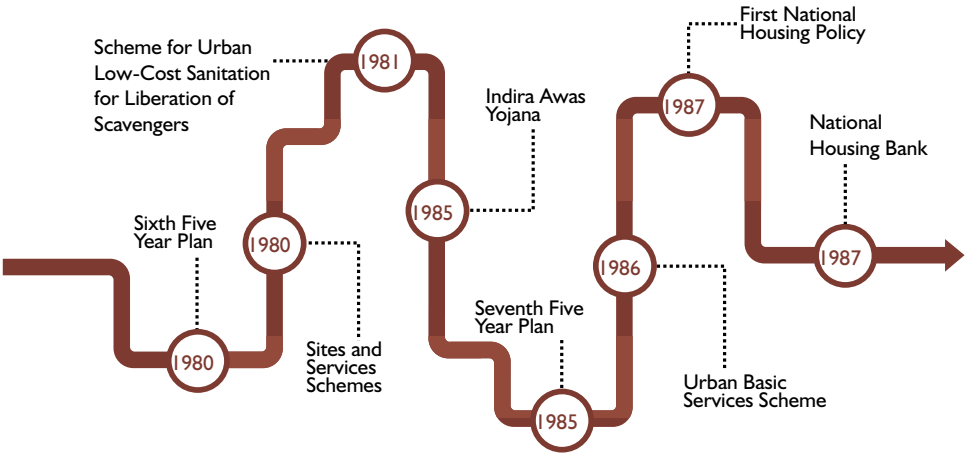


Figure 49: Housing provisions between 1980s

1990s - 2005: Renewed focus on 'Urban' Housing and Growth

In keeping with the spirit of liberalisation, in the 1990s, the role of the government was redefined from direct provision of housing or serviced sites towards enabling the private sector[6]. Another important development, via the 74th Constitutional Amendment, was the devolution of urban poverty alleviation, slum upgrading, housing, management of urban services, and the protection of weaker sections to Urban Local Bodies (ULBs). Under Section 80IB of the Income Tax Act first introduced in 1961, 100% of profits from a designated activity were exempt from income tax. Initially, provisions were loosely defined

[6] *ibid*

to promote private affordable housing for real estate and when it was introduced first in the 1990s, it did not get much traction.

A key contribution of the Eighth Five-Year Plan was to advocate integration of employment generation programmes and access to basic services for the poor. In addition, it advocated for the involvement of non-government organisations, community-based organisations, and private entities in the implementation of government schemes for the first time. The scope of EIUS was widened to include Urban Basic Services for the Poor and the Nehru Rozgar Yojana. As a first, feasible cost recovery and provision of tenure were recognised as pre-conditions for the success of EIUS. During 1992–1997, an estimated 2 million urban housing units were constructed, of which 1.4 million were for EWS and Low Income Group (LIG) households. Between 1985-1997, the rural housing programme Indira Awas Yojana (IAY) delivered a total of 3.7 million houses[7]. Additionally, in 1994, National Housing Policy was updated to call for the repeal of Urban Land Ceiling and Regulation Act (ULCRA) and modifying the RCA (1961) to increase investments in rental housing.

The Ninth Five Year Plan was important for viewing urban poverty as distinct from rural poverty[8]. The plan was the first to lay emphasis on "targeting" either by self-identification or selection, while continuing to emphasise a bottom up approach led by community based organisations. In 1997, both Swarna Jayanthi Shahri Rozgar Yojana – a first urban self-employment programme as well as the National Slum Development Program (NSDP) were launched[9]. NSDP provided both loans and subsidies to states for slum rehabilitation projects and advocated creation of 'model slums' within cities. This period also

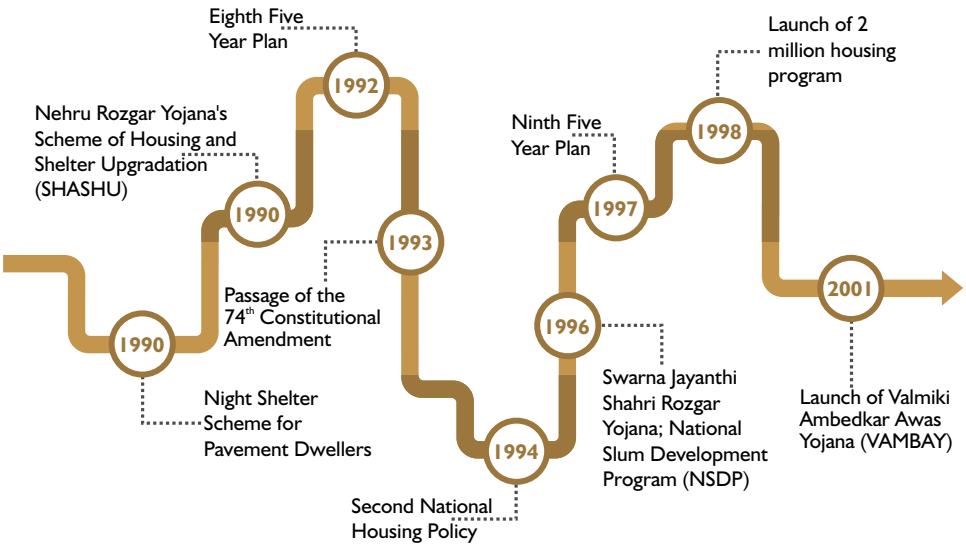


Figure 50: Housing provisions between 1990 & 2001

[7] *ibid*
[8] *ibid*
[9] *ibid*

saw the launch of Valmiki Ambedkar Awas Yojana (VAMBAY) in 2001-2002 for provision of a shelter or upgrading the existing shelter of people living below the poverty line in urban slums.

The 10th Five Year Plan (2002-2007) focused on fixing drawbacks in design and implementation of existing programmes and stressed on community involvement and capacity building of institutions and actors involved in these programmes. In 2005, Jawaharlal Nehru National Urban Renewal Mission (JnNURM) became the first big-ticket urban programme focused on delivering an integrated holistic package of reforms and project interventions. It is widely acknowledged as having focused public policy attention on cities for the first time, and for advocating for critical reforms including the repeal of ULCRA and RCA (1961) to name a few. The programme emphasised capacity building for states and ULBs to enable them to attract capital investments and raise resources. JnNURM also made the first serious attempt to engage the private sector in housing delivery and allow them to undertake land assembly[10]. The 11th Five Year Plan (2007-2012) continued to emphasise the importance of implementation of JnNURM in Mission Mode as an agent for creation of financially sustainable cities for improved governance and universal access to basic services.

While ambitious in its scope, reviews of JnNURM have been mixed. From a shelter and basic services perspective, experts believe that JnNURM has had less than desirable impact. From 2002-2012 via the Basic Services for Urban Poor (BSUP) and Integrated Housing and Slum Development Program (IHSDP) sub-components of JnNURM, a total of 1.6 million housing units were sanctioned[11]. While JnNURM tried to see housing within the urban framework, it still failed to address the key challenges that still existed, namely, density and connectivity. It took long for the government to change its focus on slum upgradation – a programme that hampered densification but encouraged crowding. The link between housing and urban transport and connectivity was missing, resulting in several greenfield affordable housing projects across the country being abandoned or never occupied due to lack of connectivity and proximity to areas of employment.

Following JnNURM, MoHUA launched an Interest Subsidy Scheme for Housing the Urban Poor (ISHUP) in 2008, the first ever demand-side subsidy and was managed by HUDCO and NHB. It targeted EWS and LIGs. However, it failed to fully achieve its stated aims. As of 2011, only 7805 people against a target of 310 thousand benefitted from the scheme with lukewarm responses from lenders. The scheme was said to have conceptualisation issues. The terms that were too onerous for lenders, and it was fraught with operational inefficiencies. In addition, it is widely accepted by experts that interest subsidy programmes are expensive to the exchequer and create unfunded future liabilities over the lifetime of the loans, and also make the government vulnerable to market rate fluctuations. There is a need to move away from interest subsidies to down payment or upfront principal subsidies to build a robust demand side subsidy ecosystem which allows housing finance markets to flourish, rather than crowd them out.

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[10] *ibid*
[11] *ibid*

Another centrally funded holistic reform linked programme for slum dwellers and the urban poor was Rajiv Awas Yojana (RAY). It was launched in 2011 with a vision of building a 'Slum Free India' and has constructed 91,823 units as on 29 June 2020. However, despite its ambitious vision, RAY did not get the expected response from ULBs and cities and neither did it succeed in enhancing private sector participation in the housing market. It did not take off and was eventually subsumed into PMAY-U. However, the programme's groundwork and thought process very much laid the foundation for the design of the sub-schemes, particularly 'Beneficiary Led Construction' under the PMAY(U). Despite the recommendations of the National Housing Policy (1994), there was limited change in regulations governing land and its use. The housing finance markets, until the early 2000s, largely continued to benefit the middle and upper middle, and high net worth market segments which were not made accessible to the poor because of lack of clear property titles, and lenders' requirement of steady incomes. In turn, this concentrated new housing supply in populous urban areas, and led to significant overcrowding which resulted in increased speculation in this sector.

JnNURM has also had mixed results. It repealed ULCRA and RCA and provided land and security for the urban poor and slum dwellers. However, it also had shortcomings. Firstly, it did not have an integrated approach to housing; it was fragmented and project-specific which lacked coordination from different ministries. This played a role in urban planning and housing, from health, sanitation, employment and electricity. In addition, the execution of JnNURM was the same across 65 cities which had vastly different needs and constraints. Secondly, there was a lack of financing and capacity in ULBs, and funds from the Central Government to states and ULBs were delayed. Finally, it had not enacted enough reforms in key sectors such as land reforms, resettlement policies for impacted citizens, and devolution of powers to ULBs.

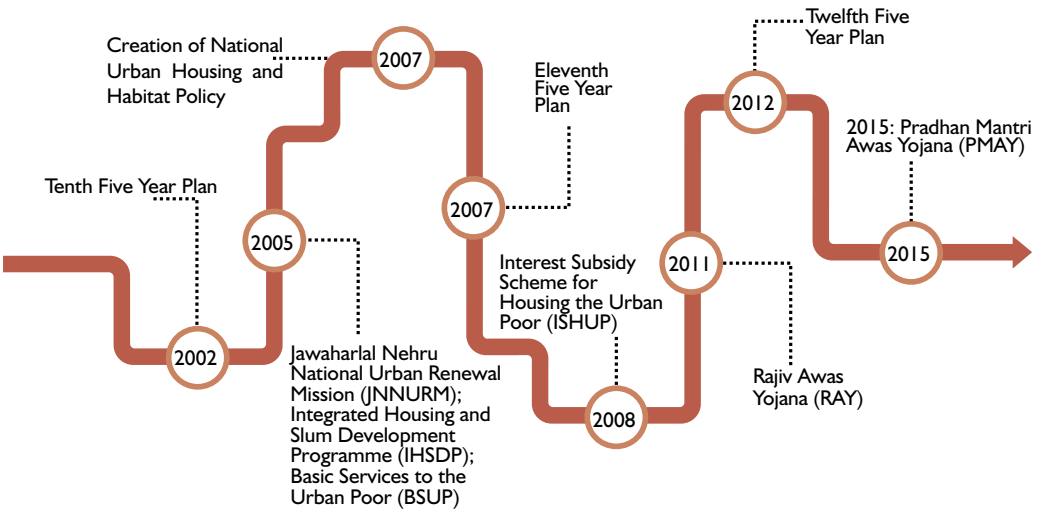


Figure 51: Housing provisions between 2002-2015

The need of the hour was for a flagship housing programme which unifies and subsumes existing housing subsidy programmes into one while still maintaining a largely decentralised approach to financing and construction of housing. In addition, while the intent of many of these schemes was to provide a facilitative environment for private sector involvement (both on the demand and supply side), they largely failed in this attempt.

The run up to PMAY(U): Defining Trends in the Housing Sector

Development of National and State Level Housing Policies to Trigger Private Sector Participation

In 2007, the then Ministry of Housing and Urban Poverty Alleviation (MoHUPA) launched the National Urban Housing and Habitat Policy (NUHHP). The core focus was provision of 'Affordable Housing For All' with a distinct shift in tone towards enabling private sector participation by improving urban planning, enhancing flow of funds from government and private sources to the sector, providing for special incentives such as increased Floor Space Index (FSI) to private players, better targeting to excluded communities, and an enhanced focus on Public-Private Partnership (PPP). This encouraged several states like Rajasthan, Maharashtra, Andhra Pradesh, Uttar Pradesh, and Gujarat to adopt specific state level policies that outlined models of PPP development in housing on paper, a first for the country. This was important as it signalled that States were best equipped to deal with the local challenges and nuances, given also that land is a state subject. Rajasthan for example, proposed multiple models of PPP with development both on private and public land. The state proposed several indirect incentives like extra FSI, exemption from development charges and other provisions. Several states followed suit with similar versions of the same. However, implementation challenges remained and many of these incentives were unviable for private developers for various reasons resulting in poor uptake. The government's model now relies largely on outsourcing construction through a simple Engineering Procurement and Construction (EPC) contract rather than PPP contracts. A more in-depth inquiry is needed to understand why these models and policies failed and how they can be made more relevant to the private sector's needs.

A Surge in Private Sector Participation in Low Cost Housing Supply (<₹1 million) between 2010-2015

Riding on the central and state level policy focus on affordable housing, studies revealed that 78,000 units below ₹1 million were constructed across 22 cities over a span of five years by organised builders from 2010 and 2015. Between 2011 and 2013, three cities, Ahmedabad, Mumbai and Indore, developed well with over 20 projects in each, priced below ₹1million and incredibly, 30% of this private supply was priced below ₹600 thousand which was unheard of until then in the organized private market. Unfortunately, however, this brief trend has not sustained at the same pace. Most organised players who were present in this segment eventually went further upmarket closer to the price range of ₹3 million and upwards, eventually aligning with RBI's definitions of affordable housing. The key reason

for this continues to be the cost of land, lack of availability of low-cost financing for developers, challenges in obtaining approvals and planning requirements that don't differentiate between low cost and luxury housing[12]. Given this, the government through its various state and city level parastatal agencies still remains the primary provider of housing for EWS and LIG segments to this day. Many of these units are subsidised to anywhere between 30-60% of its market value which also makes it harder for the private sector to compete on an even footing.

To address the process challenges faced by private developers, in 2012 MoHUPA constituted a high-level Streamlining Approval Procedures for Real Estate Projects (SAPREP) Committee which made a very strong attempt at advising central and state governments on rationalising approval processes and clearances, particularly for affordable housing. However, despite these efforts and bringing technology into the fold, permissions for housing continue to remain a bottleneck across the country. An affordable housing project could still require up to 50 permissions from local, state and central governments to kickstart a project, resulting in a factor of 5-8% cost increase for developers. A simpler single window clearance process or authority, particularly for low-cost housing projects, would mitigate these challenges significantly. Lack of availability of financing is another major challenge. While capital markets have opened up demand side lenders, the same cannot be said for developers (particularly, those who operate at a small scale and do not have a track record) who still struggle to find institutional financing to finance their projects.

In 2013, in an attempt to encourage the private sector to construct affordable housing stock for EWS and LIG segments, the government approved a scheme called 'Affordable Housing in Partnership (AHP)' as a part of RAY to provide a central subsidy support of ₹75,000 per dwelling unit constructed. However, this scheme did not take off. This amount was supposed to be availed by the developer directly from the government. The amount was too low to make any significant difference in larger cities and the process was so complex that developers preferred to not opt for it.found it simpler to not use it.

Slum Redevelopment Programmes and the Mumbai Model

National policy's focus on slums in India has distinctly moved from slum upgradation, to ex situ slum redevelopment, to in situ redevelopment in just twenty years. It is notable to underscore the influence of the Slum Redevelopment Authority in Maharashtra and its 'free housing' model which has been adopted in several states. In this model, project execution risks are transferred entirely to the private party as it involves no payment from end-users or direct subsidies from the government. By design, such a model can only be successful in select circumstances and locations where the underlying value of the land is very high and so is the demand. In addition, one must note that the scheme has been fraught with issues of systematic corruption, faulty beneficiary identification and coerced consent. While bringing in the private sector to solve this problem was essential, there is a need for the

[12] *ibid*

government to be strongly involved in areas and slums where the model is fundamentally unviable for the market to get involved. Particularly in slums where land locations and value are poor, additional central government subsidy support dovetailed with well implemented states/city level spatial and fiscal incentives will go a long way in making these projects more viable for private sector developers to get involved in them.

The emergence of specialised Private 'Affordable Housing Finance Companies'

Between 1990 to 2000, there were only two established Housing Finance Companies (HFCs) servicing the low-income segments. Between 2007 and 2010, 10 new HFCs built a portfolio of ₹10 billion crore catering almost exclusively to the low-income household (incomes up to ₹25,000 per month) in the self-built and developer led housing markets. Between 2010 to 2016, licences for HFCs given by NHB went up from 52 to 71. At the time of writing this chapter (2021), there are approximately 100 HFCs with licences from NHB, effectively doubling the number of HFCs of all time in a decade with many of these emerging HFCs catering to lower-middle income segments. This class of HFCs, whose portfolios are largely built on financing EWS, LIG and MIG households (45-50% of their book constitutes self-employed households and 70% of their loans are <₹500 thousand) for predominantly self-built incremental housing construction, have informally gained the nomenclature of 'Affordable Housing Finance Companies' (AHFCs).

Previously, financing had been constrained by factors including the difficulty in assessing informal income, lack of a clear mortgageable land title, unviable smaller ticket sizes, uncertainty in repayment patterns and in title enforcement and repossession. Over time, companies have developed specialised credit assessment mechanisms and use of advanced technology platforms have helped reduce operating costs. Notably the introduction of the Securitisation and Reconstruction of Financial Assets and Enforcement of Securities Interest Act (SARFAESI) Act in 2002 eased the enforcement of property title securities and increased the risk appetite of HFCs. However, the lack of clear property titles in peri-urban, panchayat areas and slum clusters within cities hinders widespread access. In cities where governments are actively pursuing regularisation of notified slums, HFCs are showing an interest to operate. As more AHFCs emerged, larger established financial conglomerates have also begun setting up Affordable Housing Finance Subsidiaries within their parent company structure.

The emergence of AHFCs would not have been possible without the facilitative role of NHB, which provided long term affordable refinance to these HFCs through multiple schemes introduced from 2000 onwards. In addition, NHB set up the Credit Risk Guarantee Fund Trust for Low-Income Housing (CRGFTLIH) to de-risk lenders willing to lend to EWS and LIG segments. However, this scheme has largely been a non-starter. NHB has also promoted companies with unique business models to cater to excluded segments, which has encouraged private equity, debt financiers and multilateral funds to bring in more capital into this space. Classifying both Housing and Sanitation Financing as Priority Sector Lending has also played a crucial role in growth of this sector as well as opening up of wholesale

financing from banks to HFCs. Overall, the AHFC model and NHB's role in facilitating it has been a notable success and is widely regarded as best practice in low-income housing finance.

As far as demand side subsidies go, ISHUP was an interest subsidy programme for EWS and LIG segments meant to provide subsidised loans with up to 5% interest relief over the full period of the loan. The scheme saw minimum uptake even though it was the first attempt in building a strong demand side subsidy programme.The experience from ISHUP clearly demonstrated a void in a well designed demand side housing subsidy programme in India. In order to succeed and reach a large mass of customers, the need at the time was for a programme which was easy to operationalise (both for the government and the lender) and adequately transfers the risk of borrower identification and underwriting to lenders with the government playing a strong role in oversight. A strong involvement of private lenders in borrower identification not only enhances customer outreach and quality of service but also allows for more prudent risk management. An ongoing interest rate subvention scheme is difficult to manage over a prolonged period of time. However, a proposal by Nachiket Mor of front ending the subvention to the Net Present Value (NPV) spread over the lifetime of a mortgage would make it simpler for all concerned parties: the government, intermediaries – the banks and the end consumer.

In addition, as per 2011 Census data, 53% described houses as being in "good" condition, 41% as "liveable" and 5% as "dilapidated", effectively meaning nearly half the population lives in less than desirable quality housing. A stumbling block in improving living conditions of a majority of households continues to be access to affordable credit. While the private sector has made significant strides in product development in this space, there is still a large market segment that does not have access to commercial financing, particularly due to geographical constraints and poor quality, incomplete or paralegal property titles. There is a need for central flagship programmes to recognise the importance and strong dominance of the "self-built" housing market, particularly in the EWS and LIG segments and provide simple funding mechanisms to help households bridge these financing gaps and speed up the process of construction, while auditing the quality of housing being constructed.

Defining Affordable Housing

In 2008, the then MoHUPA constituted a High Level Task Force under the chairmanship of Mr. Deepak Parekh, Chairman of HDFC to examine NUHHP's mandate of 'Affordable Housing for All'. The Task Force proved pivotal in putting "affordable housing" at the centre of the policy debate arguing that it should be treated as a "public purpose". It stated that affordability goes beyond the cost of the house or the ability to secure tenure or title of ownership, but it also means being able to hold on to this asset through a regular source of income. Therefore "affordability" even for EWS and LIG segments was defined using three prongs – size of dwelling units, cost of the house as a multiple of annual

household income and Equated Monthly Instalment (EMI)/Rent as a percentage of gross monthly income.

Eventually however, the RBI's definitions of "affordable housing" published in 2014 which has become the accepted norm within the private sector which funders and financiers aligning largely with. RBI defined it through the lens of housing loans eligible under the Priority Sector Lending norms as well as individual housing loans of ₹5 million for houses of values up to ₹6.5 million located in the six metropolitan centres and ₹4 million for houses of values up to ₹5 million in other centres for purchase/construction of dwelling unit per family. This definition has created a fundamental shift in narratives of what "affordable housing" means, which is unfortunate. Experts have long since proposed creating more contextual classification for low income housing as standard unit price based definitions of affordability don't work across different states and geographies.

Affordable housing and the importance of technology and sustainability

Rising building material costs have proved a problem for the affordable housing segment as they operate on extremely thin margins. This sparked a number of technological innovations in building materials, construction technology and building information systems. However, challenges remain in addressing issues of acceptability, scale, durability and climate appropriateness. For instance, at a round table on this subject in 2009-10 where a flat pack bamboo house was proposed at a price range of ₹50,000, the Chairman of one of the largest mortgage providers in India rightly pointed out that if people truly wanted to live in bamboo houses they would stay in their current homes in slums. Housing being an aspirational asset for almost all segments of the population, people tend to prefer concrete based construction and are averse to new materials and processes. However, this is an inevitable long term need which requires sustained private and public sector experimentation over the next decade to ensure there is a move away from traditional means of construction that are both expensive and environmentally unsustainable. At the same time, there is a need to devise more demand side incentives to help shift behaviours of households themselves to ensure better uptake of these houses in the market.

Transport and Transport Oriented Development

Over time, housing has been recognised not only as shelter but also a means to access opportunities in urban areas. This makes transport a crucial piece of the puzzle. Public transport access is particularly important for affordable housing because residents cannot afford private mobility and to spend too much time or money on their commute. A big drawback to date has been that the location of affordable housing tends to be where land is cheap, and this land is often unconnected to public transport. While there is an increasing focus on transport and transit oriented development, this issue needs to be addressed.

Experiments in Rental Housing

Earlier, rental housing was largely developed by government institutions and large corporations for their employees, but the focus quickly shifted to ownership lead models as the incentives under taxation policies favoured the latter. Structurally, the Indian rental market and financial system is not conducive for the private sector to build rental housing as yields remain low while cost of funds continue to be high. This is an area which requires more concerted efforts from the government to appropriately incentivise private sector players to participate in these markets.

Conclusion

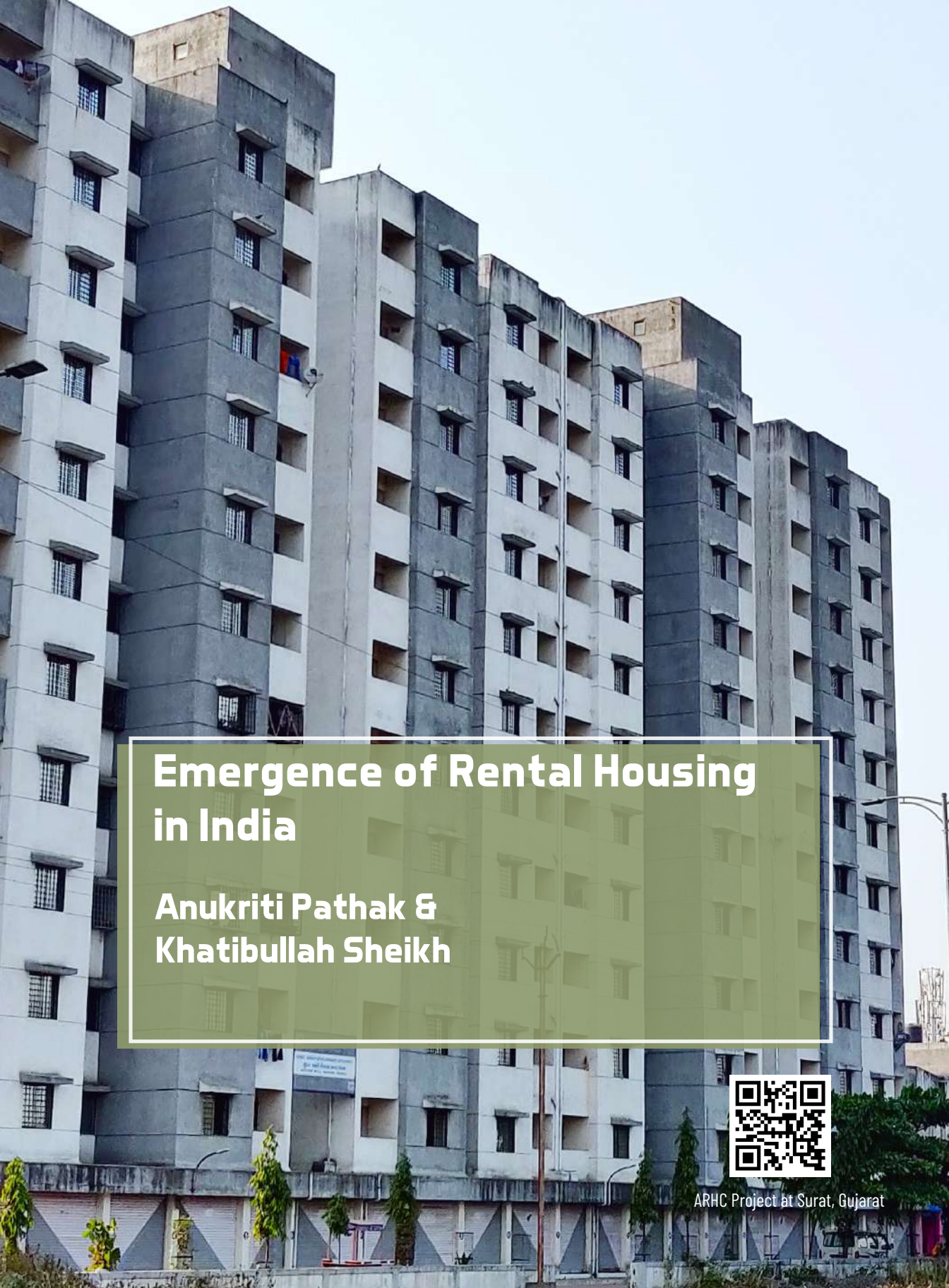
Over the past 75 years, housing in India has evolved from the state taking a lead role in provision to one where the state and market work in tandem. Several tangible achievements have been made, in particular the development of a vibrant private housing finance market which is widely considered the best practice across the world. All of the policies, schemes and market participation in these years laid the foundation for PMAY -U, which has a bold mission of achieving 'Housing for All'.

However, challenges do remain. Firstly, to keep up with rapid urbanisation, India will have to find a way to make rental housing a viable alternative to home ownership, which will require a multi-pronged approach and structural changes to ensure market viability. Secondly, there needs to be considerable attention paid to making individual freehold property rights a reality, particularly in peri-urban and rural areas, by adopting new technologies like blockchain. Thirdly, there needs to be more contextualised and nuanced definitions of low-income and affordable housing, with a clear distinction between the two. This should ideally be based on location and urban classification. Fourthly, if private sector developers need to play a role in the low-income housing market, single window clearances, ease of doing business and access to low-cost funding are essential. Affordable housing should neither be treated as part of real estate, nor should it be used as a tool by developers and industry bodies to further their interests. Government-led affordable housing will have to cater to the poorest while trying to address tremendous stress on government finances; this is why the private sector will have to play an important and pivotal role. Lastly, for any public or low-income housing to have any tangible uptake, housing investments will increasingly need to be dovetailed with transportation planning and investments.

The government has shown great willingness to address these complex issues accepting the fact that it has a pivotal role to play. There will always be a segment that cannot be addressed by the private sector and a segment that can be addressed but requires some sort of intervention or subsidy. The problem in India is compounded by the sheer scale and diversity. Even subsidy programmes have to be structured in creative various ways to address specific needs of various segments. Housing for all is a necessity and for India to grow it needs to address housing as a means to progress.

Emergence of Rental Housing in India

Anukriti Pathak &
Khatibullah Sheikh



ARHC Project at Surat, Gujarat

As per Census 2011, over 454 million Indians were found to be "migrants" for various reasons, thus accounting for 37% of the total population. These migrants consist of workers working in both formal and informal sectors and play an important role in the urban economy. Many migrants face difficulties in accessing housing and other basic amenities such as water and sanitation. In many cases, migrant workers working in informal sectors, where work availability is intermittent, and workers remain under-employed. In the lack of streamlined arrangements for housing of the migratory population, they rely on a spectrum of housing tenure arrangements, including full ownership, leasing and renting. A growing number of scholars also argue that ownership is not necessarily the best or most appropriate tenure arrangement for all households living in informal settlements, and that housing policies should recognise and support a diversity of tenure arrangements corresponding to the remuneration of the excluded population.

Further, the percentage of disposable income spend on rents is disproportionately spread across various socio-economic classes. For BPL, EWS and LIG income group the percentage of monthly income to rent of affordable house is 266%, 217% and 98% respectively as of 2010 (Tiwari & Rao, 2016). To tackle with the high rent with respect to their income, they choose to live in dilapidated and congested houses, with shared facilities like public bath and toilet etc. Since independence, ownership has remained the cornerstone of housing policies in the country, overlooking the need of ephemeral arrangements for the migratory population. Rental housing also plays an important role in "poverty-risk periods", a reality that is part of the life cycle of poorer individuals and households (Pugh, 1995, pg. 60-61). Another reason for the rental housing to remain insignificant in policy dialogues could be the fact that home ownership is politically astute (Kumar, 1996).

The COVID-19 pandemic has resulted in an unprecedented disruption worldwide through its devastating impact on public health, employment and livelihoods. Migrant population has emerged as one of the most vulnerable groups in society due to this pandemic. The living and working conditions of migrant workers has made them and their families more vulnerable to COVID-19. The subsequent lockdowns generated widespread panic among migrants across India's major cities, kicking off concerted attempts to return predominantly to rural hometowns in the States of origin. As a result, the issue of housing for migrants and urban poor came to the forefront for acknowledgment and redressal.

The chapter is an attempt to illustrate the attempts taken by the Government of India in the rental housing sector. It begins with identifying international case studies, it then highlights the correlation of migration and rental subsystems. In the third section, it draws upon the trends of rental housing sector in the country and subsequently illustrates the Affordable Rental Housing Complexes (ARHCs) a sub-scheme under PMAY(U) to propagate and formalise the rental housing sector in the country.

Rental housing has been part of overall housing policies of developed nations as a solution to need of migratory population. Box 1 provides outlines of experiences selected countries with rental housing in the world.

BOX 1

Republic of Korea, in 1988-89 initiated construction of 2 million public rental housing units. To implement this, Government allocated land to the developers at subsidized prices for rental housing and also made provisions of funds on subsidized interest rate from the National Housing Fund.

Germany has one of the lowest home ownership rates in the world. Tenants enjoy a high level of protection through housing laws and rental investment. The initial rent is fixed based on local reference rent. Also, rent tables are available in the bigger cities.

France encourages individual to invest in newly built rental housing and rent property for longer periods of time. To regulate relationships between Tenant and Landlord, the Government made mandatory provision of written rental agreements between tenant and landlord.

Singapore established Housing and Development Board (HDB) in 1960, with a mandate to provide basic rental accommodation to the poor. However, the proportion of rental housing is very small portion of housing stock. The rental housing stock developed by HDB can be rented to the tenants who are the permanent residents and rental housing market in Singapore operates freely and serves the needs of expatriates.

Australia announced 'National Rental Affordable Scheme' to promote affordable rental housing for citizens. To make houses affordable, Govt. made provision for renting houses at 20% below the market rate through annual incentives, for over a period of 10 years.

Canada introduced 'Canada Rental Supply Programme' in 1981 with the objective of stimulating private rental investment. To make such projects financially viable, the Government introduced an interest-free loan to investors for the construction of dwelling units. Also, to address the issues of affordable rent to low income households, a rental assistance scheme was introduced.

In Thailand, the private sector is actively involved in providing rental housing, particularly for lower-income workers and for the students. The Government plays an important role in financing and development of rental housing nearby the workplace through the National Housing Authority.

Trends of rental subsystem in India

After independence, Indian urban housing sector was overwhelmed with fast pace migration. Most of the migrants belonged to working class and refugees from East and West Pakistan. Amidst this chaotic situation, many informal housing markets grew especially to

cater to the population burst and ultimately rental subsystem mushroomed within the city. A lot of discrepancies were witnessed as the housing demand was constantly increasing and monopoly of landowners led to hike in rental prices. To facilitate housing supply in the city, government came up with various rental schemes for targeted beneficiaries such as Workers Housing Schemes and Govt. Workers Housing Scheme with affordable rents. According to these schemes, 10% of their income will be considered as the house rent, but as these amount was very minimal and maintenance of the dwellings was not possible with this amount, therefore these schemes were unable to meet the demands of the population. Over the years many interventions were done towards this under Five Year Plans. However, there were significant reservations about the economic, political, and policy foundations for comprehending the complexities of affordable housing, homelessness, poor housing quality, and mismatches in housing demand and supply (Tiwari & Rao, 2016).

To that aim, the Government attempted to make subsidised housing and loans available on favourable conditions, as well as direct price control measures such as Rent Control Acts (RCAs) (Wadhwa, 1988). Because tenants lacked financial and social authority, power interactions between landlords and renters were considered to be considerably biased in favour of the former. These laws are intended at simplifying and monitoring the rental markets in various States, as well as providing relief to tenants from excessive rent demands and indiscriminate eviction by landlords owing to a lack of housing in metropolitan areas. This increased the demand for homes in metropolitan areas. RCAs were supposed to keep rents from rising in response to growing demand for rental accommodation in the face of expanding urbanisation.

Formalising Rental Market

As per Census 2011, there are a total of 27.37 million rented households in India, of which 79.4% or 21.72 million are urban rented households. Historically, the Indian housing policies have been directed towards home ownership which alone cannot solve the housing conundrum. Zero or no policy interventions for rental housing have been a big deterrent for creation of rental housing stock in the country. Formalising this subsystem is a challenge for the policy makers as there are piles of challenges associated with this sector.

To begin with, low rental returns have discouraged landlords from investing in real estate. While there have been little signs of a revival in the residential real estate industry, gross rental yields have been stuck around 3–4.5%. The RCA properties are in deteriorating condition since the conflict between the landlord and the renter was never addressed. Because rents were fixed and the act was pro-tenant, such apartments were never unoccupied, and landlords allowed their properties to degrade or collapse. There is no governing organisation to formalise this industry. The New Delhi Rent Control Act, which was approved in 1997 and failed to be notified owing to opposition by traders who were sitting tenants. Reforms in the rental housing industry have been a continuous process for almost 25 years due to State laws and local political climate.

India's Approach for Affordable Rental Housing

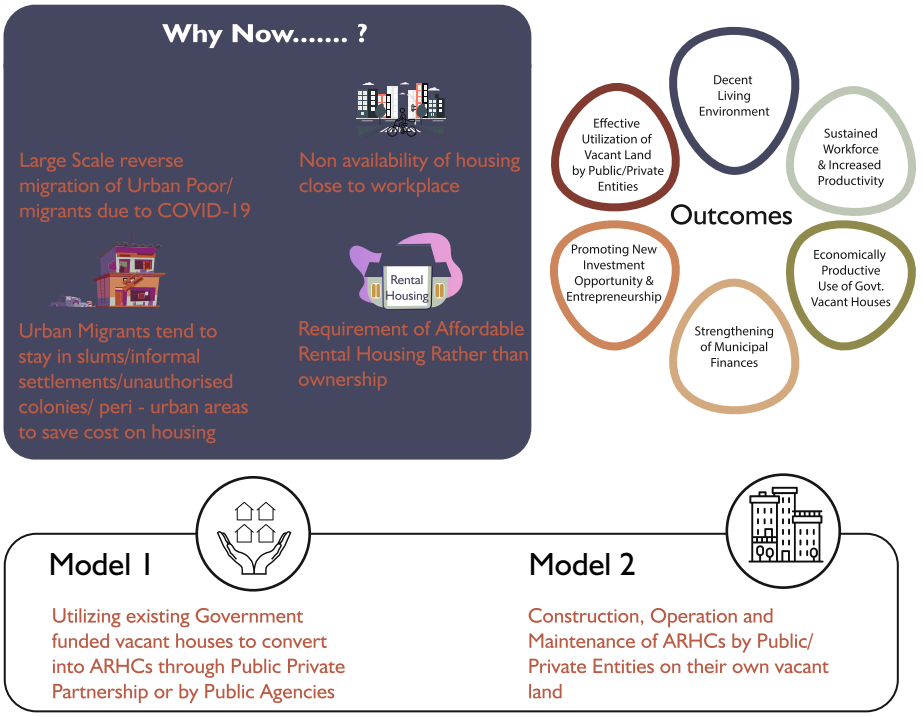
There is a close link between the economic success of a city and the growth of informal settlements. Not only such cities attract more migrants to work in the growing enterprises, the lack of an adequate housing response results in these migrants to live in informal settlements, unauthorized colonies, if not slums. Rental housing provides a viable alternative option to the home seekers and the house providers alike. According to the Census of 2011, India has more than 1.7 million homeless residents, of which 938,384 are in urban areas. Every fifth urban resident lives in slums; in the Municipal Corporation of Greater Mumbai, about half of the population lives in slums.

India does not have an overarching legal framework, nor a right to housing; however, it is considered a part of the larger right to life and housing is an integral component of statutory documents related to physical planning such as city level Master Plans and Land-use Plans. Housing quality is further controlled by building regulations and bye-laws, also enacted and implemented at city level. The regulatory and policy climate for housing, however, is focused on the formal sector and has minimal impact on low-income migrants, many of whom live in informal settlements and are also employed in the informal sector.

Rental housing, traditionally a neglected area of housing policy, is now getting attention perhaps in response to the significant floating populations in urban areas for education and work. The National Urban Housing and Habitat Policy 2007 recognized the need for rental housing. Taking note of the substantive gap between demand and supply for housing with basic services, this Policy envisioned to assist the poorest of poor who cannot afford to pay the entire price of a house by providing them access to reasonably good housing on rental basis. The policy also sought construction of rental housing by companies and employers for their employees.

Further, in the wake of growing family needs and overcrowding leading to slum-like situations due to lack of alternatives such as rental housing and absence of rental housing frameworks in the country, Draft National Urban Rental Housing Policy-2015 (NURHP) was introduced by Government of India. The policy aimed at enabling formalization of rental housing through regulatory and legal frameworks, enhancement of fund flows along with incentives for rental housing, promote institutions/organisations for constructing, managing, maintenance and operations of rental housing stock, etc.

The outbreak of pandemic COVID-19 and resultant reverse migration brought the discourse of rental housing in spotlight. Large number of urban poor who were the building block of urban economy migrated back to their native places due to lack of affordable rental housing in cities. In this context, MoHUA launched Affordable Rental Housing Complexes (ARHCs) scheme for urban migrants/ poor as a sub-scheme under PMAY(U) to provide ease of living through access to dignified affordable rental housing close to their workplace and obviate the need for staying in slums/ informal settlements/ peri-urban areas. Such



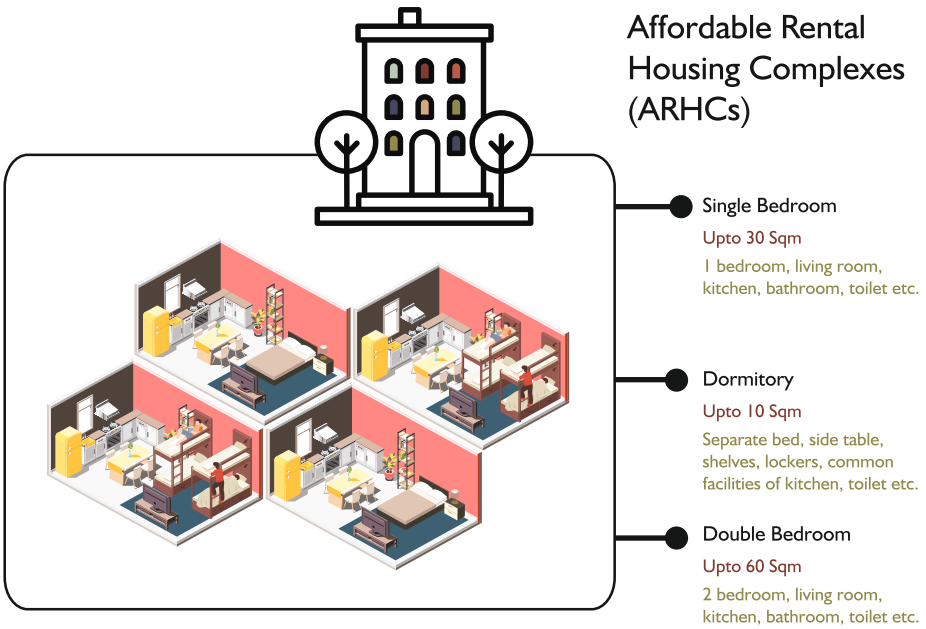


Figure 52: Need for ARHCs : Approaches and Components

provisions will not only improve their productivity but will also prevent the growth of slums. It will improve their living conditions, etc.

ARHCs will be a mix of single/double bedroom Dwelling Units and Dormitory of 4/6 beds including all common facilities which will be exclusively used for rental housing for a minimum period of 25 years. The scheme is being implemented through two models:

(1) Utilizing existing Government funded vacant houses to convert into ARHCs through Public Private Partnership or by Public Agencies.

(2) Construction, Operation and Maintenance of ARHCs by Public/ Private Entities on their own vacant land.

The initiative is expected to unlock existing vacant housing stock and make them available in urban space to save wastage of national wealth. The Concessionaire selected by State/ULB through open and transparent bidding process is expected to invest in renovation of houses and gap filling of infrastructure to make it livable. The investment will be recovered from operationalization of houses and profit will be shared with the ULB for the period of contract. Further, it will propel new investment opportunities and promote entrepreneurship in rental housing sector by encouraging Private/Public Entities to efficiently utilize their vacant land available for developing ARHCs.

Various incentives have been in-built to encourage private sector participation and create a conducive environment for rental market. Apart from income tax and GST exemption the Scheme also provisions for 50% additional Floor Area Ratio (FAR) than existing and measures of Use Permission of enabling land use changes, if required, obviating long procedures for the same. As envisaged in NURHP-2015, provisions are also made for cheaper loan by including ARHCs in Harmonized Master List (HML) and classify as 'infrastructure'. In addition, it is also proposed to provide municipal services at the rate of residential buildings.

The Scheme seems to receive encouraging response from the stakeholders and process of converting existing government funded vacant houses has been initiated and in a few places it is made operation also. Public and Private sectors have also shown keen interests as proposal for constriction of more than one lakh has been received so far (July 2021).

Model Tenancy Act (MTA), 2021

The Union Cabinet approved the Model Tenancy Act for adoption and enactment by respective States/UTs to formalise and promote rental housing in the country. MTA

envisages to balance the interests and rights of both the owner and tenant in accountable and transparent manner. The existing rental control laws are restrictive towards the growth of rental housing and discourage the owners from renting out their houses due to the fear of not getting them back. MTA will facilitate overhauling the legal framework across the country inviting further investment to promote the sector. MTA has been shared with the respective States/UTs for adoption by either legislating the new law or amending existing rent laws, including the features of MTA.

The implementation of MTA, is envisaged to formalise the shadow market of rental housing, unlock vacant properties, increase rental yields. It aims to promote growth of rental housing and invite investment in the sector, giving a fillip to entrepreneurial opportunities and innovative mechanisms of sharing built space.

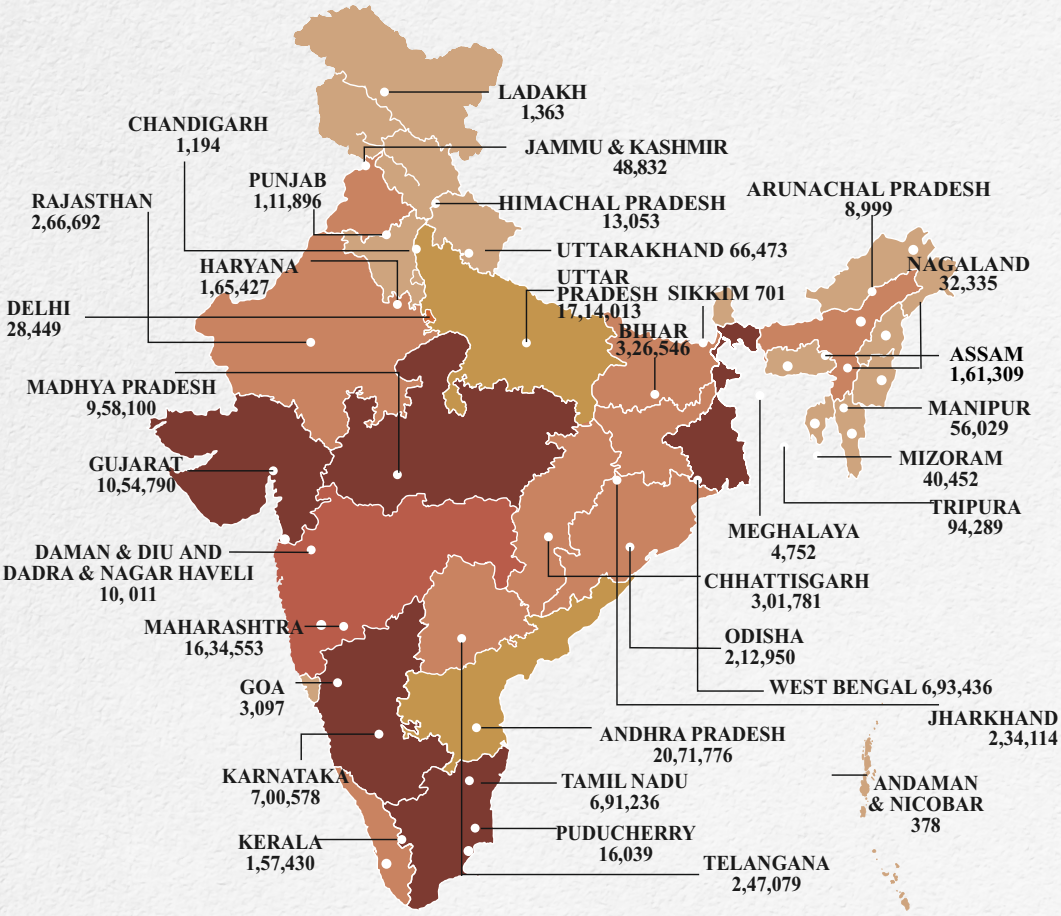
Conclusion

Indian urban housing market has always been very diverse in nature. To cater this diverse nature, policy needs to diversify public housing portfolios, enable use of public lands for these, and encourage fiscal equity between owned and rented housing. Converting existing slum pockets on ULB lands to social rental housing can give tenure security to millions of households and generate significant revenues for ULBs. Rental housing, traditionally a neglected area of housing policy, is now getting attention perhaps in response to the significant floating populations in urban areas for education and work. It has been well documented that rental housing can function only in a political climate that encourages fiscal responsibility from all stakeholders. The greatest challenge is to address the above issues and create an environment which incorporates knowledge and capacity building to manage rental housing.

Protecting the fundamental right to housing through affordable rental housing and providing tenure security to the urban residents should become a significant component of urban interventions. It is now recognised that security of tenure is more important for many of the urban poor than home ownership, as slum policies based on ownership and large scale granting of individual land titles have not always worked.

Houses Sanctioned

Date as on 12th September 2022

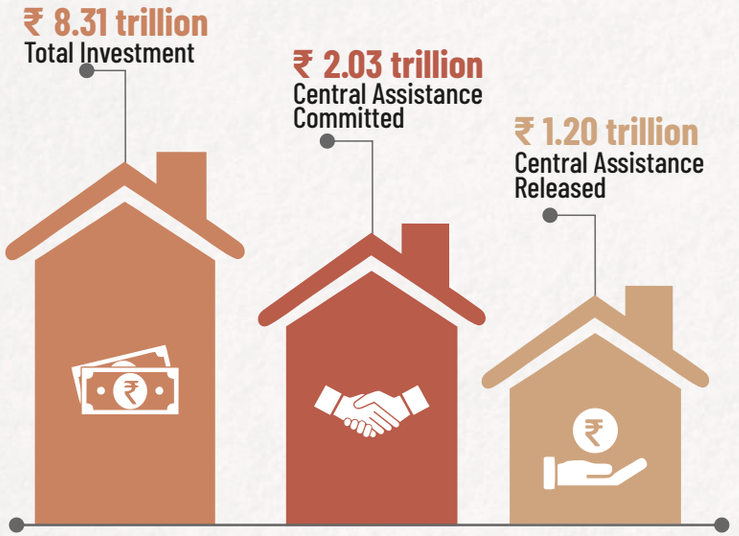


- <1 Lakh Houses
- 1-5 Lakh Houses
- 5-10 Lakh Houses
- 10-15 Lakh Houses
- >15 Lakh Houses

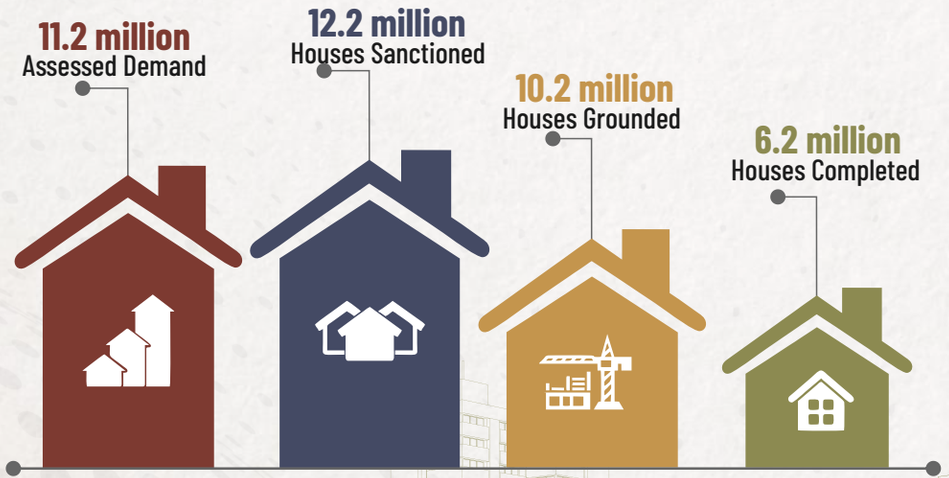
Ministry of Housing
and Urban Affairs
Government of India

TRANSFORMING URBAN LANDSCAPE
EMPOWERING WOMEN THROUGH PMAY(U)

7 Years of
Pradhan Mantri Awas Yojana (Urban)

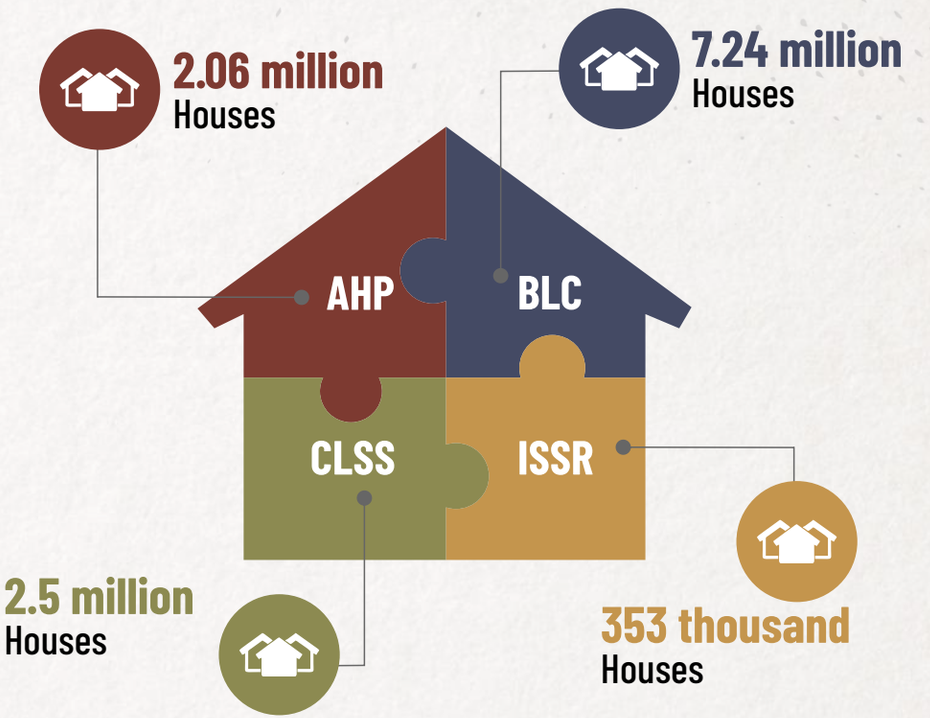


Financial Progress

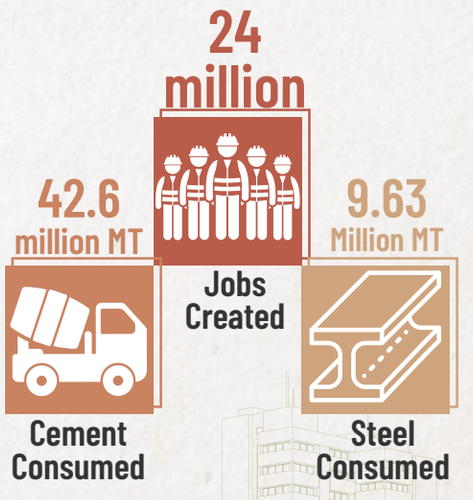


Physical Progress

* as of 12/09/2022



Houses Sanctioned amongst Verticals



Socio-Economic Outcomes

PART FOUR
Construction Technology

Global Housing Technology Challenge – India: A Disruptive Breakthrough in Housing Technology

Durga Shanker Mishra

CTI - 2019, Expo-cum-Conference, New Delhi

Genesis

Hon'ble Prime Minister has envisioned to build a New India that is strong, prosperous and all-encompassing. In order to address the increasing housing demand in cities, Ministry of Housing and Urban Affairs, Government of India is implementing PMAY-U Mission for providing all weather pucca houses to about 12.2 million eligible urban beneficiaries.

The story of GHTC-India begins with one of the Pro-Active Governance And Timely Implementation (PRAGATI) meeting held on 12th July 2017 in which while reviewing the progress of PMAY-U, Hon'ble Prime Minister urged to accelerate the adoption of new construction technologies in housing construction sector. He expected to use this opportunity to explore adoption of best innovative construction technologies from across the globe to improve the pace and quality of work under the Mission to address the challenges of rapid urban growth and its attendant requirements.

This direction from Hon'ble Prime Minister was loud and clear for a paradigm shift in technology transition using large-scale construction as an opportunity to look for new emerging, disaster-resilient, environment-friendly, cost effective and speedy construction technologies. The Ministry took this as a challenge to formulate a comprehensive strategy and framework for Global Housing Technology Challenge (GHTC-India). The process was started just right then and the Ministry along with all other stakeholders including public and private bodies worked tirelessly as Team India. GHTC-India was incepted in 2017, when PMAY-U had already been implemented for two years. It took us almost a year to materialise the planning of framework, strategies and components of GHTC-India. The chapter elaborates the whole process of conceptualization of this challenge to bring out the most innovative, simple, effective and appropriate solutions for making housing available and affordable to all.

The 5 Ws & 1 H

Let's understand the whole process of GHTC-India through the 5 Ws (What, Why, Who, When & Where) and How as under:

What?

GHTC-India intends to identify and mainstream innovative construction technologies from across the globe for housing construction sector that are rapidly executable, resource-efficient, eco-friendly, disaster-resilient and sustainable. These technologies were to be cost effective and speedier while enhancing the quality of construction, meeting diverse geo-climatic conditions and desired functional needs. Further, potential technologies were also supported to foster an environment of research and development in the country. GHTC-India aspires to develop an eco-system to deliver on the technological challenges of the housing construction sector in a holistic manner.

In order to comprehensively plan and implement GHTC-India, the whole process was categorized under following three components:

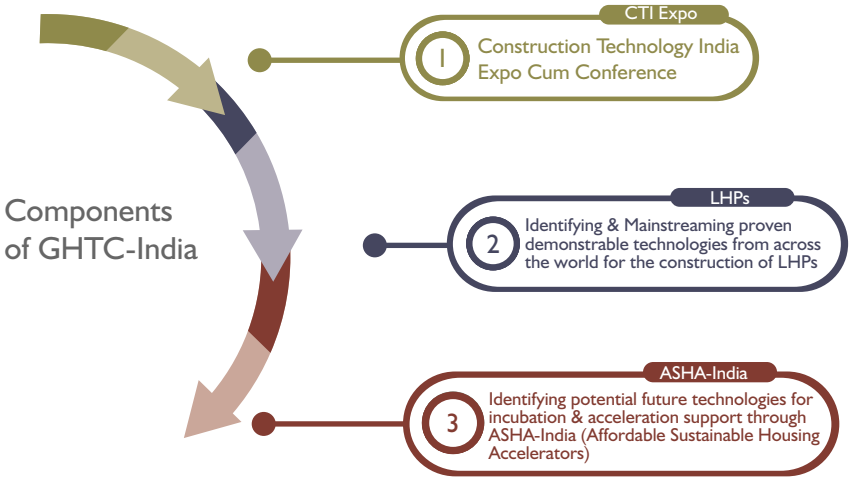


Figure 53: Components of GHTC-India

Why?

Construction of houses at the scale and pace of PMAY-U was used as an opportunity for inviting alternative technologies from across the globe to trigger a major transition through the introduction of cutting-edge construction technologies, building materials and processes. Typically, conventional construction systems using brick and mortar are slow paced, energy intensive, dependent on natural resources and have a large carbon footprint.

The answer to this lies in technological innovation and sound construction management practices. Such proven and demonstrable innovative technologies are in practice worldwide, particularly in the developed countries, which can be adopted and adapted to meet the requirements of fast and sustainable building construction suitable to varied geo-climatic conditions of our country.

Within the ambit of the overarching PMAY-U, a Technology Sub-Mission (TSM) was already in place to facilitate the adoption of such new technologies and building materials for low-cost, speedier and quality construction of houses. However, a concerted effort was required to create mass awareness to accept a technology transition from conventional to innovative technologies through pilot projects, expositions and other outreach methods for adoption, adaptation and mainstreaming their use.

For any innovative technology to be adopted and adapted, it should be: (a) easy to adapt, (b) readily available to developers and builders, (c) durable, (d) suitable to a variety of climatic and seismic/ wind loading considerations across the country, (e) cost effective, (f)

speedily implementable, (g) environmentally friendly and sustainable, (h) suitable for urban and rural applications as well as for low-rise and high-rise structures, etc.

When?

The official announcement about GHTC-India was made in February 2018 and the process laid was till the Mission period of PMAY-U. Opening up the challenge with the official logo and mobile-app, GHTC-India was launched on 14th January 2019 by Shri Hardeep S Puri, Hon'ble Minister, MoHUA.

Where?

GHTC-India is being administered by the HFA Division of MoHUA. The Light House Projects are being constructed in six regions of the country, namely, Uttar Pradesh - Lucknow (Northern Region), Madhya Pradesh - Indore (Central Region), Jharkhand - Ranchi (Eastern Region), Tamil Nadu - Chennai (Southern Region), Gujarat - Rajkot (Western Region) and Tripura - Agartala (North-Eastern Region).

Who?

The stakeholders of GHTC-India include Central Government Agencies, States/UT Government, Public Sector Agencies, Global Technology Providers, Local Partners/ Companies, Construction Agencies, Research and Development (R&D) Institutes, Emerging/ Potential Technology Providers, Academia, Developers, Entrepreneurs, Beneficiaries amongst others. It converges with other existing Centrally Sponsored Schemes and Missions such as Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat (Urban), Pradhan Mantri Awas Yojana-Urban (PMAY-U), National Urban Livelihood Mission (NULM), Pradhan Mantri Ujjwala Yojana, UJALA Yojana, Make in India, Atal Innovation Mission (AIM), Skill India Mission amongst others.

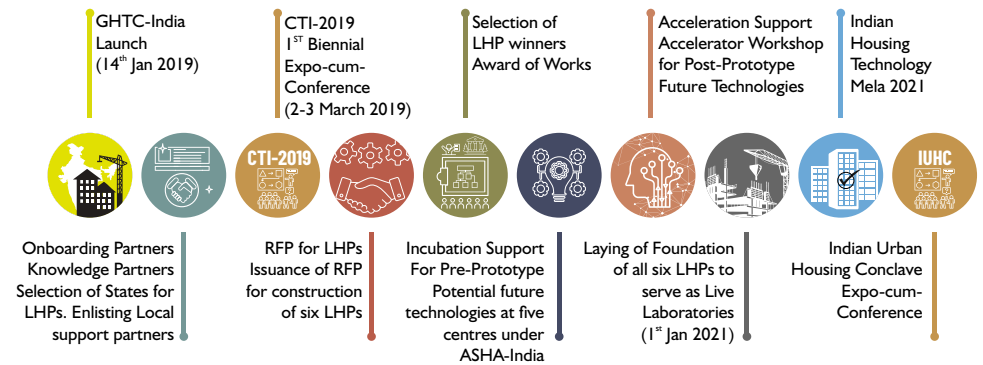


Figure 54: Timeline of GHTC-India

How?

In this section we will deal with the entire process followed so far under the GHTC-India. These processes have been grouped under different heads such as Stakeholders consultation for planning the framework, getting the right Institutional Framework, Onboarding Partners, Launch of Challenge, Evaluating and Shortlisting of best available innovative technologies amongst others as detailed in the framework below:

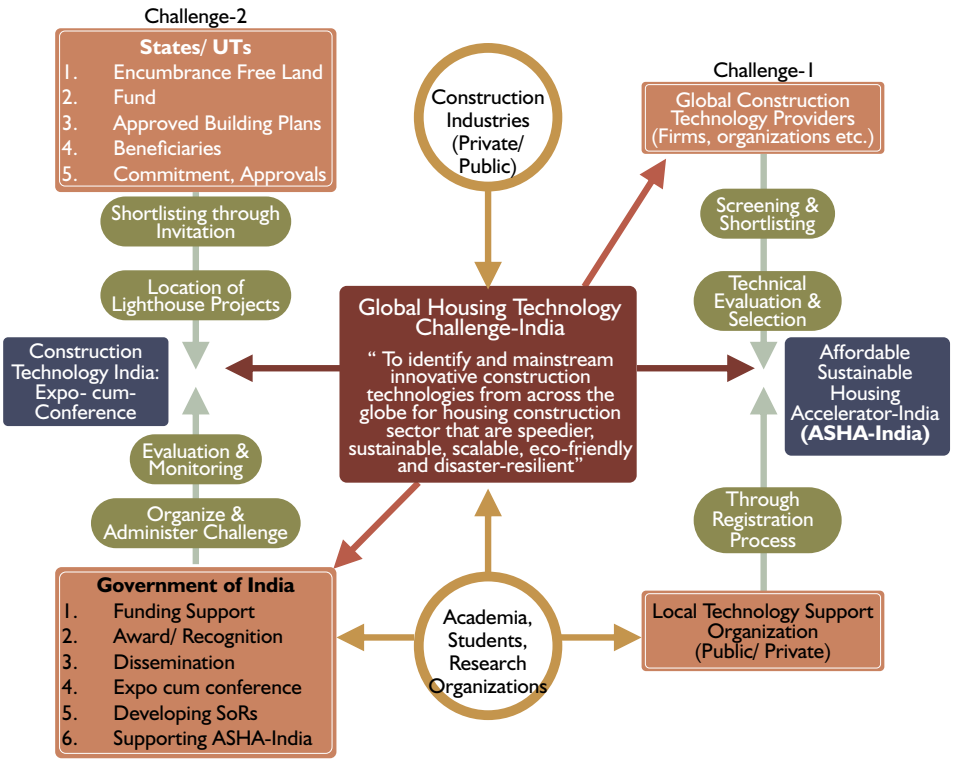


Figure 55: Process of GHTC-India

a) Multi-Stakeholders Consultations

In order to ensure a robust process, a series of consultations with industry partners, academia, technology providers and other stakeholders were conducted to address a wide range of issues and deliver well-conceived solutions under GHTC-India. Feedbacks gathered from these deliberations included ensuring the suitability of foreign technologies for Indian conditions, certification and standardization including the requirement of proper specifications and codes, challenges in the procurement process, and the necessary policy support to synergize both demand and supply.

A National Round Table Conference on GHTC-India was held in August 2017 to brainstorm on the probable components of GHTC-India and finalise the roadmap and takeaways for adopting such technologies for affordable housing in Indian context. It focused on aspects like rollout of the challenge, branding and awareness creation, financing the challenge, role of stakeholders, criteria for technical evaluation for selection of technologies, awards and incentives, institutionalizing and adoption of selected technologies by Centre and State Governments, etc.

Further, a two-day design workshop was organized to deliberate on technologies and implementation modalities to finalize the architecture of the GHTC-India. This workshop was intended to share lessons learned from other challenge competitions internationally and design all the key elements of the challenge. Representatives from MoHUA and several Central Ministries and State Governments and a wide cross section of the stakeholders from India and abroad including the representatives from Bloomberg Philanthropies, World Resources Institute (WRI)-India, Massachusetts Institute of Technology (MIT), Georgetown University amongst others participated.

In order to disseminate the processes of GHTC-India and its components among various stakeholders, a series of Town Hall Meetings were organized to encourage participation of various stakeholders from across the affordable urban housing and construction sectors such as innovative technology providers, researchers, start-ups, developers, academia, public/ private sector agencies, civil society organizations, etc.

We invited all Foreign Missions in India to actively propagate and create awareness on this Global Challenge in their respective regions by inviting all related stakeholders including technology provider, developers, business entities in housing construction sector. An interactive session with Head of Foreign Missions in India was organised on 21st Jan 2019 with an intent to spread the word to prospective technology providers and encourage global participation in housing challenge and support Indian Missions abroad to network them for facilitating participation.

b) Setting up Institutional Framework

The entire process of GHTC-India was conducted under the Technology Sub-Mission component of PMAY-U. Building materials and Technology Promotion Council (BMTPC), an autonomous agency under the Ministry, which is working on promotion, standardization, mechanization and field application of proven innovative and emerging building materials and technologies in the construction sector, supported the process.

In order to prepare the criteria for evaluation of innovative technologies and shortlisting; developing methodologies, framework and strategy for innovative technology providers for construction of Light House projects and ASHA India initiatives, a Technical Evaluation Committee (TEC) with senior officers of Central Govt. Departments along with eminent experts from Technical Institutions was formed at MoHUA.

c) Onboarding Partners

Selecting States for Light House Projects: A National Challenge for selection of sites for construction of Light House Projects (LHPs) in six different geo-climatic regions across the country was launched. States/ UTs were required to submit their proposals which included their commitment with respect to encumbrance free land, funding, and administrative support for construction of LHPs. The evaluation of proposals received from States/UTs was carried out by the TEC based on the predefined criteria including plot size offered, number of dwelling units buildable on the plot, connectivity of site to trunk infrastructure, etc. The six highest scoring States one each in six regions were finally shortlisted, namely, Uttar Pradesh - Lucknow (Northern Region), Madhya Pradesh - Indore (Central Region), Jharkhand - Ranchi (Eastern Region), Tamil Nadu - Chennai (Southern Region), Gujarat - Rajkot (Western Region) and Tripura- Agartala (North-Eastern Region).

Listing of Indian Partners for Collaboration with International Companies: In order to provide local support to global technology providers in carrying out the construction of LHPs in different parts of India, a detailed listing of about 150 Indian Partners (Public/ Private Sector Developers/ Construction Agencies) was carried out at the Central level. It was made clear to the global technology providers that they are free to choose any Indian partner after due diligence and it was not a binding on them to collaborate with any of the enlisted Indian partner, they were free to choose by themselves if that suits them. In order to get strategic advice, knowledge management on the whole process of GHTC-India, partnership was created with range of agencies as Knowledge partners and Associate Knowledge Partners on no cost basis. These included WRI-India; NAREDCO; CREDAI; IITs of Madras, Bombay, Kharagpur, Roorkee; CSIR-NEIST-Jorhat, MIT, CII, International Finance Corporation-World Bank Group, etc.

d) Call for Online applications: Online Applications were Opened Under Following Two Categories:

Proven and demonstrable technologies that are innovative and established were invited through online application form designed by TEC for shortlisting of their innovative technologies for construction of Light House Projects in India. The application form included details of Company/ Agency, description of their innovative technologies along with supporting documents/ videos/ testimonials to verify the information. It was made a point to identify the sustainability/ green aspects in terms of resource optimization, energy efficiency, use of waste materials in the technology proposed.

Under ASHA-India, a sub-component of GHTC-India, online applications were invited from Potential Future Technologies from India that are at various stages of product development and market entry. Applications were invited under two categories i.e. (a) Pre-Prototype Technologies which are at ideation stage and require further technical handholding through incubation to reach a viable product in the domain of construction

systems and components, and (b) Post Post-Prototype Technologies that have a working and viable product but, require acceleration to mainstream their product in the market.

Construction Technology India 2019: Expo-cum-Conference

Photo 26: Hon'ble Prime Minister Innaugrating CTI 2019

Construction Technology India (CTI) 2019: Expo-cum-Conference was organized on 2-3 March 2019 to provide a platform to all National and International stakeholders associated with housing construction. The Expo was inaugurated by Hon'ble Prime Minister wherein he declared year 2019-20 as 'Construction Technology Year'. The Expo brought together multiple stakeholders involved in innovative and alternative housing technologies, for exchange of knowledge and business opportunities through an exhibition, thematic sessions, panel discussions and master classes. More than 60 technology providers from 25 countries exhibited their innovative technologies in the Expo.

During the two-day Expo, various topics discussed at the session included reforms to bring an urban renaissance with an integrated approach to address urban challenges, ensuring liveability and desirability of affordable housing, skills and human resources in construction sector, enabling eco-system for new construction technologies, innovations in construction equipment manufacturing sector among others.

e) Evaluation and Shortlisting of Technologies

Against the online applications floated for shortlisting of proven demonstrable innovative technologies for construction of Light House Projects and Domestic Potential Future Technologies, the Ministry received massive response in both categories. These were further evaluated and shortlisted by the TEC as under:

Proven Demonstrable Technologies for Light House Projects:

Assessment: Proven Demonstrable Technology providers from across the globe who submitted their applications online were screened and invited in the Expo for further

assessment. During CTI-2019: Expo-cum-Conference, the technology providers made detailed presentation before the TEC. During presentations, specific queries were raised by the TEC members related to various aspects of the technologies. Opportunity was given to the audience for their queries. Based on the information submitted by the applicants at the time of online registration and presentations/ interaction during the various sessions held during two days of Expo, first level of screening of application was done.

Technical Evaluation: TEC collated the details of innovative technologies for which applications were received online from across the globe. Further through a rigorous technical evaluation and deliberations, 54 innovative technologies from across the world were shortlisted and grouped into six broad streams or categories as per its suitability for different geo-climatic regions of the country, namely,

1. Precast Concrete Construction System - 3D Precast volumetric
2. Precast Concrete Construction System - Precast components assembled at site
3. Light Gauge Steel Structural System & Pre-engineered Steel Structural System
4. Prefabricated Sandwich Panel System
5. Monolithic Concrete Construction
6. Stay in Place Formwork System.

These 54 technologies were shortlisted based on parameters such as time and cost reduction when compared with conventional system, sustainability/ green aspects including resource optimization, energy efficiency and usages.

Selection of Proven Technologies for Light House Projects: In order to showcase the use of these technologies in actual projects, six Light House Projects (LHP) consisting of about 1,000 houses each with physical and social infrastructure facilities were proposed to be implemented. Through a challenge process among the cities in 6 geo-climatic regions, six places across the country, viz., Chennai, Rajkot, Indore, Lucknow, Ranchi and Agartala were selected. Thereafter, States proposed the draft proposals with respect to their requirement of housing and physical/ social infrastructure facilities along with tentative cost estimation. A Request for Proposal (RFP) for all 6 LHPs on Design & Build Basis mode was issued by the Ministry, which was limited to the 54 technology providers shortlisted under GHTC-India. The bids received were opened in order of size of plots offered by the States (from highest to lowest). In order to ensure that all 6 LHPs get distinct technologies from each of 6 broad categories, once a bid using technology falling broad category were selected on the basis of lowest cost, the other bids using that technologies from same broad category were made ineligible for subsequent projects.

Standardization and Institutionalizing the Technologies: Out of the 54 technologies identified under GHTC-India, till date, 39 of them have been evaluated and certified under Performance Appraisal Certification Scheme (PACS) of BMTPC. CPWD has issued Schedule of Rates (SoRs) for 29 of them along with Office Memorandum regarding adoption

of any one of these new and emerging technologies including all 54 technologies as shortlisted under GHTC-India, in future projects, as these technologies are agnostic to use, irrespective of location and cost.

Potential Future Technologies

ASHA-India, a sub-component of GHTC-India invited from domestic Potential Future Technologies/ Start-ups having a working and viable product that requires acceleration to mainstream their product in the market. The applications were invited in pre- and post-prototype category from the domains of construction systems and components, improving the efficiency of natural resource use, self-help innovations and digital technology in the housing sector.

Under ASHA-India initiative, five centres have been set up for providing incubation support for identifying innovative materials, processes, and technology for resource efficient, disaster resilient and sustainable rapid construction. These Centres will help in developing design guidelines, construction manuals and other necessary guidelines, relevant for effective use of such technologies in the region.

About 80 technologies from across the country applied for the ASHA-India programme, all of which were thoroughly assessed by an eminent Jury of industry experts at CTI-2019, and subsequently by the TEC. The shortlisted potential technologies under Pre-Prototype category are being incubated at the ASHA-India Centres. The potential technologies under post-prototype category were provided with Accelerator Workshop for mentoring and networking support for scale-up in the national and international markets. ASHA-India aligns well with Atal Innovation Mission and integrates with the objectives of "Make in India", "Skill India" initiatives.

Conclusion

The entry of innovative and alternative construction technologies in India has been gaining momentum in usage, and while these technologies have entered the market, their acceptance and adoption need further strengthening. Innovative technologies sourced through GHTC-India will ensure technology transition in the country from conventional to new technologies through lighthouse projects, expositions and other outreach methods that will further mainstream their use in other construction projects.

In a major policy push for adoption and adaptation of innovative and alternate technologies in in LHPs, we have for the first time introduced a Technology Innovation Grant (TIG) for States to offset this impact of using new and innovative technologies and absorb the issues related to economies of scale and other related factors.

Taking inspiration of Hon'ble Prime Minister, we are on the path of developing an ecosystem for a New India, wherein we are up-to-date with the latest technologies in the construction sector. As I see, GHTC-India will enable the paradigm shift required in the

construction sector in the country and will bring change, both in the perception as well as the manner in which construction of houses is done. It is also promoting the future technologies to foster an environment of research and development in the country.

I see huge opportunity for the country to move to 'Technology 2.0'. I am particularly sure that it will help bringing an evolution to the construction technology sector. The technology transition will help accelerate construction of affordable housing, maximising resource efficiency without adversely impacting the environment and addressing the diverse geo-climatic conditions of different regions. GHTC-India is a win-win situation for all parties and it will not only help in achieving the goal of Housing for All but also unleash tremendous business opportunities with growth of ancillary industries and provide the required skill set in the innovative and alternative construction regime.

This technology transition will contribute towards achieving the 'Sustainable Development Goals' (SDGs) as laid out by the United Nations (UN), the 'New Urban Agenda' and the 'Paris Climate Accord' to which India is committed and other such international commitments. Such a technology transition aligns well with the vision of 'AatmaNirbhar Bharat'.

When I look back, the process of getting the best globally available technologies in the country has been a bold Indian disruptive experiment and the learnings have been excellent. Collaborating with States from the east, west, north, south and every region of the country in the whole process has further strengthened our sense of cooperative federalism contributing to the India's growth story.

I am sure that GHTC-India would give a new direction to the housing construction in the country, and we will be proud to witness the change in the manner houses will be made in future. Needless to say that success of GHTC-India will translate into opening up of newer markets that are witnessing similar urban growth trend.

The Role of Start-Ups in GHTC-India: ASHA India

O P Agarwal &
Rejeet Mathews

Ministry of Housing and Urban Affairs (MoHUA), in a first, opened its doors to innovative start-ups and creative entrepreneurs in the housing construction technology sector in January 2019. This was done through the launch of a special Affordable Sustainable Housing Accelerators (ASHA)-India component within the larger Global Housing Technology Challenge – India to catalyse domestic innovation in the country. It intended to enable the adoption of new construction technologies that could build affordable homes faster and more sustainably, while lowering the costs. The winning start-ups of ASHA- India demonstrated innovations such as transformation of waste materials into housing components, use of speedier construction techniques, efficient raw material use, as well as indigenously produced future technologies such as 3D printing. These start-ups are expected to fill a gap to bring technical know-how and innovative and sustainable products to the small individual house owner to construct an adequate house at affordable costs.

PMAY-U or 'Housing for All' Mission is one of the largest housing programmes in the world. An estimated, of 7.8 billion person days jobs would be generated in the construction of all sanctioned houses, of which about 7.05 billion person days jobs would have been generated in the grounded houses as stated by Hon'ble Minister Shri Hardeep Singh Puri. The houses being built under the Mission will need to be climate and disaster resilient, given the increasing incidents of extreme weather events such as cyclones, floods, heavy rainfall, droughts, and extreme heat events. New technologies and processes have the potential to ensure structurally stable and speedier construction of homes, as well as the construction of low carbon homes that minimise emissions, and energy and natural resource use.

The size, scale, and impact of the 'Housing for All' Mission presents transformational opportunities, leading Hon'ble Prime Minister to call for the adoption of new and innovative construction technologies to improve its pace and quality. The Global Housing Technology Challenge – India (GHTC-India) was thus conceived and launched by MoHUA in January 2019.

Photo 27: Launch of GHTC– India (January 2019) by MoHUA, GoI

The larger aim of GHTC-India was to identify and mainstream the best globally available, proven construction technologies that are sustainable, green and disaster resilient through a challenge format which could bring a paradigm shift in construction practices for affordable housing. Typically, conventional construction systems (such as the use of brick and mortar) are slow paced, energy intensive, dependent on natural resources and have a large carbon footprint and the challenge intended to phase this out. GHTC-India encompassed a biennial grand expo-cum-conference and two challenge streams.

The two challenge streams were: 1) Identifying Proven Demonstrable Technologies from across the globe to construct Light House Projects (LHPs), and 2) Providing Incubation and Acceleration Support to promote Potential Future Technologies through the establishment of the ASHA-India programme. The first stream invited well-established technology providers with a proven track record of building mass housing. Through a tender process, the technology providers could win and construct a complete affordable housing project of over 1,000 houses each at six selected locations across India. The second stream invited upcoming domestic technology innovators in the housing sector to receive technical handholding/improvements to reach a viable product, or the assistance to mainstream viable products. The second stream will be detailed further in this chapter.

Innovators of construction technology products face several challenges that prevent them from reaching scale. Tenders floated by Central and State/UT Government agencies typically require contractors to be enlisted with them and demonstrate similar scales of previous project experience. Strict adherence to procurement norms, standards, and schedules of rates therefore allowed only established players to compete and hence interact with the Ministry for mass housing construction projects such as those under the Affordable Housing in Partnership (AHP) vertical. Start-ups who provide innovative, sustainable housing components such as paving tiles or walling bricks for example, are not listed in the standard schedules of rates, and hence cannot compete or join consortiums for the project, and are often unaware of how to achieve this certification.

The Ministry also provides financial incentives under PMAY-U to verticals such as Beneficiary Led Construction (BLC) and Credit Linked Subsidy Scheme (CLSS). These sub-schemes benefit the small individual homes built by the beneficiaries for themselves and are typically ground floor structures or walk ups. Being low to mid-rise structures built at basic costs, they do not require high technology or structural specifications used in tall buildings. Such small houses do not attract developers or established players who typically build mass/ high-rise Affordable Housing as seen in the AHP vertical. This gap can easily be filled by start-ups who can provide both technical know-how as well as innovative and sustainable products for the small house owner to construct an adequate house at affordable costs. Start-ups, however, do not have the reach or endorsement of their products to enter this space.

There are various stages that innovative start-ups and creative entrepreneurs go through in their journey towards becoming an established business. Some start-ups are at

initial conceptual stages where an innovator has a potentially disruptive and scalable idea that can solve a real-world problem in the construction sector. Others have moved from ideation to prototyping or process creation and are at testing stages of their product. Yet others have reached a Minimum Viable Product (MVP) and are at various stages of market entry and scaling up.

Understanding the stages that a start-up goes through and their related needs, ASHA-India platform was established by MoHUA under the GHTC- India challenge umbrella. The intent was to catalyse domestic research and development in construction technologies, materials and related products and provide a suitable platform to showcase India's vibrant and dynamic community of innovators. The platform is expected to power a new wave of innovative business ideas, collaborations, and job-creating companies under GHTC- India. A flowchart of the chronology and challenge process of ASHA- India has been included for ease of understanding.

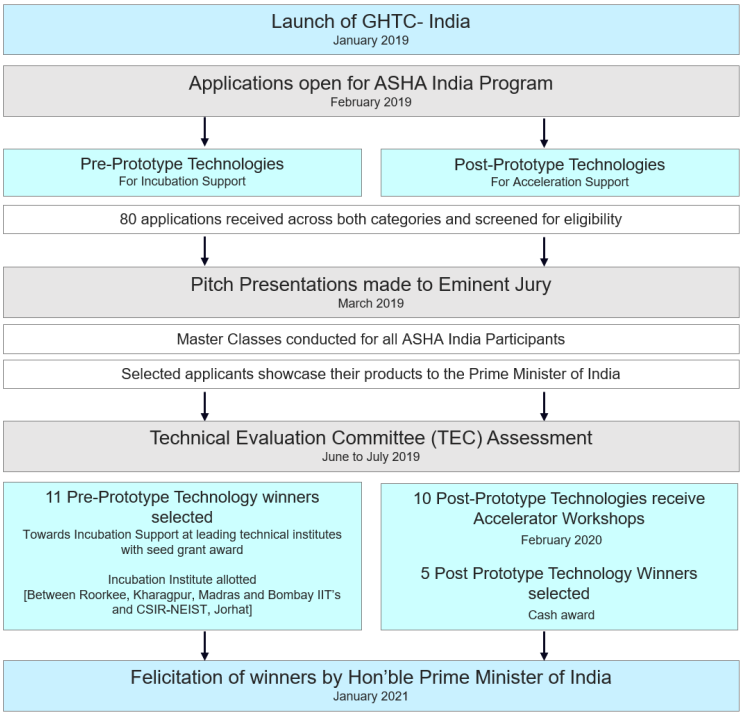


Figure 65: Process flowchart of the ASHA- India programme of GHTC India for Pre and Post Prototype Technologies

Two categories of start-ups were invited as part of the challenge, namely, (a) Pre-Prototype Technologies for Incubation Support, and (b) Post -Prototype Technologies for Acceleration Support.

For Incubation Support, Pre-Prototype Technologies invited were those at early prototypical stages and undergoing iterative design and development. The technology needed to be an essential part of the construction and completion of housing such as structural beams, columns and slabs or components such as walling, roofing, and flooring. Incubation for these technologies would be provided at selected Indian Institutes of Technology (Roorkee, Kharagpur, Madras and Bombay) and CSIR-NEIST, Jorhat. Winning innovators would be provided access to mentors, workshops, laboratories, testing facilities, libraries, IPR support, financial and business model advice and networking support. The process would be time-bound and would provide essential support towards product development, refinement, and standardisation, thereby making the product ready for commercial use. A seed grant was also incorporated.

For Acceleration Support, Post-Prototype Technologies invited were those who had completed prototyping and were at various early stages of market entry and scaling up including sourcing investment. The technology needed to be an essential part of the construction and completion of housing such as structural beams, columns and slabs or components such as walling, roofing, and flooring. This subcategory invited further domains such as natural resource efficiency improvers such as water or waste recycling, self-help innovations, and digital technology enabled products such as software for building information management. Acceleration would be provided through workshops and masterclasses on certification, market scaling, pitch development, soft skills and networking skills, which would be conducted by industry leaders, mentors, founders of successful start-ups, market experts and Government certification and procurement agencies. A monetary award was also included.

The Potential Future Technologies Challenge component was organised by the Building Material and Technology Promotion Council (BMTPC) in association with the World Resources Institute (WRI) India. The larger GHTC-India challenge as indicated in the flowchart was launched in January 2019 and application forms for ASHA-India component were opened in February 2019. 80 applications were received across the Pre- and Post-Prototype categories that underwent a screening for eligibility and were subsequently invited to pitch their solutions at a grand expo-cum-conference.

In person pitch evaluations of the applicants were done by an eminent jury during the conduct of the expo-cum-conference of GHTC-India in March 2019 which was inaugurated by Hon'ble Prime Minister. The criteria for shortlisting applicants included their elevator pitch, the real-world problem they were addressing, the actual product or solution, its impact, its competitive edge, business model, team capability and their need for the GHTC-India platform. Post the evaluations by the jury, a detailed technical assessment was conducted by the Technical Evaluation Committee (TEC) instituted by MoHUA between June and July 2019.

Photo 28: A participant makes a pitch presentation to a jury comprising leading technologists and industry experts (March 2019)

Selected innovators got a unique opportunity to interact with Hon'ble Prime Minister and explain their innovative ideas and products to him. Further, for the benefit of all the participants who attended in person, master classes were conducted at the expo-cum-conference under the themes of product marketing and finance, certification and standardisation of new technologies, sustainability metrics and international trends.

Photo 29: Selected applicants in the Potential Technology Category of GHTC India pitch their products to Hon'ble Prime Minister of India (March 2019)

11 Pre-Prototype Technologies won Incubation Support, while 10 Post-Prototype Technologies were recommended for participation in Acceleration Workshops, of which five were selected as winners. The cohort of 10 Post-Prototype participants received one on one interactions and mentoring with domain and industry leaders and attended a panel discussion with eminent experts in the Accelerator Workshops held in January 2020. Domain experts provided one on one interaction under various themes such as standardisation and certification, research and development, public procurement, funding and venture capital access, understanding real estate markets and developers, and organisational growth and team building.

Photo 30: A shortlisted applicant explains his innovative product during the conduct of Accelerator Workshops (February 2020)

Photo 31: Participants of the Accelerator Workshops (February 2020)

The 11 winning Pre-Prototype Technologies demonstrated a range of innovations from agro-based products to high technology-based 3D printing machines. Agro-based products included using hemp to make construction components like blocks, treating

bamboo for low-cost housing construction and skilling the local workforce, and using agro-industrial by-products to make bricks. High technology-based products included the use of robotic mobile arms with accompanying software, indigenously developed 3D printing technology, custom-built wheeled swarm robotic systems for 3D printing, and prefabricated prefinished volumetric construction panels, including those made from recycled plastic and industrial waste.

The five winning Post-Prototype Technologies demonstrated innovations that recycled waste as well as other advanced technology solutions. Recycled products included plastic waste, industrial waste and agro-waste based paver blocks and kerb stones as well as thermal insulation foam that functions as a stay in place substrate made from waste materials. Other innovations included mortarless and highly standardised interlocking block moulds, a hemp based composite concrete for walling as well as a housing solution with advanced structural components such as an inter-meshable blocks and a peggable-contoured roof combined with on-site sanitation provisions.

The winning start-ups are all pushing the sustainability, cost and time envelopes in the housing construction technology sector. Recycling of waste material such as plastic, ensures that they stay out of landfills and the natural environment, and consume far less energy than would have gone into making a new tile or block from raw materials. The utilisation of agro-waste similarly reduces its improper disposal or burning (causing air pollution) and instead reuses valuable biomass resources. 3D prefabricated and prefinished volumetric construction significantly cuts down on the time and cost that goes into building homes. They can be produced off site in a factory, unaffected by unfavourable local weather and labour constraints and only require assembly on site. Construction components which are mortarless and do not require shuttering and binding bring in efficiency of material use and reduce costs while some others are using new processes to treat traditional building materials like bamboo and hemp for low-cost housing construction. Indigenous developers of 3D printing technology which is expected to be the future of the construction industry are also getting a boost.

The winners in both categories were felicitated during a virtual PMAY-U event in January 2021, which was presided over by Hon'ble Prime Minister of India. The 11 Pre-Prototype winners have now been allotted their respective premier technical institutes for handholding. Testing a products structural stability or heat or earthquake resistance for example is a prohibitive cost and further navigating its standardisation and certification process is yet another complicated step for a novice. ASHA-India's Accelerator programme will enable such promising start-ups to test their products in specialised labs with access to mentors, and network access which would otherwise be unaffordable to many start-ups and will also receive a seed fund to sustain their initial expenses. Similarly, the five Post-Prototype winners received one on one interactions with experts to understand the process of certification, standardisation, team building and networking among other critical skills. They have received their monetary reward and continue to receive Central assistance such as

introductions and endorsement letters to various public agencies across the country with further support under discussion.

Photo 32: Hon'ble Prime Minister of India virtually announcing the winners of the Potential Future Technology category under the ASHA-India programme of GHTC- India (January 2021)

With the right support, these innovators could rapidly provide affordable, sustainable, and durable housing solutions to the small individual homes built by Scheme beneficiaries where there currently exists a gap. They can be utilised well in the BLC vertical and CLSS, which targets over 60% of the 12 million PMAY-U houses planned. Smaller components such as paving tiles and blocks may also be used in mass housing such as in the AHP vertical.

The ASHA- India platform has enabled start-ups with potentially path breaking ideas in construction technology to get a foot in the door to have discussions with MoHUA. They also spoke with the Central Public Works Department (CPWD), and BMTPC, during Accelerator Workshops which previously would have been improbable. On the other hand, it also gave a window to Government agencies in the housing construction space to get a field view of the nature, extent, and maturity of innovative construction technologies prevalent across the country. Overall, this has been a welcome and bold step to recognise and promote a culture of innovation, towards the country's long-term sustainable and economic growth.

Alternative and Innovative Construction Technology in PMAY-U and Beyond

Anil Sawhney &
Dr. Shailesh Kr. Agrawal

LHP site at Chennai, Tamil Nadu

Introduction and Background

The provision of housing for the urban and rural population is a great opportunity and a significant challenge for India. The 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development clearly validate this. Goal 11, "*Make cities inclusive, safe, resilient and sustainable,*" includes a target which states that "*By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums*". Numerous Government and private initiatives of varying dimensions are underway to meet this very crucial basic need.

The Challenge

Since 2015, India has made substantial progress in deploying innovative construction technologies and advanced materials to construct affordable housing. This has been primarily made possible by strong leadership at Central Government level and by partnering with Local Governments. However, a lot remains to be done because the Indian housing value chain is complex. A plethora of factors and issues need to be addressed in making these technologies mainstream. From the perspective of affordability and sustainability, development and identification of appropriate construction technologies for the housing sector are crucial pieces of this puzzle. A careful evaluation of these technologies is equally important.

The adoption of emerging housing technologies in the Indian housing sector before the launch of 'Housing for All' was relatively low. The Government realises that to meet the demand for affordable and sustainable housing, the sector must use innovative technologies. While there is no shortage of available technologies, selecting the most appropriate among the emerging technologies is complex (BMTPC, 2015). It depends on factors like cost and time certainty, speed of construction, energy efficiency, effectiveness in the use of materials, design flexibility, future maintenance requirements and performance throughout the housing life-cycle, customer satisfaction and acceptance, compliance with building regulation, etc.

India is growing rapidly, presenting a massive opportunity for its citizens and the rest of the world. Concurrent with this growth are some challenges. It is well documented that the construction sector has severe supply-side constraints that make the accomplishments of the above-mentioned programmatic goals extremely challenging (BMTPC & SPA, 2021). Current building construction practices are wasteful and put tremendous pressure on our natural resources, our environment, and our exchequer. Energy usage, greenhouse emissions, financial affordability, land usage, and labour shortage are some of the supply-side issues that India must overcome to meet the demands placed by the nation.

Given the importance of construction sector to their national economies, several countries have undertaken studies to identify the challenges and opportunities that the

industry presents. These studies have generally identified a standard set of challenges or problems that the industry faces. For example, in one such study, a list of ten challenges faced by the construction sector in India were identified (Anil Sawhney, Agnihotri, & Kumar Paul, 2014).

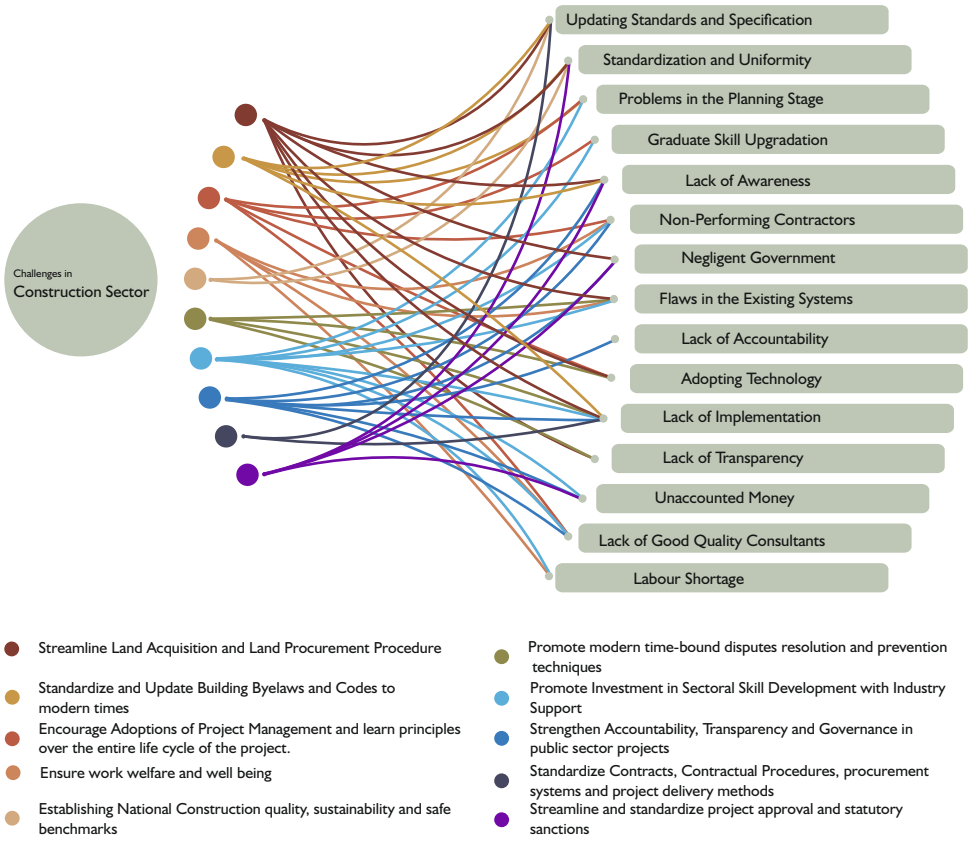


Figure 56: Key challenges faced by the Construction Sector

These issues require a transformational change in the industry, and we envision that in order to mainstream innovative construction technology and advanced materials for the construction of affordable housing, we have to take a holistic approach.

Business-as-usual in the face of demand-side pressures and supply-side challenges will not lead us to a desirable outcome. The "sticks and bricks" approach is likely to give us a status-quo that the country cannot afford. It is obligatory on our part to use innovation as a foundation and technology as a tool to confront the challenge of delivering habitat both in quantity and quality. It is imperative that emerging building technologies and materials find adequate impetus in our quest to produce habitat both in the rural and urban setting. Getting this right will significantly affect the economy, spurring innovation, technology transfer, and

other wealth generation activity. As quoted by IIT Guwahati Director TG Sitharam "civil engineering (construction sector) transforms society as the economic engines of the nation are based on it." He envisions this sector to benefit from Information Technology, Artificial Intelligence, and Internet of Things that are also part of the Industrialised Construction framework described in this chapter. The framework presented in this chapter is not new. Several other Indian experts have defined the broad contours of different elements of the framework in previous publications.

The Need for Innovative Construction Technologies

To influence the Affordable Housing ecosystem, we must ask some fundamental questions about the operating system of our sector. First, we must re-evaluate the design, construction, and operation processes, i.e., we must test how we construct or fabricate against today's realities. Second, to successfully achieve the demands placed on the sector, we must also carefully consider digital technologies that help the design, construction, and operation processes. And finally, we have to interrogate the procurement and delivery systems we use to provide affordable housing.

Explained in the next section, significant strides have been made in using innovative construction technology and advanced materials to construct affordable housing. Numerous technologies are now available to the Indian housing sector. Many of these technologies and materials are now being used extensively. However, to reach the inflection point where the complete transformation of the sector is possible, we have to address the remaining questions about the operating system. We must find ways to incorporate early inputs from the construction and operation processes into the design process. This can be accomplished by promoting a product orientation in the design process and by using the principles of Design for Manufacture and Assembly (DfMA). Concurrent with this, we also have to rethink the digital platform available to our sector, the design, construction, and operation processes of Affordable Housing.

Industrialised Construction for Affordable Housing

A new operating system for affordable and sustainable housing is needed. The new operating system utilises innovative construction technologies and advanced materials. Additional elements of this system are as follows:

1. Design for Manufacture and Assembly (DfMA)
2. Product-orientation
3. Digital Tools and Ecosystem
4. Innovative Procurement Systems
5. Improved Delivery Processes

Under the new operating system, that is referenced as Industrialised Construction, the provisioning of housing will follow these broad steps (Sharma, Sawhney, & Arif, 2017).

Preparation of a building model: The process begins at the design stage by creating a three-dimensional building model [Building Information Modelling (BIM)] with design, manufacturing, assembly, and operating information embedded. The principles of DfMA can be applied to such a model, and the industrialised construction process begins early.

Segregation of disciplines: The building model is then segregated into all the disciplines- architectural, structural, mechanical, electrical, and plumbing. The design and engineering teams can use the segregated models to bring disciplinary expertise and adopt DfMA and product orientation principles.

Modularisation of design: After all the disciplines are appropriately segregated, prefabrication and product experts from each discipline can work further on the model related to their field for defining modules and sub-assemblies depending upon the level of prefabrication to be achieved.

Optimisation: While using DfMA, product orientation, and modularisation, the project team can use optimisation techniques to prudently evaluate essential objectives of time, cost, quality, sustainability, and other outcomes. The industrialised construction approach allows experts to seek optimal solutions proactively.

Prefabrication and manufacturing: After the optimisation is complete, prefabrication and manufacturing can begin. Final construction modelling is done, and shop drawings are developed. This information is used in on-site, near-site, or off-site production facilities to prefabricate and manufacture building components.

On-site assembly and erection: Building components are transported, modules and/or elements are placed on the site based on the design details, and final assembly occurs.

Commissioning and operation: With the industrialised construction approach, the built asset is data enriched, providing the end-user and occupant with detailed information that can enhance its performance.

As the Indian housing sector continues to enhance its ability to use the above-described steps, additional gains can be made regarding affordability and sustainability. In addition, the approach can allow longitudinal learning. That is, the sector can start considering using these benefits across projects.

Figure 57: Questioning the operating system of construction sector

In the following sections, we explain the elements of the industrialised construction system.

Innovative Construction Technologies and Advanced Materials

With the preceding discussion, it is evident that the construction sector requires a paradigm shift from traditional construction systems by bringing innovative construction systems which are resource-efficient, environmentally responsible, climate-responsive, sustainable, disaster-resilient, faster, and structurally and functionally superior. These kinds of systems are being practised in the world successfully and have shown their versatility over time. However, the Indian construction sector needs to be receptive and innovative to adopt and adapt these systems to build New India leading to sustainable growth and quality living for its citizens.

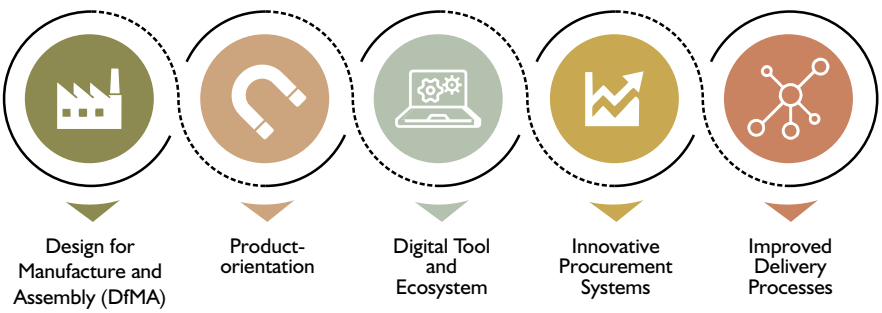


Figure 58: Elements of a new operating system for affordable housing construction

BMTPC is in the process of mainstreaming alternate housing technologies other than conventional ones which are suitable for affordable mass housing especially in urban areas. These alternate construction systems offer a basket of appropriate structural systems that are superior to the existing Reinforced Cement Concrete (RCC)/ load-bearing construction practices and deliver quality, safe and sustainable houses at a much faster rate with much improved functional performance. As a result, about 1.6 million houses are being constructed with alternate construction systems in India under PMAY-U and other state-run schemes. These systems are sustainable and have the potential to replace conventional methods of construction.

Design for Manufacture and Assembly

DfMA is a paradigm that focuses on ease of manufacture and assembly efficiency of components needed to produce or construct a widget. DfMA is both a design philosophy and methodology. The fundamental principle behind it is that by simplifying the design of a product, it is possible to enhance the efficiency of manufacturing and assembly. This principle leads to cycle time reduction and lower overall cost. Downstream processes of manufacturing and assembly are considered when designing products (Tan et al., 2020). Originating from the manufacturing industry, DfMA suggests a systematic design process that integrates the production and assembly experience into the product design (Boothroyd, 2005).

Traditionally, DfMA has been applied to sectors such as the design of automotive and consumer products, both of which need to produce high-quality products in large numbers efficiently. More recently, the construction industry has begun to adopt DfMA to prefabricate construction components such as wall panels, foundation walls, floor slabs, columns and beams, and pods. In addition, given the characteristics of DfMA, it is highly applicable to Affordable Housing construction.

DfMA combines two principles–Design for Manufacture (DFM) and Design for Assembly (DFA). As the name suggests, DFM is concerned with designing for the ease of manufacture of the final product parts. It focuses on selecting cost-effective materials and production processes and results in minimising the complexity of the manufacturing operations. Similarly, DFA aims at the ease of assembly of the parts to produce the final product. It results in reducing the product assembly cost by minimising the number of assembly operations. Together, DFM and DFA seek to reduce material usage, complexity, possibilities of mistakes and other inefficiencies, and overall costs.

Applying DfMA enables the identification, quantification, and elimination of waste or inefficiency in product manufacture and assembly. The main principles of DfMA are:

1. Minimise the number of components or parts
2. Design for ease of part-fabrication and manufacture
3. Tolerances of parts and making them mistake-proof
4. Minimising the use of flexible components
5. Design for ease of assembly
6. Mistake proofing assembly
7. Eliminate or reduce defects
8. Utilise production and assembly data, expertise, and knowledge early in the design process.

With some similarities between DfMA and constructability, the industrialised construction process embraces these principles in a much more holistic fashion. As a result, DfMA, when applied to industrialised construction, provides the following benefits:

1. DfMA brings schedule and cost certainty to the construction process.
2. One of the primary advantages of DfMA in construction is the reduction in overall cycle time and, more importantly, reduces the time spent on on-site activities.
3. DfMA can reduce construction costs by reducing assembly costs. As fewer parts are used, the labour requirements go down, and assembly is simplified.
4. Construction projects that use the DfMA principle are of higher quality, and sustainability is enhanced. This is primarily accomplished via waste reduction, increased efficiency in site logistics, and a decrease in materials movement on site.
5. The workface activities are made efficient via DFA, and assembly steps are shorter and clearer.
6. DfMA increases reliability by lowering the number of parts, thereby decreasing rework and defects.
7. DfMA makes on-site activities safer.

So far, efforts in India have remained mainly focused on the construction stage, and therefore full support of the designers in the industrialisation process is lagging. To fully reap the benefits of the proposed framework, it is essential that Indian architects and designers fully utilise the DfMA principles to allow early involvement of construction and operations expertise in the design process. Significant benefits can be attained through this approach.

Product Orientation

A product orientation is a crucial element of the industrialised construction approach to Affordable Housing. Product orientation allows a shift away from the design and engineer-to-order approach on a project-by-project basis. Instead, the design and engineering processes rely on predefined products, components, and modules (Lin, Tanyavutti, & Jindrapacha, 2007). These are used for configuring the buildings in a standardised configuration process.

As a result, project-specific design is eliminated or significantly reduced. Instead, the products that are used are optimised, and their production, assembly, supply chain, and other details are predefined processes tailored for the specific product. Products such as wall panels, window and door panels, mechanical and electrical sub-assemblies are available to the designer during the design process. The designer configures these products to arrive at the final design of the building. As shown in the simplified illustration, the design of the building is seen as an assembly of products, components, and modules.

Product orientation, in turn, relies on the concept of product platforms. Product platforms are ubiquitous in the automotive sector and are essentially used to achieve mass customisation. The platform of products uses shared components and production processes (Bryden Wood, 2018; M. S. Sawhney, 1998). Using this approach, companies can develop differentiated products efficiently, increase the flexibility and responsiveness of their manufacturing processes, and shift away from developing only one product at a time.

A platform is the collection of assets that are shared by a set of products, divided into four categories(Robertson & Ulrich, 1998):

1. Components: the part designs of a product, the fixtures, and tools needed to make them
2. Processes: the equipment used to make components or to assemble components into products, and the design of the associated production process and supply chain
3. Knowledge: design know-how, technology applications, and limitations, production techniques
4. People and relationships: teams, relationships among team members, relationships between the team and the larger organisation, and relations with a network of suppliers.

One can see the benefit of product orientation, product platforms, and all the design, production and assembly information embedded in these products. The product-oriented approach is not pervasive in the design and construction processes of Affordable Housing in India. However, some early adoptions with limited success in the commercial and industrial construction are now being reported (*e.g.*, Infosys Phase 2, Bengaluru, GKNM Hospital, Coimbatore, Lulu Mall, Lucknow, and GEMS Education, Kerala).

Digital Tools and Ecosystem

As the construction sector is seeing significant investments in new information technology start-ups that are in the process of developing new digital tools for the industry, with some reports estimating total expenditures of $10 billion in the eighteen months beginning January 2018 (Putzier, 2018), it seems that there are some changes on the horizon. It is now clear that the construction industry must modernise as a sector and fully embrace digital tools(A. Sawhney, Riley, & Irizarry, 2020).

The key to the sector's digitalisation is taking a model-centric and data-centric approach to our work practices. The new way of working requires the use of BIM. Using BIM in our design, construction, and operation processes in conjunction with product orientation and DfMA, we can achieve the desired efficiencies.

In addition to using BIM, it is also essential to consider the importance of data over the life cycle. This requires a data-centric way of working. BIM and collaborative project

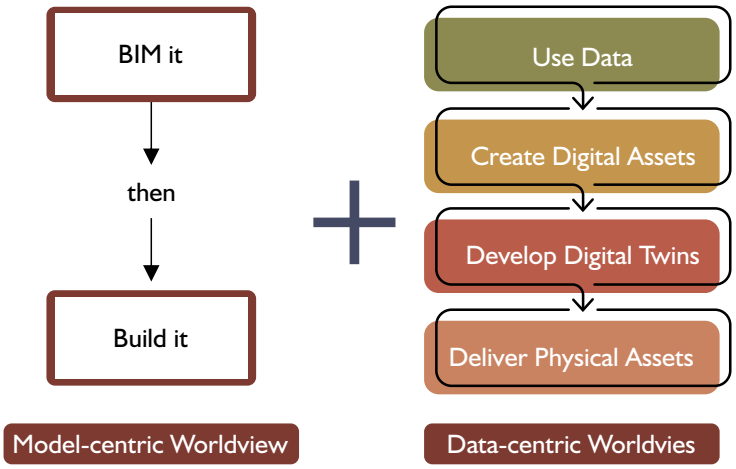


Figure 59: Intregating model-centric and data-centric approach in construction sector

management platforms are pushing the industry towards the use of digital ecosystems to address the fragmentation challenges it faces (Cooper, 2018). While the formal recognition of the idea of digital ecosystems is difficult to trace, but in a recent report by Global Industry Council, a framework based on digital ecosystems is advocated (Global Industry Council, 2018). The report suggests a digital ecosystem-based digital transformation to consolidate fragmented platforms, standardise processes, and attract digital-savvy talent (A. Sawhney, Riley, Irizarry, & Pérez, 2020).

The idea of platforms and ecosystems in the construction sector may be roughly traced to the use of procurement and bidding platforms and materials and equipment supply portals (Noelling, 2016). Unfortunately, these ecosystems did not address the root causes of the horizontal, vertical, and longitudinal fragmentation in the industry. Still, they did demonstrate the value of an ecosystem approach in the sector.

Housing projects need to be designed with modern design technologies that are generative and parametric in nature. BIM, also known as Virtual Design and Construction, can play a significant role in making our designs sustainable, end-user friendly, efficient, and mistake-proof. India has made good progress on the model-centric front. Many designers, engineers, and construction organisations are using BIM. However, there is a need to enhance the use of data and combine it with a model-centric approach.

Innovative Procurement Systems

An adversarial transaction-based procurement regime mars the construction sector. The system of procurement, that is currently prevalent, hinders innovation and does not allow mainstreaming of the elements of industrialised construction that are discussed in this chapter. To fully embrace the ideas of product orientation, DfMA, and advanced construction technologies, it is essential to shift away from a transactional approach to an

enterprise-based system. First, we need to transform procurement processes in sync with proposed digital and physical transformations. The current risk transfer model and search for the lowest builder is not conducive to promoting industrialised construction practices. Second, we must address legal and contractual issues that hinder progress. The Indian public housing sector is lagging in addressing this issue. Third, the procurement systems need to be modernised, taking into account the other elements of the Industrialised Construction framework. A significant effort is required to upgrade and modernise our codes, bylaws and ensuring the capacity to implement them. Finally, we need to reach a stage that building regulations and policies become a mechanism to promote innovation in the Affordable Housing value chain.

Improved Delivery Processes

The multitude of challenges faced by Indian construction have created a restrictive environment for effective delivery of projects and, in turn, responsible for the sectors constrained growth. Lack of coordination and mistrust are commonly cited reasons for the current state of the Indian construction sector " (Kovvuri, Sawhney, Ahuja, & Sreekumar, 2016). This creates the need for testing a different project delivery approach and adopting an efficient project operating system. Around the globe, stakeholders in the construction industry are shifting towards lean principles and practices for efficient project delivery and addressing issues cited above. Indian Government has recommended the 'introduction of efficient technologies and modern management techniques' to raise the industry's productivity. Streamlining the project delivery process will benefit the sector by enabling the other elements of industrialised construction "(Kovvuri et al., 2016).

Transformations Needed

The authors envision the co-emergence of digital ecosystems (*e.g.,* BIM software-based ecosystems) and product ecosystems (*e.g.,* modular or prefab product-based ecosystems) in the innovation journey proposed for the Affordable Housing sector.We believe that the industrialised construction framework is possible with a combination of three transformative processes (each represented as a vertical pillar in the figure):

1. Product transformation
2. Digital transformation
3. Transformation in project delivery processes and related business processes

While the concept of digital ecosystems drives digital transformation, there is a need for the simultaneous evolution of product-platform-based ecosystems to reap full benefits of the framework. The transformation journey on the digital front has already begun. First, as an industry, we move away from a non-model-based approach to a more model-centric practice (Borje Ghaleh and Sardroud, 2016; Sawhney, Khanzode and Tiwari, 2017). The next step in this digital journey is the evolution towards an integrated, synchronous, and collaborative model-centric approach (World Economic Forum, 2018). Once this step is achieved, the

digital systems used by the industry will integrate with cyber-physical systems that, for example, will help in creating digital twins.

The transformation journey also moves away from 'stick-built' on-site methods towards modular and offsite construction on the physical front. In the physical transformation of the construction industry, product platforms can play a significant role (Bryden Wood, 2018). The digital transformation for our industry is facilitated by digital ecosystems; the product transformation is underpinned by product platforms but is incomplete without considering changes to the current delivery and procurement regime. Therefore, concomitant with these two transformations, the industry must also transform the delivery processes and commercial terms from a transactional to enterprise-centric and integrated one (Construction Leadership Council, 2018).

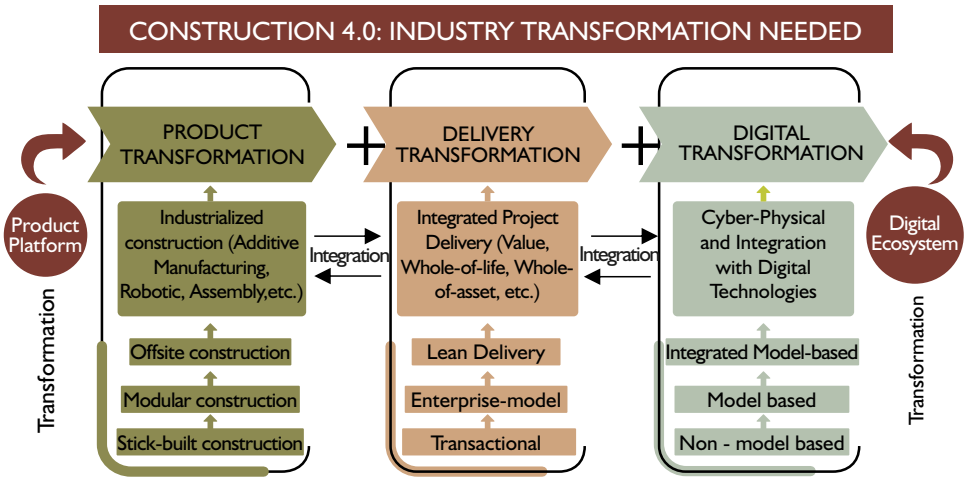


Figure 60: Need of three parallel industry transformation

Benefits

Several recent studies have attempted to define the industrialised construction framework in general and provide a roadmap for research and implementation based on a detailed literature scan (Alcácer & Cruz-Machado, 2019; Liao, Deschamps, Loures, & Ramos, 2017; Pereira & Romero, 2017). Similar attempts are being made regarding industrialised construction (Cooper, 2018; Dallasega, Rauch, & Linder, 2018; Oesterreich & Teuteberg, 2016). These studies focus on identifying the sectoral benefits of industrialised construction. Based on these studies, the benefits of the framework are listed below (A. Sawhney, Riley, Irizarry, et al., 2020).

Enabling an innovative environment: the framework may provide the right mix of enablers to allow the innovation mindset to take root in the industry. Through an integration of the physical and digital layer, this innovation will likely lead to integrated solutions that

will strike at the heart of horizontal, vertical, and longitudinal fragmentation that currently dominates the industry.

Improving sustainability: the integrated framework allows the industry to fully embrace a life-cycle approach and ensure prudent use of resources with a significant reduction in energy usage and emissions.

Improving the industry's image: The construction industry suffers from an image problem caused by several factors. It is well known for its harsh working environment and its low level of automation and digitisation (Farmer, 2016; Oesterreich & Teuteberg, 2016). The digital and physical technologies of industrialised construction can improve the industry's image by transforming the work, the worker, and the workplace and making it more attractive for recruitment and retention of talent.

Cost savings: The use of industrialised construction supported by digital technologies, BIM and Common Data Environment (CDE), can help reduce inefficiencies and waste. Robotics and automation can result in reduction in direct costs. Real-time access to the physical layer with an abundance of data will improve decision-making and provide financial incentives for project teams to collaborate and innovate.

Time savings: Modern methods of construction like prefabrication, additive manufacturing, and on-site assembly will improve the speed of construction. With real-time access to field data, any potential delays can be avoided resulting in time savings.

Enhancing safety: Industrialised construction will enhance site safety. In addition, Augmented Reality (AR)/ Virtual Reality (VR)-based training, wearable technologies, IoT-based connectivity of objects, things, and people, image and video processing can improve safety.

Better time and cost predictability: With real-time monitoring, automated site data collection, image processing, AI, and analytics tools, the time and cost predictability of ongoing projects can be improved. Availability of large volumes of historical data and information can help set benchmarks for early time and cost prediction of new projects, thereby allowing longitudinal integration.

Improving quality: The horizontal and vertical integration resulting from the adoption of industrialised construction framework allows monitoring and control of the design and production processes, thereby improving the quality of construction.

Improving collaboration and communication: Use of cloud-based project management tools, Blockchain, central repository of information, and real-time data access enhances trust among the project team members and enhances communication, coordination, and collaboration.

Customer and end-user-centric world view: With the reduction in tedious and repetitive tasks, the project team focuses on creating value and focusing on what matters most to the customer.

Challenges

The Farmer report documented the reluctance of the construction sector in embracing technology and summarised that the industry missed the Industry 3.0 transformation (Farmer, 2016). Oesterreich and Teuteberg, and Dallasega, Rauch, and Linder, based on an extensive literature review, developed the following list of implementation challenges the sector faces while implementing an industrialised construction framework (Dallasega et al., 2018; Oesterreich & Teuteberg, 2016; A. Sawhney, Riley, & Irizarry, 2020).

Resistance to change: The construction sector has a conservative worldview when it comes to change. With considerable opposition, the industry embraces change. As a result, the elements of transformation that we propose are likely to face scepticism and resistance.

Unclear value proposition: Adoption of innovation requires a clear value proposition for all stakeholders. The complex value chain and transactional nature of the Affordable Housing sector make it difficult to document benefits and financial gains, leading to hesitation by stakeholders to invest.

High implementation cost: The model that we propose may require high initial investments. This may become a barrier to adoption primarily due to unclear benefits and the prediction of cost savings.

Low investments in research and development: Historically, the construction sector has ignored investments in research and development. This may be a significant blocker to our proposed framework.

Need for enhanced skills: The industry is already facing the talent challenge. Without significant enhancements in education and training, the pipeline of skilled workforce is non-existent.

Longitudinal fragmentation: Many in the industry believe that we make the same mistakes from one project to the next. To reap benefits from the industrialised construction framework, it is essential to learn and implement best practices across projects and organisations.

Legal and contractual uncertainty: The construction sector uses a transactional procurement regime that promotes adversarial relationships and limits innovation. The proposed framework requires that delivery and procurement processes transform in sync with the proposed transformations.

Summary and Conclusion

This chapter highlighted the opportunities afforded by the concepts, principles, and components of an industrialised approach to the construction of affordable and sustainable housing. We now approach a potential tipping point at which the concepts generated and applied by forward-thinking innovators and early adopters are accepted and used in the sector mainstream. The practical application of innovative construction technologies and advanced materials, DfMA, product orientation, superior digital tools, innovative procurement models, and improved delivery processes can help transform the Affordable Housing sector. This chapter provides an introduction to our proposed framework and its main components. It places them into context with the past and current state of the industry and describes their potential for significant change. The wide adoption of these elements can transform the construction industry into a more efficient and transparent enterprise.

While the first cost of Industrialised Construction may seem high, the full benefits of the framework must be evaluated holistically. Therefore, in conducting a benefits-cost analysis, we must consider the following outcomes and impacts:

1. Reduce life-cycle costs of Indian buildings
2. Improve the quality of habitat
3. Reduce the dependence on natural resources
4. Reduce the environmental impact and energy use of Indian buildings
5. Improve safety, durability, and performance of Indian buildings

In conclusion, it is crucial to understand that the Indian housing sector's value chain is very complex, making the diffusion of emerging and innovative technologies a tempting yet challenging task to accomplish. We have to be mindful of issues such as urban versus rural housing, cultural and social aspects, incremental housing, climatic and earthquake zones, *etc*. However, this cannot impede our progress, and we must stick to an optimistic agenda wherein we can meet the goals and expectations of this mission. Our quest must be guided by the "whole-building approach," "whole-life approach," and "whole-industry approach." This will allow us to develop implementation models that are integrated, work over the entire life of the building and ensure the meaningful contribution of all stakeholders in the industry. While there is a significant value creation opportunity in this, we must keep the end-user in mind in all activities we undertake as part of this Mission.

The Experience of Light House Projects

Dr. Shailesh Kumar Agarwal,
Raj Kumar Gautam &
Manish Kumar

LHP site at Chennai, Tamil Nadu

Background

The genesis for Light House Projects (LHPs) under Global Housing Technology Challenge-India (GHTC-India) was that there is no better way to adopt, adapt and mainstream the globally available innovative technologies than to go for actual construction of housing projects of considerable size in various geo-climatic regions of the country. These LHPs can have significant visibility and impact on all stakeholders related to building construction and shall show the way for all future constructions in the country.

In order to achieve the goals of 'Housing for All' in Urban India and to bring about major transition in the building construction industry, Government of India through MoHUA initiated GHTC-India in 2019. GHTC-India aims to identify and mainstream a basket of innovative technologies from across the globe that are sustainable, green and disaster-resilient, cost effective, speedier, complying with quality standards, meeting diverse geo-climatic conditions and desired functional needs. It aspires to develop an eco-system to deliver on the technological challenges of the housing construction sector in a holistic manner.

As a result of this global challenge, about 54 innovative technologies from across the world were shortlisted by an eminent Technical Committee formulated at the national level. The shortlisted technologies were further grouped into six broad categories as per its suitability in various geo-climatic conditions of the country.

What are Light House Projects?

Light House Projects (LHPs) are actual housing projects being constructed using shortlisted proven innovative technologies under GHTC-India, suitable to the diverse geo-climatic and hazard conditions of the region. Six LHPs are being constructed in different regions of the country at Chennai (Tamil Nadu), Lucknow (Uttar Pradesh), Indore (Madhya Pradesh), Rajkot (Gujarat), Ranchi (Jharkhand) and Agartala (Tripura) with minimum 1,000 houses with allied infrastructure at each location using six distinct innovative technologies identified under GHTC-India.

Through these projects, other sustainable practices such as green rating, rain water harvesting, use of renewable resources, other passive measures for energy efficiency, waste-water treatment and recycling are also being promoted. Further, these LHPs will adapt to thermal comfort norms reducing the operational energy in the lifecycle of these houses. During the course of construction, the construction waste would also be reduced as compared to conventional construction techniques. The details of the six LHPs, with necessary physical and social infrastructures, under implementation in six regions of the country are as under:

Construction of LHPs, along with all necessary infrastructure is expected to be completed within 12 months from the date of getting all statutory approvals in a challenge

The Experience of Light House Projects

Location	Houses Proposed/Floor	Technology Name	Country of Origin
Agartala, Tripura	1,000/ G+6	Light Gauge Steel Framed System (LGSF) with Pre-engineered Steel Structural System	New Zealand/Kenya
Chennai, Tamil Nadu	1,152/ G+5	Precast Concrete Construction System	USA/ Finland
Indore, Madhya Pradesh	1,024 / S+8	Pre-fabricated Sandwich Panel System with Pre-engineered Steel Structural System	Japan/ China
Lucknow, Uttar Pradesh	1,040/ G+13	Stay In Place PVC Formwork System with Pre-engineered Steel Structural System	Canada
Rajkot, Gujarat	1,144/ S+13	Monolithic Concrete Construction using Tunnel Formwork	France
Ranchi, Jharkhand	1,008/ G+8	Precast Concrete Construction System - 3D Volumetric	Germany

mode. Further, speed of construction being one of the important parameters of this challenge, an incentivisation strategy has been adopted by rewarding the Construction Agency completing the project at the earliest. Foundation stones of all six LHPs were laid jointly by Hon'ble Prime Minister remotely through Video Conferencing and the concerned Hon'ble Governors and Hon'ble Chief Ministers/State Ministers at the site of the concerned LHPs on January 01, 2021. A minimum of 1000 houses will be built at each location. This means that on an average two and a half houses will be built every day. In a month, about 90-100 houses will be built and a 1000 houses are targeted to be constructed in a year.

Houses in LHP Indore will not have brick and mortar walls, but prefabricated sandwich panel system will be used. In LHP Rajkot, monolithic concrete construction technology using tunnel formwork of France is being used, through which about four houses can be made in a day, which will be more capable of withstanding disasters. The houses in LHP Chennai is using Precast Concrete technology of US/Finland, which will help build houses faster and cheaper. The houses in LHP Ranchi is using Germany's 3D construction technology through which each room is separately built and then the entire structure will be added as the Lego Blocks toys. In LHP Agartala, houses are being built by using New Zealand's steel frames technology which are considered better where the risk of earthquakes is high. In Lucknow, Canada's technology is being used, which will not require plaster and paint but the pre-constructed walls be used. It will help in building houses faster.

In order to understand the technology wise construction process being followed and special features of all six technologies, the table below may be referred:

LHP at Agartala, Tripura	
Technology Name:	**Light Gauge Steel Framed System (LGSF) with Pre-engineered Steel Structural System**
Construction Process	The components/ sections are produced by cold forming method and assembled as panels at site forming structural steel framework for walls and roof of a building. LGSF is used in combination with pre-engineered steel structural system for buildings above G+3. The sequence of construction comprises foundation laying, fixing of pre-engineered Steel Structural System, fixing of tracks, fixing of wall panels with bracings as required, fixing of floor panels, decking sheet, fixing of electrical and plumbing services and finally fixing of concrete walling panels with light weight concrete as infill.
Special Features	Due to light weight, significant reduction in design earthquake forces is achieved making it safer compared to other structures. Fully integrated computerised manufacturing of LGSF sections provides very high precision and accuracy. Structure being light does not require heavy foundation and structural elements can be transported to any place including hilly areas/ remote places easily. Structure can be shifted from one location to other with minimum wastage of materials. Steel used can be recycled multiple times and this system is very useful for post-disaster rehabilitation work.

LHP at Chennai, Tamil Nadu	
Technology Name:	**Precast Concrete Construction System**
Construction Process	Casting of individual precast components such as walls, slabs, stairs, column, beam etc. in manufacturing plant/ casting yard in controlled conditions. Precast components are then moved to stacking yard for curing and then transported to site. These precast components are installed at site by crane and assembled through in situ jointing and/ or grouting, etc.
Special Features	Nearly all components are manufactured in casting yard and in situ jointing of components reduces the construction time, resource optimisation, improved quality and precision. Concrete can be designed with industrial by-products such as Fly Ash, Ground Granulated Blast Furnace Slag (GGBFS), micro silica, etc., resulting in improved workability and durability, while also conserving natural resources. In this technology use of shuttering and scaffolding materials is minimal and eliminates use of plaster, helps in keeping neat and clean construction site and dust free environment.

LHP at Indore, Madhya Pradesh	
Technology Name:	**Pre-fabricated Sandwich Panel System with Pre-engineered Steel Structural System**
Construction Process	Factory made pre-fabricated Sandwich Panels of cement or calcium silicate boards on both sides and infill core of light weight concrete with EPS granules balls. These pre-fabricated panels are manufactured in controlled condition in different thicknesses and then dispatched to the site. The panels have tongue and groove joints for construction of a building. Two panels are jointed with dowel bars and filled with polymer modified mortar and finished with putty after placing anti- crack fibre tape. These pre-fabricated panels can be used as load-bearing and non-load bearing walls. For buildings higher than single storey, the system can be used either with RCC or steel framed structure.
Special Features	It is a dry walling system which brings speed in construction, water conservation (no use of water for curing of walling components at site). The sandwich panels have light weight material as core material, which brings resource efficiency, better thermal insulation, acoustics and energy efficiency. Being light in weight results in lower dead load of building and foundation size.

LHP at Lucknow, Uttar Pradesh	
Technology Name:	**Stay-In-Place PVC Formwork System with Pre-engineered Steel Structural System**
Construction Process	The stay-in-place formwork components for concrete walls is manufactured from rigid poly-vinyl chloride (PVC) based polymer compounds. Construction is done in a sequential manner where at first, the pre-fabricated PVC wall panels and pre-engineered steel sections as per the design are transported to the site. These sections are erected on the prepared foundation using cranes and required connections. Floor is installed using decking sheet. Once the structural frame and floor is installed and aligned, wall panels are fixed on decking floor. The pre-fabricated walling panels having provisions of holes for services conduits are fixed along with the reinforcement and cavities inside the wall panels are filled with concrete. Upon installment of wall panels, the flooring, ceiling and other finishing works are executed.
Special Features	Having formwork already as part of system, the construction is faster as compared to conventional buildings. In case of concrete as filling material, the curing requirement of concrete is significantly reduced, thus saving in precious water resources. The formwork system requires no plaster and gives an aesthetic look. The system provides advantages in terms of better structural strength, durability, improved weather resistance and thermal insulation and ease of construction. The PVC formworks can be recycled/salvaged up to 55%. Thus, making it an eco-friendly system.

LHP at Rajkot, Gujarat	
Technology Name:	Monolithic Concrete Construction using Tunnel Formwork
Construction Process	The concrete walls and slabs in this system are cast in one go at site giving monolithic structure using high-precision, re-usable, room-sized steel forms or moulds called 'TunnelForm'. The system replaces the conventional Reinforced Cement Concrete (RCC) Beam-Column structure which uses steel/plywood shuttering. Tunnel Form system uses customised engineered steel formwork consisting of two half shells which are placed together and then concreting is done to form a room size module. Several such modules make a building unit. The typical construction process includes positioning of the formwork with the installation of mechanical, electrical and plumbing services, installation of reinforcement in the walls and slabs, concreting, stripping of the formwork for next casting.
Special Features	Use of this technology facilitates rapid construction of multiple modular units making structure durable with low maintenance requirement. The precise finishing can be ensured with no plastering requirement. Being box type monolithic structure, it is highly resistant to horizontal forces (earthquake, cyclone, etc.). The large number of modular units bring economy in construction.

LHP at Ranchi, Jharkhand	
Technology Name:	**Precast Concrete Construction System 3D Volumetric**
Construction Process	The 3D volumetric concrete construction is the modern method of building by which solid precast concrete structural modules like room, toilet, kitchen, bathroom, stairs, etc. and any combination of these are cast monolithically in plant or casting yard in a controlled condition. Sequential construction in the project here begins with keeping the designed foundation of the building ready, while manufacturing of precast concrete structural modules are taking place at the factory. Factory finished building units/modules are then installed at the site with the help of tower cranes. Pre-stressed slabs are installed as flooring elements. Rebar mesh is finally placed for structural screed thereby connecting all the elements together.
Special Features	About 70% - 90% of the building work including finishing is completed in plant/ casting yard leading to significant reduction in construction and occupancy time. Industrial by-products like Fly Ash, GGBFS, Micro silica, etc., can be used in concrete for improving workability and durability and also increasing the resource efficiency. With smooth surface, it eliminates use of plaster and the monolithic casting of walls and floor of a building module reduces the chances of leakage. This system helps in keeping neat and clean construction site and dust free environment.

Photo 33: 3D perspective view of LHP Agartala

Photo 34: 3D perspective view of LHP Chennai

Photo 35: 3D perspective view of LHP Indore

Photo 36: 3D perspective view of LHP Lucknow

Photo 37: 3D perspective view of LHP Rajkot

Photo 38: 3D perspective view of LHP Ranchi

Why are these called Light House Projects?

These are called LHPs as they will have demonstrative effect, wherein people from all sectors such as engineering, planning, architecture, academia, builders/ developers, innovators, policy makers amongst others will be able to see and get to learn the use of innovate technologies on ground.

These LHPs have been introduced for familiarisation, adoption and adaption of innovate technologies, materials and processes suited to diverse Indian geo-climatic and other conditions so that they may be replicated for construction in other construction projects of public and private sector. Special attention has been paid to the fact that these technologies are resource efficient, sustainable, climate resilient, cost effective and result in faster pace of construction.

These six LHPs are anticipated to give a new direction to housing construction in the country. The coming together of states from the east-west, north-south and every region of the country has further strengthened the sense of cooperative federalism.

Light House Projects as Live Lab

The LHPs have been designed to serve as Live Laboratories for different aspects of transfer of technology to the field which includes planning, design, production of components, construction practices, testing, evaluation, documentation etc. The whole process of Live Laboratory is based on the principles of 'Learning, Exploration, Adaptation and Replication'. It is intended to create large scale citizen participation and technical awareness for learning, deliberation, experimentation and innovation, thereby mainstreaming these global technologies in Indian context.

On the lines of 'Satyagrahis' and 'Swachhagrahis', a campaign of 'Technograhis' has been launched by MoHUA. The Technograhis are to act as the change agents of innovative and sustainable technologies triggering technology transition in the construction sector through its adoption in the country. They will act as catalysts to transform the urban landscape for the New Urban India for fulfilling the vision of Aatma Nirbhar Bharat. Technograhis are being exposed to the innovative construction technologies through onsite activities and offsite workshops/ webinars, webcasting, mentoring on technical know-how/ module, etc., to learn different aspects of use of innovative technologies in LHPs.

In order to promote cross learning and exposure to LHP technologies, an E- course on these innovative technologies have also been started which is free and open to all. This E-course includes audio-visual classes, on-site recording of construction, talks by domain experts/ developers/ project engineers, etc.

Closure

The amount of efforts gone right from planning/designing to the implementation of GHTC-India and LHPs so far as enumerated above, it is bound to have a large-scale impact on the overall construction mechanism in the country. LHPs are not business as usual in which the construction generally happens in the country, rather it is a step towards 'pole-vaulting' to address the housing shortage in urban areas wherein use of innovative technologies has a significant role to play. Normally, with the use of conventional technologies, construction of about 1,000 houses as planned under LHPs would have taken about two to three years, but the same scale of houses under LHPs will be constructed in lesser time. These projects will demonstrate and delivery of ready to live houses showcasing the speed, economy and with better quality of construction in a sustainable manner.

Through these LHPs, the shortlisted global technologies are being showcased which can then be adapted and replicated in other construction projects in Indian condition. These global technologies will have the benefit of being incorporated in Schedule of Rates (SoRs) and standards, receiving certifications. This will help in bringing getting necessary modifications, as felt necessary in the innovative technologies of different origin to suit Indian condition for fast adopted in Indian construction industry. Besides, more than 16 lakh houses built under the PMAY-U have used innovative technologies. Innovation is also evident in the use of the building materials as per local needs and available resources. Expansion of these new and innovative technologies in cities will also accelerate both construction and delivery of houses in projects developed by other public sectors and private agencies.

Today, the country is on a different approach and has adopted a different path of all round technology revolution. These six LHPs are a perfect example of the country's working practices. A total of 6,368 houses are being built, which means that on an average two and a half houses will be built every day. In a month, about 90-100 houses will be built and 1,000 houses are targeted to be constructed in a year. These projects will also demonstrate the Government's firm resolve to bring speed, quality, durability and resilience in building construction at one hand and comprehensively address the issues of climate change by reducing the carbon footprints, thermal comfort, improved air quality, construction and demolition waste reduction, reduced construction period as well as environment protection, etc. These projects will stand out for India's pursuit in innovation, excellence, adaptation and self-reliance (AatmaNribhar) with people being at the core of each action. LHP Chennai has already been inaugurated and dedicated to the Nation by Hon'ble Prime Minister on 26th May, 2022.

Sustainable Housing : Opportunities and Constraints

Sunita Narain,
Anumita Roy Chowdhury &
Rajneesh Sareen

AHP Project at Rajkot, Gujarat

Cities in India are still under construction. Building sector is a major contributor to climate change and to local environment destruction because of construction materials used, energy used for lighting, heating and cooling, water consumption and waste discharge. Urban built environment has locked in enormous resource inefficiency, upsetting carbon footprints of cities, and intensifying toxification of environment. Cities are also more vulnerable to extreme weather events including urban flooding and heat island effects that have bearing on built structures that magnifies health burden. Urban environmental degradation of this magnitude erodes 'developmental' gains. The opportunity is that a great part of India is still unbuilt and it is possible to build new that is sustainable.

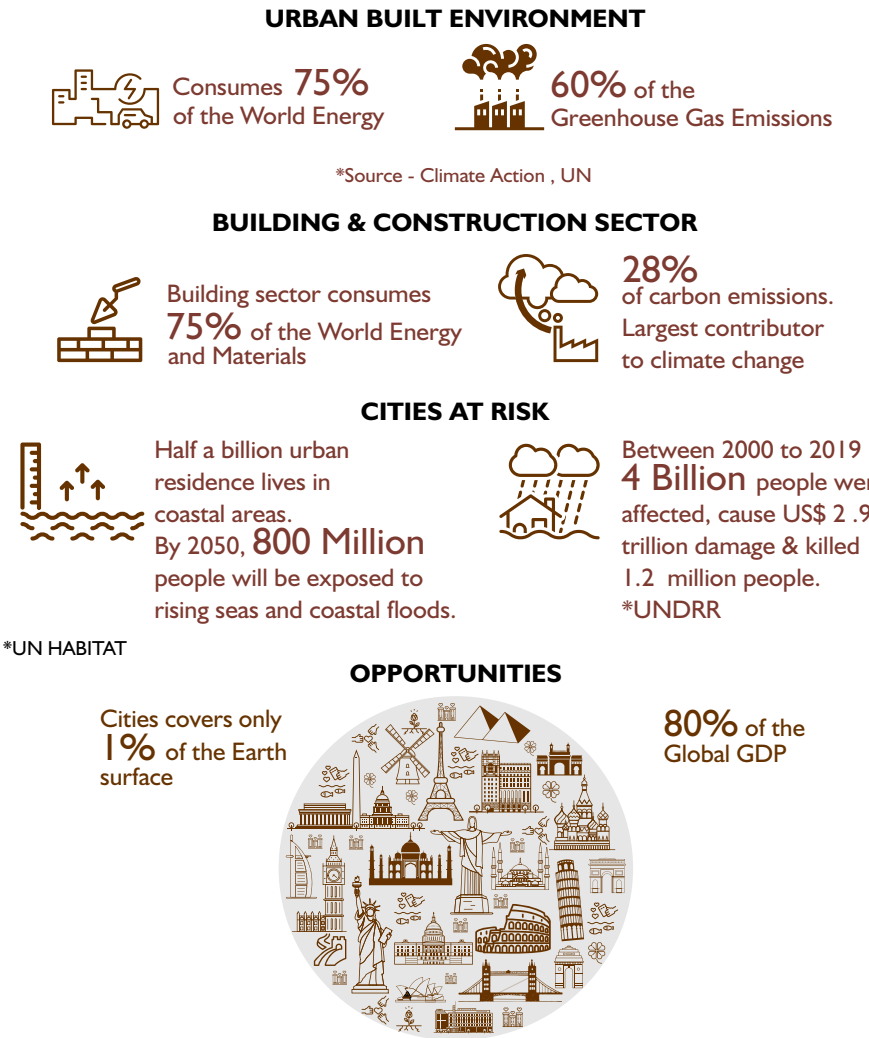


Figure 61: Urban build environment: Challenges and Opportunity
**World Bank*

Answers and solutions to these emerging urban environmental challenges to a great extent lie in the way the buildings and urban structures, primarily buildings and their habitat, are designed and built. Buildings that account for majority of the land use in cities can be designed to prevent them from becoming carbon and heat trappers and resource guzzlers. While containing the growing dependence on energy intensive mechanical cooling due to combined effect of growing affluence and warming climate is necessary, building thermally comfortable and liveable buildings for all income classes has also become compelling and non-negotiable. Studies by Centre for Science and Environment (CSE), Delhi have shown that due to growing dependence on mechanical cooling, electricity peak demand during midnight of summers in Delhi can be higher than the afternoon peak. Residential sector is already using up nearly 24% of electricity in the country.

The COVID-19 pandemic has further reinforced the linkages between thermal comfort and energy efficiency of residential buildings and the health and life of residents. It has underscored the need for housing schemes to address liveability and affordability of the inhabitant in the post-pandemic era. With strategic intervention potential for green recovery and a better quality of life for residents is possible. According to UN-Habitat, housing determines the cities' spatial form, densities, urban environment, degrees of exclusion or inclusion from civic life and overall quality of life. It is, therefore, important to understand India's current efforts and opportunities for reforming the housing sector in order to prepare cities for climate resilience, thermal comfort, liveability and energy efficiency.

India is set to more than double its building footprint in the next two decades, according to the International Energy Agency. An analysis by Central European University and Global Buildings Performance Network suggests that majority of this area is going to be residential at 75% of the total floorspace in India. India's residential sector is adding at least 178 million sqm of residential floor area every year. About 1–1.2 million Dwelling Units (DUs) are expected to get added to the formal housing stock within the next few years. Are thermal comfort interventions getting deferred?

According to Niti Aayog's India Energy Security Scenarios (IESS), buildings contributed to total energy demand by 238 TWh/year in 2012. This is a fourfold increase in just 20 years. This share is projected to grow to above 12% by 2047, in a scenario of determined efforts and that too at an enormous 2,287 TWh/year. Bureau of Energy Efficiency (BEE) notes residential space cooling need, especially room-based air conditioning units, is a major factor contributing to the high energy demand. Although there is no residential baseline energy data available at present, IESS predicts residential heating and cooling demand will continue to dominate buildings energy demand (at 40% of the total) until 2047, followed by residential lighting and appliances segment (at 27% of the total). Residential buildings play a key role in maintaining energy security and reducing emissions against India's Nationally Determined Commitment (INDC) target too.

Within this context, India Cooling Action Plan (ICAP) was launched in 2019 by Ministry of Environment, Forests and Climate Change (MoEFCC) with a target of reducing cooling energy needs by 20%- 40% by 2037-38. This target was set against the fact shared by MoEFCC that majority of buildings in the country will not be able to achieve thermal comfort by 2037-38 due to uninformed layouts, design and choice of materials. India is among the first few countries to set such a comprehensive and long term vision. A thermally comfortable house has less heat stress, which is a growing health concern in a warming environment and also consumes lesser energy, that adds up to monetary savings for the occupants as well.

According to the ICAP, space cooling in buildings that accounts for 60% of the country's cooling energy consumption can be brought down by 20% through climate appropriate building envelopes and design. Supportive strategies of Eco Niwas Samhita 2018 or Energy Conservation Building Code for residential buildings (ECBC-R) can be leveraged to enable thermal comfort. This can be improved by working on ventilation, sunlight ingress and overall design of the living spaces. Community-led efforts have also shown to make an impact for thermal comfort. For instance, cool-roof initiatives in four cities, Jodhpur, Bhopal, Surat and Ahmedabad, wherein in slum roofs were painted with solar reflective paints have helped keep indoor temperatures lower by 2-5 degrees Celsius (3.6-9 degrees Fahrenheit), compared to traditional roofs.

National Resource Efficiency Policy launched in 2019 aims to mitigate impact by guiding resource consumption. This guides minimisation and optimisation of resource consumption to ensure material security, waste minimisation, higher value creation among others in line with efficient and circular approaches.

Several policies and regulations now converge to promote wider penetration of climate-responsive housing that keeps indoor temperatures within an acceptable thermal comfort band. This has the potential to align layouts, ventilation strategies, building envelope, material choices and walling assemblies to maximise human comfort and well-being. This policy ecosystem gives a fresh impetus to India to work towards reducing the heat load and disease risk/ burden of the upcoming housing stock and improving liveability for all.

Pradhan Mantri Awas Yojana – Urban: An opportunity

India launched PMAY-U, world's largest housing programme, in 2015 with an aim to house every Indian in a serviced and durable structure. India is looking at a target of constructing 12.2 million houses for the Economically Weaker Sections (EWSs) and Lower Income Groups (LIGs) based on the demand surveys conducted by States and Union Territories (UTs). PMAY-U was launched with four verticals, namely in situ Slum

Rehabilitation (ISSR), Affordable Housing in Partnership (AHP), Credit-Linked Subsidy Scheme (CLSS) and Beneficiary Led Construction or Enhancement (BLC). These four verticals enable the Government to implement and empower the beneficiaries to access housing using varying methods.

Only recently, a fifth vertical or a sub-scheme under PMAY-U, Affordable Rental Housing Complexes (ARHCs), was added amidst the lockdown and migrant crisis induced by COVID-19 pandemic. Thousands of migrant workers had set on a journey afoot back to their hometowns when they were deprived of shelter, food and wages in the large cities. Rental housing will now be developed to house migrant workers or urban poor near their workplace in rental housing units, which will be equipped with basic services and a dignified living environment. This is the first ever initiative of formal rental housing.

PMAY-U programme is supported by Central and State/ UT Government incentives, that is an opportunity to make the incentives more performance oriented. Central incentives include 'Infrastructure status' to Affordable Housing; gives priority to use of land for Affordable Housing, and Goods and Services Tax (GST) reduced to 1% (from 8%). PMAY-U also requires states to provide additional Floor Area Ratio (FAR) and Floor Space Index (FSI), or Transferable Development Rights (TDR) and relaxed density rules for slum redevelopment and low-cost housing. State/ UT Governments additionally provide exemption from stamp duty, additional FAR and TDR and relaxed density rules. They also provide free or subsidised material, or cap the construction cost.

The seven years of implementation of PMAY-U have thrown up lessons and also offered opportunities for India to reform the Affordable Housing sector. With an aim to construct 12.2 million housing units, the requirement of resources for this programme has been and will continue to be colossal and will have strong bearing on land, power demand, wastewater treatment, solid waste management infrastructure, etc.

If addressed at early stages of planning, this has potential to respond well to the needs of all, including the vulnerable sections. An operational framework is now required to set and guide the terms for mass and self- construction of housing and improve planning and designing of housing that is climate- appropriate, resource-efficient, safe, healthy, comfortable and affordable to the masses, especially the poor.

Key Takeaways

Incentives without performance requirements and criteria may make structures under-performing with respect to resource efficiency and thermal comfort. Review of the Affordable Housing schemes in States carried out by CSE has shown that in most cases, States are working with fixed layout or design template. Construction agencies are prioritising materials for fast pace construction that often ignores the architectural designs needed for improving thermal comfort. New generation pre-fabricated materials are

expensive and yet favoured as time and labour can be saved. It has become necessary for Cities/States to identify design and materials based on performance benchmark. It is important to augment information on performance of new materials and technology choices. BEE has estimated that energy demand in buildings can be cut down by up to 40% by designing an efficient envelope.

Benchmarking of materials and construction cost can help construction agencies to understand the impact of new walling technologies. PMAY-U is backed by the incentives crafted under Technology Innovation Grant (TIG) under Technology Sub-Mission (TSM) of PMAY-U to promote innovative and alternate technology for speed of construction, and sustainable, resource efficient and disaster resilient construction. A TIG of ₹1,00 thousand per DU in case of double bedroom (upto 60 sqm carpet area), ₹60,000 per DU (upto 30 sqm carpet area) in case of single bedroom and ₹20,000 per dormitory bed (upto 10 sqm carpet area) is provisioned.

TSM and TIG are an opportunity for India towards enabling thermal comfort in mass housing. These can guide housing sector on technical requisites for resource efficiency, thermal comfort and liveability. This connection will have to be made more explicit, otherwise, housing may not conform with the needs of the beneficiaries while failing to meet the sustainability targets.

Field assessment by CSE in States and simulation of sample housing projects from different typologies from different climate zones with reference to National Building Code 2016 and ECBC-R 2018, has put a spotlight on the role of ventilation, daylighting, heat ingress, energy consumption and expenditure and impact of design and materials on thermal comfort of the houses. This assessment has revealed a number of opportunities that exist to strengthen India's housing regime. These opportunities need to be tied in a framework that ensures performance in the future housing stock to minimise use of materials, and embodied and operational energy.

Green performance and reduced burden of operational cost for beneficiaries

A number of incentives are already available to developers. These include extra FAR, FSI and TDR and tax holidays. Information on performance of materials, and operational performance for thermal comfort and energy efficiency need to be prioritised. But this requires adequate research and information about their suitability from a thermal comfort standpoint. Improved resource efficiency can reduce cost burden on the beneficiaries too, as otherwise this can lead to increased requirement of annual operational hours of cooling and increased costs due to poor serviceability.

Existing regulatory frameworks such as Environmental Impact Assessment (EIA), building bye-laws and also public private partnership models or procurement guidelines for Affordable Housing need to incorporate these performance indicators for green performance of housing.

This can help to overcome the challenges in Affordable Housing sector that include low demand and liquidity, stuck capital, and uncertainties around the availability and costs of material and labour. In fact, combined impact of material choices and architectural design solutions can increase incremental cost by about 20-35% compared to conventional construction (depending on construction costs and material penetration in states). Developing thermal performance criteria is crucial along with linking subsidies and incentives with performance of the housing stock and integrating regulatory instruments like EIA, building bye-laws, etc. with thermal performance criteria.

Architectural design and space design can improve climate-responsiveness of buildings

Thermal comfort of Affordable Housing is deeply affected by layout, orientation, walling, clustering, day lighting and ventilation. Orientation to the sun can be adjusted to limit heat gain in hotter regions. For example, orientation with longer façade facing north-south (NS) directions and a higher north-south to east-west (NS:EW) surface exposure ratio can reduce annual hours of thermal discomfort substantially. Similarly, choice of materials has strong bearing. Materials with higher thermal mass and insulation properties help. Sequence of layering of walling materials impact heat ingress. Handbook on functional requirement of buildings guides appropriate sequencing. Height of buildings and the distance between them become a crucial parameter for ideal daylight penetration. According to Central Public Works Department's (CPWD) integrated green design manual, distance between the buildings for ideal daylight penetration should be such that the lowest floor windows of a building should subtend a maximum angle of 22.5 degrees with the top of the adjacent building.

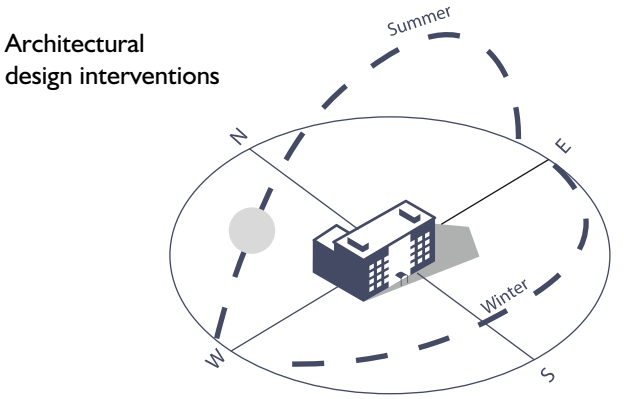


Figure 62: Optimum orientation sun path

Layout and orientation can influence air movement and can be improved by staggering buildings, mid-rise height, clustering diagonally to wind flow direction, and increasing distance between buildings. Moreover, it optimises the envelope factor. The ratio of total envelope area to the carpet area of a building has a positive correlation with the

number of overheated hours in a building. Envelop of a building has to be more efficient to perform for thermal comfort.

Need improved criteria for assessing affordability in post COVID-19 scenario

The recent migrant crisis due to the pandemic-induced lockdown was evident in the capital and metropolitan cities. Interestingly, the same cities also face the widest affordability gaps in housing sector. For instance, Mumbai has the highest price-to-income ratio among cities globally. This raises several concerns. This limits of housing affordability of the poor. Working on city level price-to-income ratios can reveal actual affordability gaps and housing demand. But the poor are not reflected adequately in the housing databanks. Proper documentation of household incomes and expenditures, and market prices at the city level (across classes) is necessary.

Rental housing scheme for migrant workers and urban poor amidst the lockdown seek to provide close-to-workplace housing with basic services on affordable rent. But this has been launched with a view to utilise the unoccupied inventory of affordable houses and earmark appropriate locations for rental housing in master plans.

Need health criteria for space standards

Liveability is also linked with space standards. In India, a house is considered congested or crowded when a married couple does not have a separate room. Adequate sunshine ingress, ventilation and physical distancing requirements placed by the pandemic change the standardisation game. Quality and design of a habitable space now needs attention with a view to reduce the disease burden of housing. Further, the current typologies of housing are disconnected with the space needs specific to the LIGs. For instance, a substantial population in lower income segment is usually occupied in home-based livelihoods which requires spill out areas. Housing layouts and designs need to accommodate expandable work and community spaces to suit the economics and social dynamics of this income group.

To improve performance and accountability establish energy disclosure policy

Developers need to be assigned resource efficiency and sufficiency targets for every Affordable Housing project when seeking building permission from the Government. Third party assessment and verifiable annual disclosure of energy and other resource use during the operation of buildings need to be made mandatory. This will ensure that targets are met during the operational phase. A certification tool may be developed for developers to track their performance, and it may be linked to future incentives like extra FAR/FSI/TDR. For instance, BEE's PAT scheme is a similar tool that allows project proponent to trade energy savings.

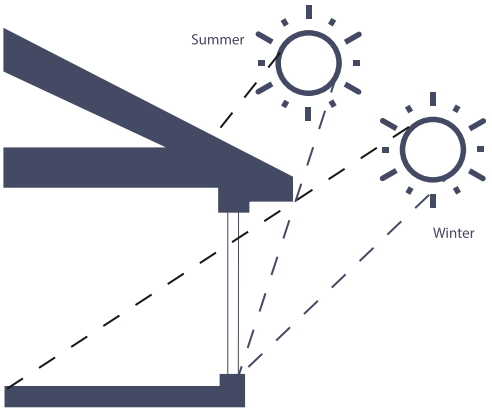


Figure 63: Passive Solar Design - Seasonal Position of the Sun

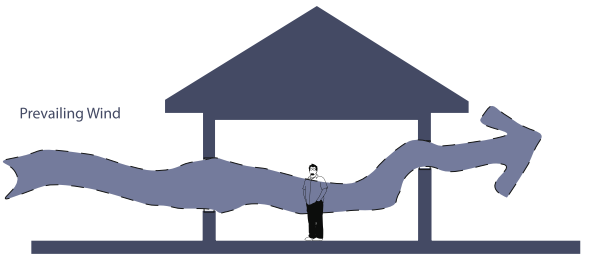


Figure 64: Cross Ventilation

Need better integration of housing schemes with the city plans to address mobility needs and costs

Rental housing has come at a time when explosive urbanisation is making cities sprawl. Fuelled by existing zoning norms, this urban sprawl has been increasing mobility needs and associated costs for the beneficiaries. At a time when Indian cities do not possess adequate and robust public transport systems, affordable rental housing has potential to curb urban sprawl and limit development of unsuitably located housing projects. This will have to be addressed through urban planning regime. There is a need to watch how the states will implement rental and other upcoming Affordable Housing schemes in this context.

Expand knowledge base on climate-appropriate design, materials, and associated tools and techniques; repositories from the ongoing PMAY-U experience can enable this

There is a need for new tools and techniques to deliver affordable housing in line with India's thermal comfort, resource efficiency, and sustainability goals. These tools, such as simulation software and analysis, should be made part of the academic curricula of architecture, planning and engineering courses. Academia needs to be familiarised with

these methods of analysis and why they are important given the several challenges and objectives of the country. The construction industry, comprising of both Government bodies like CPWD, National Buildings Construction Corporation (NBCC), etc. and private developers, also needs to do the same. Developer associations like Confederation of Real Estate Developers' Associations of India (CREDAI) need to be particularly engaged and trained on the subject to make them ready to receive and deliver on the requirements for thermal comfort, resource efficiency, and sustainability. Self-construction forms a major segment under PMAY-U, this warrants the need for guiding the community as well.

Knowledge repositories can enable this

The current learning curve from the seven years of PMAY-U's implementation needs to be documented amassing the information on layouts, designs, materials used, locations, environmental services, good and best practices among others. This will not only expand the knowledge base of different stakeholders but also inform the future housing stock.

Clearly, PMAY-U programme has enormous potential to transform the housing sector. Several steps have already been initiated. This now needs to be taken forward to tap the potential of resource savings. We need to scale up the practice of affordable and sustainable buildings. This knowledge and practice will further evolve. Already so much is happening in different parts of the country to experiment with materials, energy, water and waste. The challenge is to keep learning and inform to make this work.

Addressing energy poverty for liveability of the poor

Yet another critical aspect of liveability is clean energy access to eliminate energy poverty. There are several schemes now that are contributing to this transition. Pradhan Mantri Sahaj Bijli Har Ghar Yojana – Saubhagya scheme is aiming at ensuring last-mile connection of all willing yet unelectrified households to move up the energy ladder and reduce dependence on polluting fuel such as kerosene. Pradhan Mantri Ujjwala Yojana (PMUY) has further helped to substitute highly polluting solid fuels. In fact, according to State of Global Air 2020, dramatic increase in access to liquefied petroleum gas (LPG) in India has led to significant decline in exposure to household air pollution and its associated burden of disease. This needs to be leveraged further by adopting additional measures to ensure sustained use of the fuel by the households at affordable rates.

It is also clear that India's ambitious plan to achieve an installed capacity of 40 GW of solar energy has to address equitable access of the poor to new clean energy through a decentralised model of mini and micro grids. Infact, residential solar rooftop is also part of that strategy that needs to be scaled up. Current housing stock being built under PMAY-U is an opportunity to leverage this scheme to maximise clean energy access. But residential solar rooftop currently forms only 13% of the 6 GW capacity target. This needs speed and scale of implementation.

Energy efficiency measures can provide equitable benefits

While thermally comfortable buildings can reduce overall energy consumption for the beneficiaries, affordable access to energy efficient appliances can further enhance energy security of households. According to Niti Aayog's India Energy Security Scenarios, domestic lighting and appliances will use up about 27% of energy demand by 2047. At the level of mass consumption two appliances, fans and bulbs, dominate.

Most commonly owned cooling device is a ceiling fan and its efficiency can be improved cost-effectively. Current policies and programmes such as standards, labels, and financial incentives can be used to accelerate adoption of efficient ceiling fans in order to realise potential savings. As per ICAP 2019, BEE's proposed standards and labelling norms for ceiling fans for 2022 and this would result in energy savings up to 15%, a substantial saving in household electricity bill.

BEE, under its Market Transformation for Energy Efficiency initiative, has launched a Super-Efficient Equipment Programme (SEEP), a labelling programme for fans in 2019 but in the face of COVID-19 pandemic, its implementation has been postponed to January 1, 2022. Similarly, Ministry of Power is promoting energy efficient lighting through Unnat Jyoti by Affordable LEDs for All (UJALA). As of June 9, 2021, 367.9 million LED bulbs have been distributed under the UJALA scheme for domestic purpose that has saved 47,712 million kWh of electricity per year, as per the National UJALA dashboard.

Need performance monitoring of buildings to ensure improved liveability, accessibility and affordability

A balanced scorecard approach enables decision makers to plan and act in a comprehensive manner. Currently, green rating systems for buildings and townships is the only instrument to guide resource and energy savings through a comprehensive planning and design process. Some of the key rating programmes include Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC)'s Green Homes rating and Green Building Council of India's (GBCI) EDGE Homes are some of the metric. CPWD has also come up with its own system – Green Habitat Accomplished Rating (GHAR) for all its new buildings.

However, these schemes are voluntary and enjoy a range of incentives like additional FAR, discounts on additional FAR, property tax rebate, exemption of stamp duty among others. National Housing Bank under its SUNREF Green Housing India programme also extends loans at subsidised rates for green ratings. While these instruments have the potential to improve resource savings, a bigger focus has to be on continuous and transparent monitoring of performance of buildings post construction to deliver on the intended benefits.

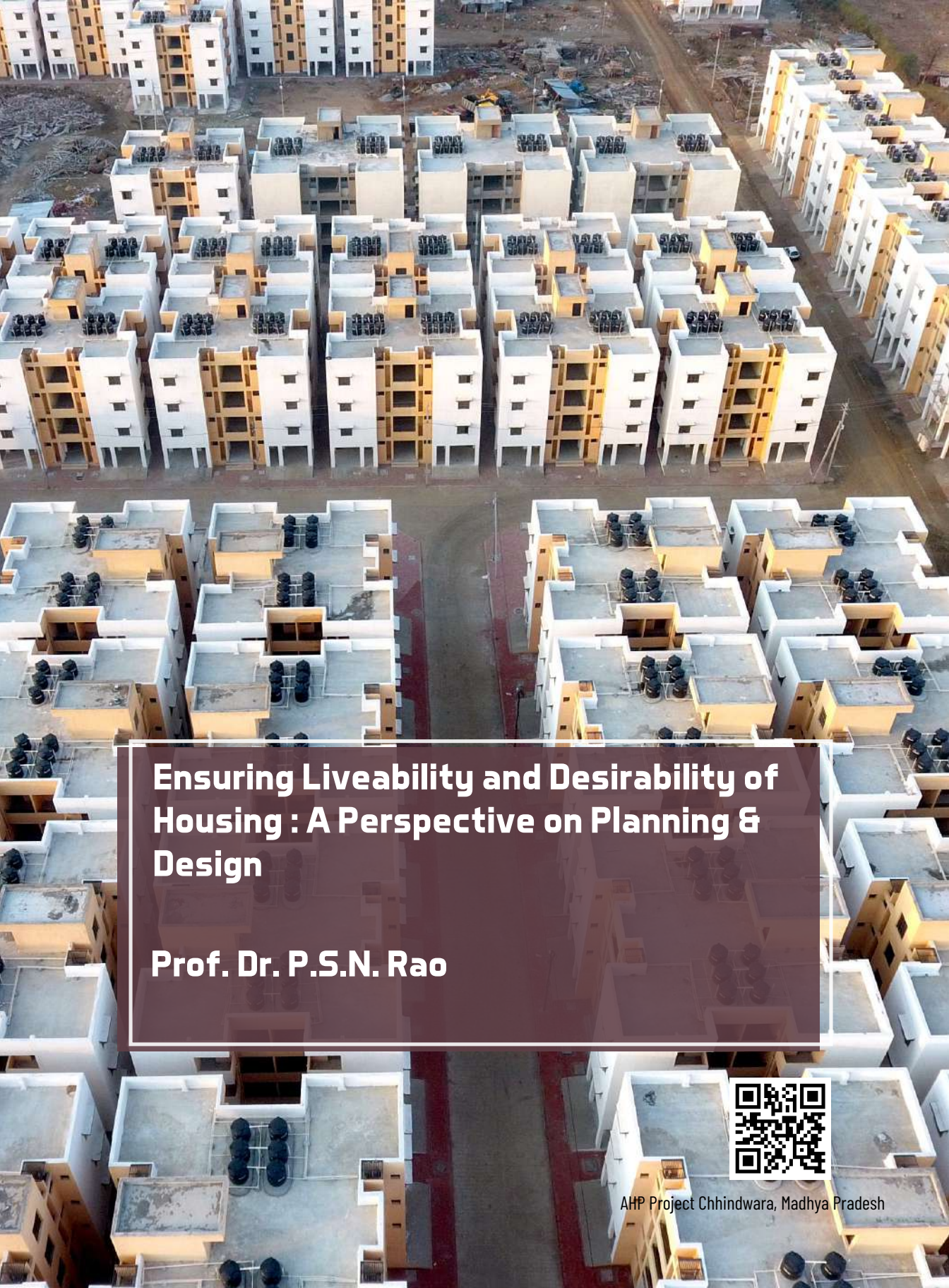
Infact, Energy Conservation Building Code Rules 2018 include performance monitoring. Accordingly, building owners have to submit Energy Performance Index (EPI)

report through empanelled energy auditors for two consecutive years post commencement of operations, to the respective state designated nodal agency. However, adoption of the rules has remained weak and requires more stringent application.

For more widespread application of sustainability features in all future affordable housing, a viable financing model is needed to offset the additional cost. Enabling thermal comfort in buildings may increase construction cost compared to conventional construction (depending on construction costs and material penetration in States). Instruments that quantify and enable well-rounded performance based on a balance scorecard is needed. This needs to combine transparent tracking of indicators related to energy savings, water and sanitation and waste management, connectivity and accessibility of settlements.

Ensuring Liveability and Desirability of Housing : A Perspective on Planning & Design

Prof. Dr. P.S.N. Rao



AHP Project Chhindwara, Madhya Pradesh

The Concept of Liveability

The concept of liveability originated way back in the 1950s. The book 'Liveable Streets' published in 1981 also brought the concept of liveability to planners and urban designers, particularly as it related to streetscapes and transportation. The usage of 'liveability' in planning literature saw an increase in 1999 with the Gore-Clinton Liveability Agenda, a framework for coordinating and adding huge funding for new tools and resources to preserve green space, ease traffic congestion, and pursue regional 'smart growth' strategies.

American Association of Retired Persons (AARP) has been developing guidance on 'liveability' since their first Community Evaluation Guideline in 2000 and continues to offer tools and guidance to communities around it. In 2005, the next iteration of AARP's evaluation guide provided their definition of liveability that is perhaps valid even today:

"A liveable community is one that has affordable and appropriate housing, supportive community features and services, and adequate mobility options, which together facilitate personal independence and the engagement of residents in civic and social life".

In United States, the concept of liveability gained significant traction in 2009 as a set of guiding principles from the new Partnership for Sustainable Communities (PSC), a collaboration between US Department of Housing and Urban Development (HUD), US Department of Transportation (DOT), and US Environmental Protection Agency (EPA). The six *'Liveability Principles'* developed by PSC are as follows :

Figure 66: Six 'Liveability Principles'

In India, the concept of 'liveability' of cities and neighbourhoods has been gaining traction in the recent past. In 2018, MoHUA brought about the concept of 'liveability' in a big way. According to the Ministry, "Ease of Living (EOL) is a framework to assess improved well-being of citizens, since the end goal of development is to improve liveability. The Index examines *liveability* of 114 Indian cities across a set of 3 pillars, which include a total of 14

categories and 50 indicators on the subjects of Quality of Life, Economic Ability and Sustainability". The index gives a fairly sophisticated measure of the liveability of Indian cities on a comparative scale.

Amongst the various parameters which are used to compute the liveability index, housing plays a significant role. Electricity, water & sanitation and affordability, along with education and health are some of the key areas where data and perception have been collected to compute the index. Actually, housing is the anchor for liveability. All the parameters ultimately get connected to housing, since a house without physical and social infrastructure and transportation does not mean anything.

Desirability of Housing

India being a very large country with diverse geographies, the emergence of housing form and culture has also been equally varied. What people want or desire in housing in different parts of the country is different. Desirability is intrinsically related to several natural elements. For example, in coastal areas, humidity is very high as compared to the continental locations. Therefore, people desire to have more breeze, which would mean large windows. Similarly, in places where rains are very heavy, a sloping roof is desired so as to drain off the rainwater and in hot and dry areas, smaller openings are more desirable. Culture and lifestyle practices also play a very important role in desirability of housing. Courtyards, for instance, have been a very important element in traditional Indian houses. They have multiple uses, whether it's for child's play area, drying of clothes, for sitting or sleeping in the open.

In the modern-day context, desirability of housing has changed substantially. Aspirational desires, particularly for latest fixtures especially in the kitchen and toilets, have changed the story completely. Housing for low income population is no longer low cost housing, it has to have atleast some of the modern features for it to be acceptable by the buyers. There is enough evidence for one to see in various low income housing projects all over the country that when people build their homes, they decorate with the best of materials and products they can afford. This shows that ownership gives pride and people collect resources from as many quarters as possible to achieve the same. There is enough literature on this aspect of 'security of tenure' in housing enhancement.

Significance of Planning and Design in Housing

For families to live lives according to their requirements, housing design is of paramount importance. Design of houses in India evolved over centuries. Local geography, climate, availability of materials, level of technology, affordability and social status were all considerations. No discussion on this can go forward without referring to Amos Rapoport. His classic work titled 'House Form and Culture' in 1969 considered, in the words of Joseph Adeniran Adedeji, "the underlying theoretical constructs that have shaped, and continue to shape, the built environment, including religion, beliefs, customs and socio-cultural forces at

large. Rapoport presented neatly distilled correlates of culture and house form with a large volume of cultural illustrations from across the globe. The book is also a presentation of cross-disciplinary studies of dwellings, buildings and settlements from architecture, planning and cultural geography". This is an excellent scholarly discourse on the relationship of house design and culture of societies across the globe. It emphasises the role of significance of planning and design as shaped by cultural forces, as apart from climate and materials of the time.

Perhaps the most expensive purchase for a householder is a house. Nevertheless, families do not hesitate to spend well as they would like their house to look the very best. A house is a reflection of the station of a person's life and is a symbol of prestige in the community. The design of a house shapes life and lifestyle of a person and his family. While some of these concepts have changed with time, people still pay a lot of attention to various design aspects related to housing. Often, when a person purchases a built house, the level of satisfaction is not as much as when he himself builds a house.

Freedom to Build

The concept of 'freedom to build' was first widely discussed way back in 1972 by John FC Turner, based on research done in South America. His book titled 'Freedom to Build' was perhaps the very first book which argued that "when dwellers are in control, their homes are better and cheaper than those built through Government programmes or large corporations." The book is a compilation of experiences in various countries and is influenced by his notion of 'housing as a verb'.

Turner's ideas became the theoretical basis for policies governing international urban assistance to developing countries in the form of 'sites and services' and 'slum upgrading'. These two approaches for improving urban shelter and infrastructure became the dominant form of urban aid by World Bank during 1970s and 1980s. Such type of projects were financed in more than 80 countries and hundreds of cities and towns in this period, directly reflecting the insights of John Turner and of authors in the Turner and Fichter book. The legacy of this work has largely been undervalued. Yet, the assertion of 'freedom to build' is the fundamental premise of this activity on a global scale. The very fact that a large number of houseless households in developing countries have been using their own funds, capacities, indigenous mechanisms, skills and systems to fend for themselves to provide for their shelter needs shows the enormous power of this 'freedom to build'. A large number of "unauthorised colonies and slum settlements", essentially individual and community efforts, are evidence to this fact that people have been strongly exercising their freedom. However, since this 'freedom' is often curtailed, the settlements which they carve out for themselves are branded as "unauthorised"[1]. Legislation related to town planning and housing, having been adapted from Britain, has given a system of plan preparation and implementation which does

[1] *For a detailed discussion on the state of housing in India, see MEHROTRA, Rahul and MEHTA, Kaiwan (2018). The State of Housing in India – aspirations, imaginaries and realities, Vol.1 and 2, UDRI and Architecture Foundation, Mumbai.*

not accommodate this freedom to shape neighbourhoods and this is an area which also needs a relook and reform today.

Limitations of Housing Provision in Indian Cities

The popular mechanism for housing provision in urban India has been through organisational instruments of State Housing Boards, Corporations and Urban Development Authorities. While these performed actively during the early decades after the Independence, their performance slowly declined for various reasons. Setting up of Housing and Urban Development Corporation (HUDCO) gave a big boost to these parastatals in the provision of housing. However, this was only short-lived. The promotion of private real estate developers by the State and local Governments led to the decline of housing demand from the state housing agencies. While international agency funding did help in the initial decade or two, that too dried up soon. Active promotion of real estate entrepreneurship only led to the promotion of upper and middle income housing and lower income households were left with few options. This, in turn, led to the proliferation of illegal land subdivisions, illegal since the land sub dividers did not desire to follow the rules and pay huge land conversion charges to the State. Indian housing story also saw the emergence of cooperative sector in a big way in many cities. However, why that is not being vigorously encouraged is a mystery. The result of the earlier faulty policies with inadequate consumer safeguards, over the decades, have finally shown huge vacancy rates and stalled housing projects, basically of real estate developers. The Real Estate (Regulation and Development) Act 2016 (RERA) is trying hard to restore consumer confidence into the residential real estate sector.

One of the reasons for State/ UT Governments to excessively depend on developers is the fact that they find it difficult to acquire land for housing projects, since the land acquisition legislation changed in the country. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (a mutated version of the earlier Land Acquisition Act of 1893) has made it rather difficult and cumbersome to acquire land for housing projects. As a result, public housing projects have reduced substantially. Although most States have also enacted Affordable Housing Policies, they too rely heavily on real estate developers coming forward to develop 'Affordable Housing'. All these developments have called for a strong intervention of the Government in housing sector and this is where PMAY-U 'Housing For All' programme has brought a major policy shift in favour of strong Government intervention and funding for housing development all over the country.

PMAY-U and Housing Diversity: Ensuring Liveability

PMAY-U is a flagship programme of Government of India, spearheaded by MoHUA, launched in 2015. This programme adopts a four pronged strategy, popularly referred to as the four verticals of PMAY-U. Each of these vertical is a different strategy to address a particular segment of housing problems in the country. The verticals are namely

'In-situ' Slum Redevelopment (ISSR), Affordable Housing in Partnership (AHP), Beneficiary-led construction (BLC) and Credit Linked Subsidy Scheme (CLSS).

Under BLC, central assistance of ₹150 thousand is provided to individual eligible families belonging to Economically Weaker Section (EWS) to either construct new houses or enhance existing houses on their own. Those desirous of avail this assistance have to approach Urban Local Bodies (ULBs) with adequate documentation regarding availability of land owned by them. They may be residing either in slums or outside the slums. Beneficiaries living in slums that are not being redeveloped can be covered under this component, if they have a kutcha or a semi-pucca house. ULBs validate the information given by the beneficiary and building plan for the house submitted so that ownership of the land and other details like economic status and eligibility can be ascertained. In addition, condition of the house of the prospective beneficiary is be checked with Socio-Economic Caste Census (SECC) data to ensure their consequent eligibility for construction of new housing. SECC data regarding number of rooms, details of family members, etc., is also checked to ensure eligibility for enhancement.

On the basis of these applications, ULBs prepare an integrated citywide housing project for such individual beneficiaries, in accordance with the City Development Plan (CDP) or other such plans of the city. This is done to ensure that construction of the proposed houses is as per the planning norms of the city and schemes are implemented in an integrated manner. Individual applicants for assistance are not considered. Such projects are approved by States/UTs in the State Level Sanctioning and Monitoring Committee (SLSMC). While approving projects for individual house construction, ULBs and State/ UTs ensure that the required finance for constructing the planned house is available to the beneficiary from different sources including his own contribution, Central and State/UT Government's assistance, MoHUA, etc. In no case, Central assistance is released for house where balance cost of construction is not tied up, as otherwise release of Central assistance may result into half constructed houses.

States/UTs or cities also contribute financially for such individual house construction. Central assistance is released to the bank account of the beneficiary identified in a project as per the recommendations of the State/UT. Though funds from Central Government to State/ UT Governments are released in lump sum, including assistance for this component, it is further released to the beneficiary in 3-4 installments, depending on progress of construction of the house. Beneficiary may start the construction using his own funds or any other fund and assistance from Central Government is released in proportion to the construction by individual beneficiary. The last installment of ₹30,000 of Central assistance is released only after completion of the house. The progress of such individual houses is tracked through geotagged photographs so that each house can be monitored effectively. From the progress of the entire PMAY-U so far, it can be seen that the BLC component of the Mission has been the most successful, with over 65% of all houses constructed so far being under this vertical.

One of the important features of BLC is that the plans are sanctioned and therefore, standards of light, ventilation, safety and infrastructure are ensured. However, sometimes, it is also felt that for low income housing, strict adherence to building bye-laws may not always be required or necessary, as it is very difficult to enforce. In fact, in recognition, in Unified Building Bye Laws (UBBL) 2016 in Delhi, SARAL scheme has been introduced where house construction on plots of land up to 100 sqm need not apply to the Urban Local Body and need only to intimate them for record. This saves a lot of time, money and harassment for the low income population, who need not run from pillar to post trying to get their drawings approved.

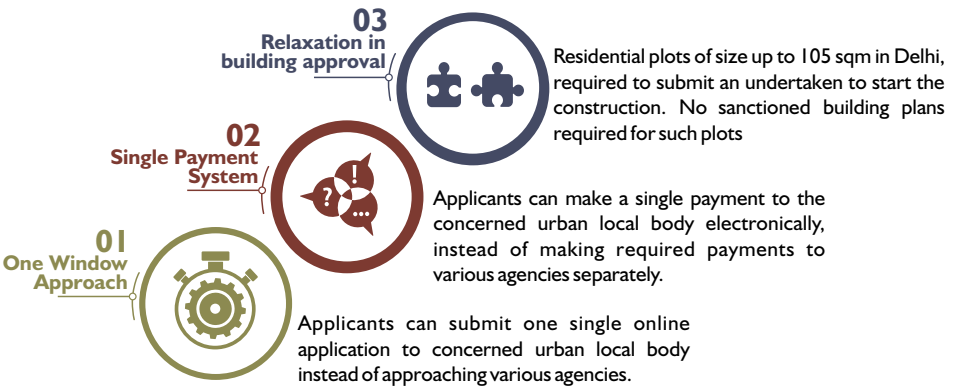


Figure 67: Components of Unified building Bye Laws 2016

Conclusion

From the above discussion, it can be concluded that provided land is available to people, they like to construct their houses by themselves, with their own liking, design, materials and specifications. All they need, perhaps, is some financial support and infrastructure upgradation. The reason for this is that in a diverse nation like India, people have strong likes and dislikes. Individual desirability varies from family to family and person to person. When people are given the freedom to build and shape their housing environments in a manner in which they desire, then maximum satisfaction is achieved. This is not to say that modern technology has no place. Using modern technology options is also possible when people build for themselves. On one hand, while there are technology options for rapid mass construction by machines and developers for consumption by people who do not have the time and energy to build their own houses, on the other hand, there are also alternative technology options for individuals to purchase materials off the shelf in the market and build their own houses, at their own pace, own choice and own affordability so as to suit their peculiar and unique requirements of desirability and liveability.

The lesson for policy makers now, therefore, is that while urban India is huge and diverse, there is enough space for all kinds of housing strategies to co-exist. However, in the particular context of EWS and the poor, the policy approach should be 'provision of serviced land for housing'. Once this is done, everything else will be taken care of by the people

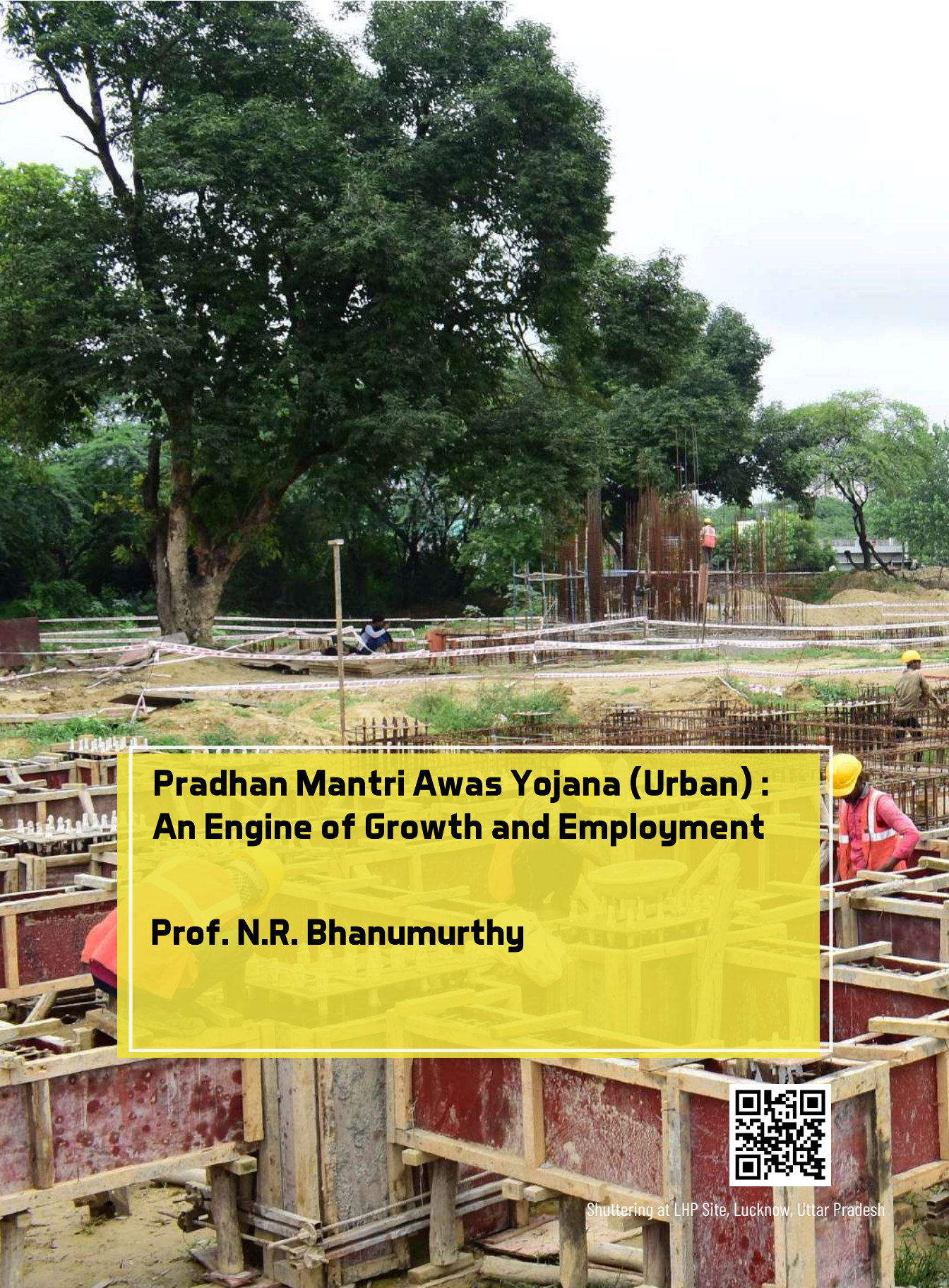
themselves and they will proudly exercise their freedom to build. Earlier, this concept was implemented in the name of 'sites and services' by acquiring land on a large scale through land acquisition legislation. However, ever since this law for land acquisition has been amended, it has become very difficult and expensive to acquire land for housing provision. Therefore, one has to look for alternatives such as Town Planning Schemes and Land Pooling Schemes. While frameworks for such Schemes are available in many States, they are wrought with many problems and delays. MoHUA is advocating for the simplification of these frameworks, that will go a long way in improving the supply of land parcels for planned housing development as per norms and standards.

Today, the enormous success of BLC under PMAY-U has shown that we now need to encourage this concept of 'assistance for plotted neighbourhoods'. If there is a Phase II of PMAY-U, then this should be the way to go – Government assistance should be only for facilitating serviced plots and the rest of the housing process would automatically happen. This would greatly help the landless urban poor to procure a shelter for themselves. Obviously, when people make their own choices for housing, their satisfaction levels on design, materials, quality, functionality and usability are high and this will reflect on ensuring better liveability of housing. What people cannot do for themselves viz. roads, water and sewerage infrastructure, street lighting, garbage management, etc., is where the Governments need to focus on and leave house design and construction to the people. With this kind of an approach, our efforts to build a 'New Urban India' can be further speeded up.

PART FIVE
Impact on Economy And Financial Inclusion

Pradhan Mantri Awas Yojana (Urban) : An Engine of Growth and Employment

Prof. N.R. Bhanumurthy



Shuttering at LHP Site, Lucknow, Uttar Pradesh

Housing for All

The problem of housing, which appears to be universal, is critical especially in urban areas, given the increased pressure on urbanisation. This is much more critical for an emerging market economy like India where, with globalisation, the expansion of urban areas has coincided with strong economic growth since 1991 economic liberalisation. The rise in population size and a significant shift in migration from rural to urban has only worsened the already weak housing conditions in urban India, where a large number of urban population did not have proper housing with basic civic amenities. Often the urban poor live in over-crowded housing, self-made temporary structures in slums and squatter settlements, exerting pressure on deteriorating urban infrastructure and social services. These altogether were making the standard of living of the urban poor vulnerable, that needed a special focus towards providing affordable housing to this section of the society.

In case of India, the Report of the Technical Group on Urban Housing Shortage (TG-12) brought out the problem of housing shortage and suggested the ways to fill the gap between the stock of affordable houses and the number of prospective beneficiaries as well as providing more new and affordable houses (Government of India, 2012). This report estimated the housing shortage in urban India to be as high of about 18.78 million in 2012. In order to address this issue, in June 2015, Government of India launched PMAY-U.

The extent of investment in housing sector has both direct and indirect effects on other sectors of the economy. Due to strong interlinkage between various sectors of an economy, any investment made in one sector has multiplier effects on the others, inducing economy-wide growth and employment opportunities. This is more so in the construction sector, which has strong backward and forward linkages with other sectors of the economy. Housing sector appears as one of the major employment generating sector. In this context, investment made towards addressing housing shortage under PMAY-U offers an opportunity to stimulate growth in the economy, especially when it is battered due to COVID-19 pandemic with negative Gross Domestic Product (GDP) growth at -7.3%[1] in 2020-21. Further, as PMAY-U Scheme provides affordable housing to the beneficiaries under four verticals, it is expected to contribute to both growth and development, which has been argued as two mutually exclusive concepts of the economy.

Under the Scheme, which is a demand driven one, till now the government has sanctioned 12.2 million houses among the four verticals, as on 25 June 2022. But the most important aspect of the programme that it is expected to have significant impact on employment and output is the total investments under the Scheme. As on 25 June 2022, the total investments under the Scheme is estimated at ₹8.31 trillion with ₹3.46 trillion by the Centre and State/ UT Governments and the rest ₹4.85 trillion invested by the beneficiaries. With this background, in this chapter, we look at to what extent PMAY-U has contributed to improving growth as well as employment in the economy. At a macro level, we also look at how public investments, especially in construction activities, could spur larger impact on employment and output at the overall economy.

[1] *National Income estimates released by the National Statistical Office*

Role of construction in overall economic activity

In the Gross Value Addition (GVA) estimations, the share of construction activity is about 8 to 9% (as in 2018-19). However, this has seen a sharp decline in 2019-20 due to the pandemic as well as due to general slowdown in the economy. Importance of the sector could be made if one looks at the employment elasticity. The latest National Sample Survey Organisation (NSSO) data on Employment and Unemployment situation in the country for the year 2011-12 suggests that the employment elasticity in construction sector is estimated to be as high as 1.12 between 2004-05 and 2011-12, while economy-wide employment elasticity was estimated to be quite low at 0.06 (see Misra and Suresh, 2014). Apart from "Utilities" sector, construction is the only sector that registered elasticity of more than one[2]. Further, if the same is examined from the NSSO round of 1999-2000 to 2011-12, while the employment elasticity has declined in almost all the sub-sectors, construction sector is only one of the two sectors that have seen significant increase. It has increased from 0.88 between 1999-2000 and 2004-05 to 1.12 between 2004-05 and 2011-12. This also suggests that the high GDP growth period between 2004-05 and 2011-12, is also coincided by the growth of construction sector, both in terms of its contribution to output and also to the total employment that India has generated during that high growth period.

In terms of sectoral shares also, there is a significant increase in employment shares in construction sector. The employment shares are presented across four NSSO rounds, the employment share in construction has more than doubled from 4.5% in 1999-2000 to 10.6% in 2011-12. It is only the construction sector employment that is showing sustained increasing trend across all the four rounds compared to other three major sectors. One important point to note here is that construction sector absorbs more than half of the employment that has moved out of agriculture sector, which is known to have very low labour productivity. In a way, the structural shift in employment appears to be strong from agriculture to construction sector.

The issue is while there is an increase in the share of employment in construction sector, one important policy question is what is its contribution to output? For this we looked at the sectoral labour productivity (output per unit of labour) data provided by India-KLEMS Database (RBI, 2020) . Although there are few phases of decline, overall, it is clear that labour productivity has seen a significant increase from ₹13,300 (at constant 2011-12 prices) in 1990-91 to presently at ₹18,000 in 2017-18, with an annual average growth of about 1.3%. However, the growth in labour productivity is sharper in the latest period, i.e., between 2012-13 to 2017-18, which is at 2.69% per annum (on average). Based on the information from employment elasticity and labour productivity, it is very obvious that construction is one sector that has seen sustained increase in both employment growth as well as the growth in labour productivity in India in the post-reform period.

[2] *Based on regression model (log-log), the study finds that employment elasticity in construction is the highest (at 1.03) for the period 1993-94 to 2011-12.*

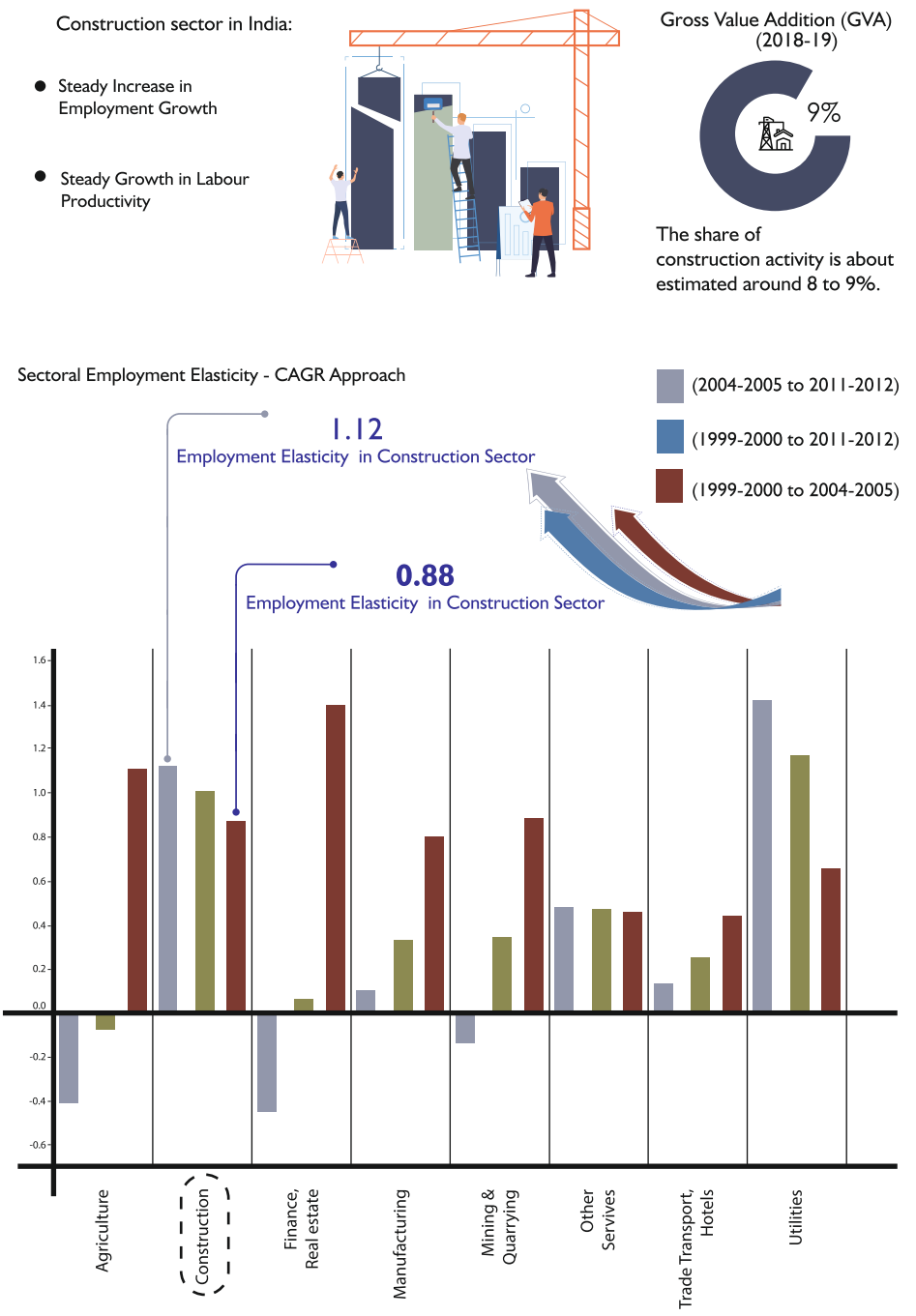


Figure 68: Role of construction sector in India's economy

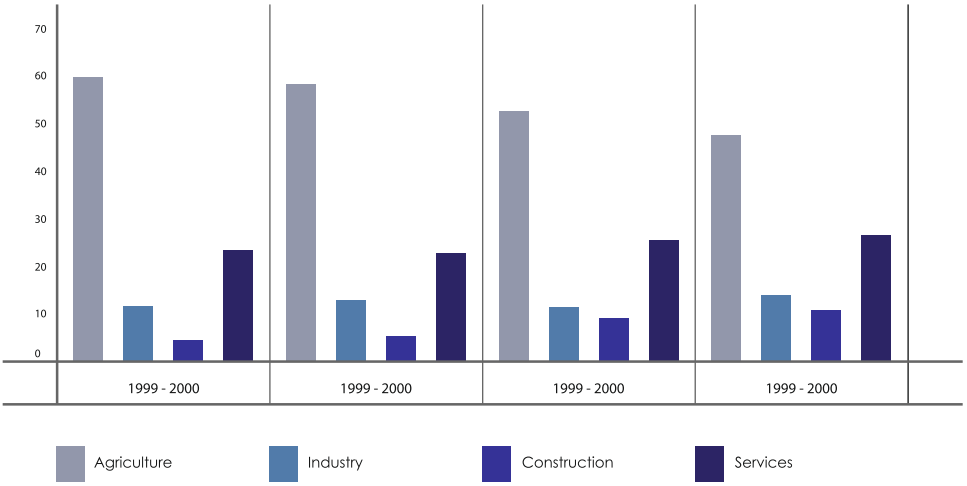


Figure 69: Sectoral Employment Shares in India (In %)
Source: Based on estimates from Misra and Suresh (2014)

In terms of the role of public and private sector in the overall growth of construction sector, while it is clear that large part of construction happens in the private sector, government also invests a lot in this sector. This is more so in building public infrastructure (both in rural and urban areas) that also includes developmental programmes such as Pradhan Mantri Awas Yojana (both in rural and urban areas), Pradhan Mantri Gram Sadak Yojana (PMGSY), among many other flagship schemes. Indeed, in many difficult conditions, these developmental programmes have been introduced as a fiscal stimulus measures. Even during the Aatma Nirbhar Bharat scheme that government announced in various phases during the pandemic in 2020-21, it included over ₹700 billion for PMAY-U Scheme. This is in addition to special liquidity schemes that are provided for housing finance companies such as National Housing Bank by Reserve Bank of India (RBI). During the pandemic, it is the government's investments in infrastructure that has compensated for the decline in the aggregate demand due to decline in private investments as well as in private consumption. Here, it is interesting to quote the recent RBI's Annual Report 2020-21 that says, "At a disaggregated level, fixed investment in dwellings, other buildings and structures decreased by 0.3 percentage points to 15.5% of GDP in 2019-20, mainly due to public non-financial corporations and the household sector, which offset the gains made by the general government sector through its thrust on infrastructure and affordable housing" (p.23). For the PMAY-U, under Aathma Nirbhar Bharat scheme, CLSS for middle income group was extended, which could have provided boost to the housing sector. This reiterates the role of public investments in reviving the economy that is badly affected due to the pandemic.

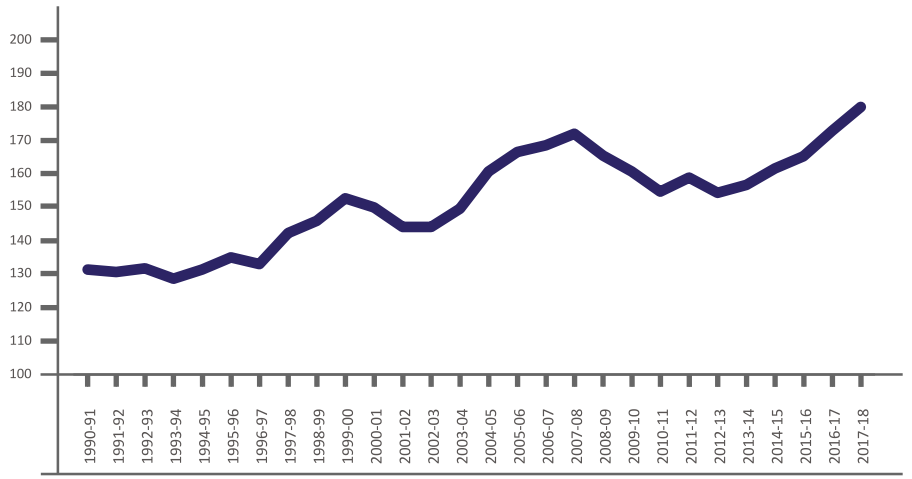


Figure 70: Labour Productivity in India's Construction Sector (in '000 Rs) [Source: RBI, 2020]

The role of government capital expenditure (or public investments) in reviving the economy may be noted in the recent Union Budget: 2021-22, where allocation for capital expenditures is substantially increased and also emphasised the need for front loading these expenditures. One reason for this renewed focus on government capital expenditure, despite larger demands for increasing government consumption expenditure (through subsidies and other income transfers), is the differences in the size of fiscal multipliers for these expenditures. The government has emphasised that fiscal multipliers for government capital expenditure is 2.45 while the same for consumption expenditures is less than one (this is based on our study published in 2013 (Bose & Bhanumurthy, 2013)). Following this and also based on the labour productivity discussions earlier, while the size of the multiplier for capital expenditure under PMAY-U could be different from economy-wide multiplier, it could be safely concluded that it could be higher than 2.45, but not less. This suggests that there is a larger role for PMAY-U in reviving the economy that has contracted by 7.3% in 2020-21. Hence, speeding up construction activity across the four verticals of the Scheme as well as undertaking enhancement of existing houses under the Beneficiary Led Construction/ Enhancement vertical at the beneficiary level should be the priority of the Ministry.

Employment effects of PMAY-U

The impact of PMAY-U on employment is estimated by using unit level information on all the verticals as well as on the extent of progress such as completed or under-construction.

As discussed earlier, while PMAY-U Scheme was initiated largely to provide affordable housing to the eligible urban households in the country, the Scheme has an in-built

positive externality in terms of generation of both employment and output which are crucial for economic stability of the country. As the construction industry has strong linkages with other sectors of the economy through input-output links, the expenditure on the Scheme not only would have generated direct employment in the construction sector, but also indirectly in other sub-sectors such as steel, cement, bricks, timber, paints, electricals, etc. Hence, in Table 1, the extent of employment generation in both completed as well as under construction houses (both direct and indirect) are presented. Here, the estimates are presented in both, number of jobs generated and also in terms of number of person-days generated across all the four verticals. The multipliers used here are same as presented in our larger study that was submitted to MoHUA in 2019 (NIPFP, 2019) and are based on the NSSO Employment and Unemployment Survey of 2011-12, which was the latest available survey at that moment. Indirect employment is based on Input-Output tables that covers 130 by 130 sectors and investment in construction creates indirect output and jobs in all the 130 sectors as an induced effect. In terms of total employment, overall, the PMAY-U Scheme is estimated to have generated about 12.9 million jobs in the country since its inception. Within this, total direct employment is about 7.9 million jobs while about 5 million jobs are created indirectly. In terms of person-days, the Scheme is estimated to have generated about 3.6 billion person-days among all the verticals and in both completed and under-construction houses. The total employment generated by the Scheme can also be divided into skilled and unskilled. According to our earlier report (NIPFP, 2019), the share of skilled employment in the total employment generated is about 41%. By the end of the Scheme, it is estimated to be substantial employment generator. This is expected to have a large and permanent impact on the national income in the coming years.

Table 1: Employment (Direct + Indirect) Generated in the Economy

Jobs

	Direct			In-Direct			Direct+Indirect		
Scheme/ Verticals	Completed	Under Construction	Total	Completed	Under Construction	Total	Completed	Under Construction	Total
BLC	2.08 mn	465 thousand	2.54 mn	958 thousand	241 thousand	1.2 mn	3.03 mn	708 thousand	3.74 mn
AHP	340 thousand	294 thousand	641 thousand	368 thousand	213 thousand	581 thousand	715 thousand	507 thousand	1.22 mn
ISSR	982 thousand	37 thousand	1.02 mn	318 thousand	246 thousand	364 thousand	1.30 mn	82 thousand	1.38 mn
CLSS	2.44 mn	0.00	3.96 mn	2.99 mn	0.00	2.99 mn	6.95 mn	0.00	6.95 mn
PMAY-U	**7.37 mn**	**797 thousand**	**8.17 mn**	**4.63 mn**	**499 thousand**	**5.13 mn**	**12.0 mn**	**1.30 mn**	**13.30 mn**

Person Days

	Direct			In-Direct			Direct+Indirect		
Scheme/ Verticals	Completed	Under Construction	Total	Completed	Under Construction	Total	Completed	Under Construction	Total
BLC	581.6 mn	130.8 mn	712.4 mn	268.3 mn	67.4 mn	335.7 mn	849.9 mn	198.2 mn	1.048 bn
AHP	97.3 mn	82.2 mn	179.5 mn	103 mn	59.6 mn	162.7 mn	200.3 mn	141.8 mn	342.1 mn
ISSR	270.5 mn	10.3 mn	285.3 mn	89.2 mn	12.8 mn	102 mn	364.2 mn	23.1mn	387.3 mn
CLSS	1.110 bn	0.00	1.110 bn	836.8 mn	0.00	836.8 mn	1.947 bn	0.00	1.947 bn
PMAY-U	**2.064 bn**	**223.3 mn**	**2.287 bn**	**1.297 bn**	**139.8 mn**	**1.437 bn**	**3.361 bn**	**363.1 mn**	**3.724 bn**

Notes:
1. One job is effectively represent 280 of working days (person days).

2. The conversion formula is estimated based on the NSSO Employment Unemployment Survey 2011-12.
Source: Calculation estimated using multipliers based on detailed analysis as on NIPFP-PMAY-U study, and Urban India article.

To sum up, expansion in construction sector in general, and PMAY-U in specific, is expected to result in significant increase in both, the number of jobs generated in the economy and also in the overall GDP growth. With expansion in the overall housing programme and increased allocation, the Scheme is expected to bring structural transformation in housing conditions in the urban landscape in India. With the recent revamp in planning and monitoring of the Scheme, one should expect significant increase in the speed of construction and also improvements in the quality of housing in the urban areas.

Credit Linked Subsidy Scheme: Time to Think Big and Global

Deepak Parekh

AHP Project at Jamnagar, Gujarat

June 25, 2015 marked an exceptionally important turning point for urban India. This was the date of the launch of Pradhan Mantri Awas Yojana (Urban) Mission. An ambitious target was set by Hon'ble Prime Minister to provide 'Housing for All'. Though the housing shortage in India continues to be acute, sanction of 12.2 million housing units under the Scheme in a short span of time is indeed a remarkable achievement.

The focus of the PMAY-U Mission was clear – housing has a strong multiplier effect on the economy, it is a large job creator and people are healthier, better educated, more prosperous and feel they have a stake in society when they are home owners. This Mission is imperative for an India that aspires to be a US$ 5 trillion economy by 2024-25. One of the components of PMAY-U is Credit Linked Subsidy Scheme CLSS. It stands out because of its wide coverage and focuses on the EWSs and LIGs where the average ticket size of home loan is approximately ₹1million and ₹1.8 million respectively. CLSS also seeks to fulfil the aspirations of home ownership of the MIGs. In effect, CLSS offers home buyers a helping hand at the beginning of the home loan, thereby enabling a person to become a home owner earlier in life. By June 2022, cumulative housing units approved under CLSS stood at 2.39 million units of which over 1.7 million units were beneficiaries from EWS and LIG segment while 600 thousand units were from MIG. The cumulative subsidy amount is in excess of ₹550 billion.

The true test of a well- functioning subsidy scheme is its design, implementation and ensuring the funds reach their intended beneficiaries. CLSS has been a collective effort of MoHUA, National Housing Bank and the Primary Lending Institutions. At every stage, since inception, there has been a willingness to discuss and seek feedback to improve the efficacy of the Scheme. Due credit must be given to Hon'ble Minister (HUA), Shri Hardeep S. Puri for spearheading this over the years.

HDFC is fortunate to have the privilege of partnering with the government in its Mission to enable more Indians to become home owners. HDFC has consistently been amongst the top players and has one of the largest number of beneficiaries under CLSS. When the history of this era is being written, three key initiatives will stand out – financial inclusion through the Jan Dhan accounts, digitalisation initiatives in the financial sector and CLSS. No doubt, there have been several salutary initiatives taken to support the housing sector in the recent period, including continued fiscal incentives on home loans, attractive Standard Operating Procedures (SOPs) for developers building affordable housing units, putting in place real estate regulators to ensure orderly development of the sector and reduction in stamp duties in certain states, besides CLSS.

As far as CLSS is concerned, there is now a strong track record of a Scheme that has been effective, well executed and delivered the desired results. To my mind, CLSS is worthy of being upheld as a 'model' housing scheme to promote home ownership. The Scheme can be easily replicated and adopted by other countries. It is thus befitting that this Scheme be showcased and shared across the globe. CLSS could help countries deepen their nascent mortgage markets, particularly those in Asia and Africa. Knowledge sharing of best

practices could be done through bodies like United Nations, multilateral agencies and direct one-on-one inter-governmental engagements. Housing forms an integral part of Sustainable Development Goals and India must seize such opportunities to share experiences which have made a difference on the ground.

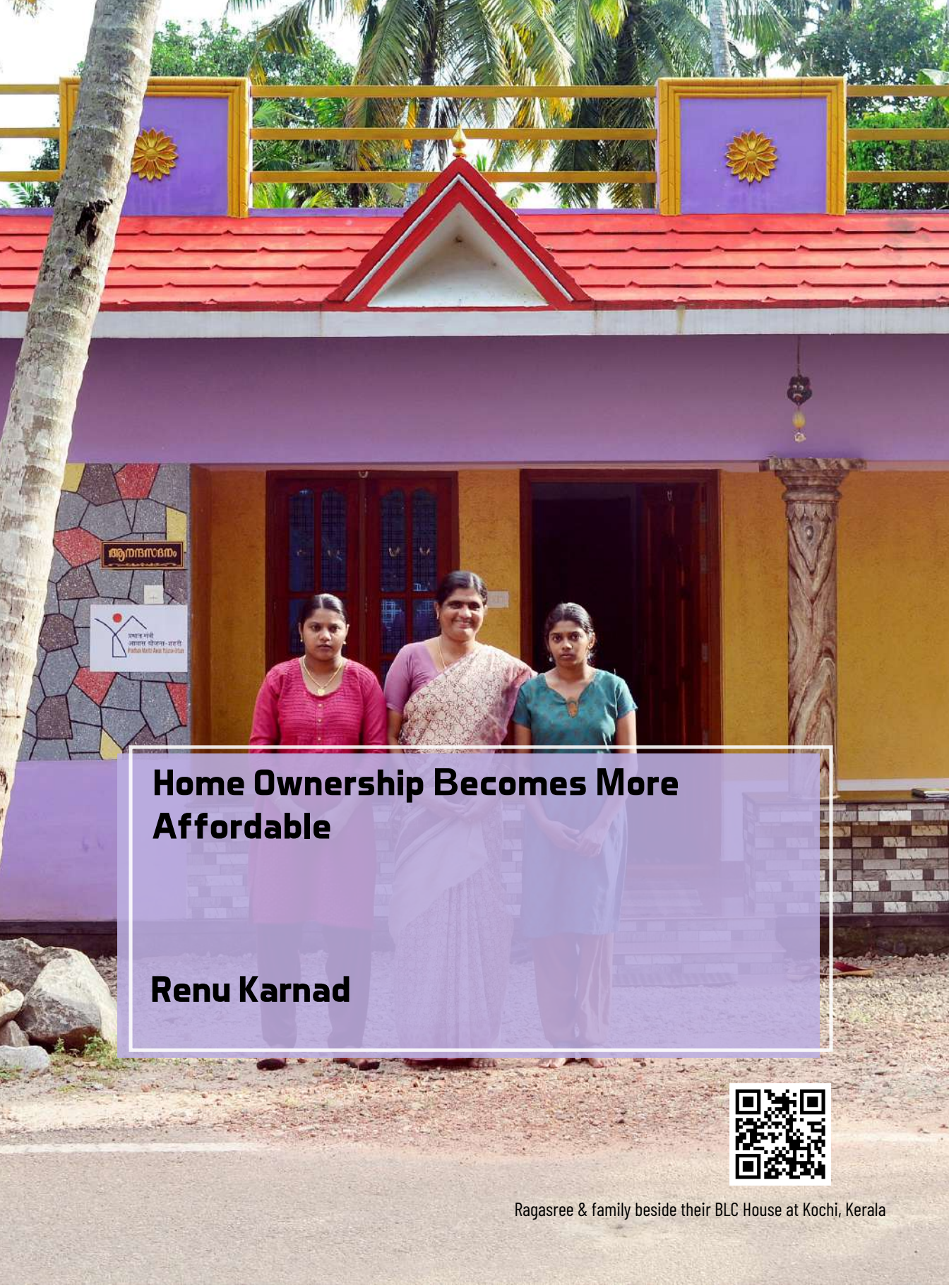
The global investor community today has vast pools of funds that are exclusively earmarked for investments which factor Environment, Social and Governance (ESG) parameters. CLSS has now entered its penultimate year. It is time to seriously think of the future of CLSS. So far, funding support for CLSS has come exclusively from the government. It is time to think big for long-term sustainability so as to ensure that CLSS does not just remain a time-bound scheme. We need to explore possibilities of converting CLSS into a more self-sustaining, long-term programme. One option could be to explore if incremental funding for CLSS can be obtained from global funds committed towards ESG and sustainability. This could be supplemented through partial government support as well. Structured well, it could be a win-win situation wherein global investors could earn a better return on their investment and fulfil their investment objectives. For the government, it would ease the burden on its scarce fiscal resources, whilst simultaneously ensuring that funds for housing continue to reach the intended beneficiaries. Meanwhile, the lending institutions can continue to render support to CLSS as the processes, systems and checks and balances are well in place.

India had a housing shortage of 18.78 million houses in the urban areas, since 2015 the Government has made multifold efforts to meet the housing shortage, due credit must be given to the Government for its efforts towards helping more Indians become home owners. I remain confident that this is the right time to look at CLSS 2.0.

HDFC Customers
Different Homes . Same Happiness

Photo 39: Expression of happiness by HDFC customers

"Thanks to PMAY (U) -CLSS, we now HAPPILY occupy our own homes. It is A DREAM come true. The joy of ownership AND the EASE with which the HDFC TEAM guided us through the LOAN process is a wonderful feeling. A roof over our HEADS MEANS my FAMILY is secure! THANK YOU!"



Home Ownership Becomes More Affordable

Renu Karnad

Ragasree & family beside their BLC House at Kochi, Kerala

Being a homeowner is one of the most fulfilling experiences for most people. A home brings to mind – comfort, security and spending joyous times with one's family. It gives a sense of identity to the individual and brings pride to the entire family. Home ownership in the Indian context has an additional connotation. It's just not about the sense of pride and security but has elements of societal validation. In spite of these factors, home ownership dream remains elusive for millions of Indians, especially in urban India. Urban housing shortage in India stood at 18.78 million in 2012. A rapidly growing country like India, with a huge young and urban population, needs more homes in the affordable category to ensure home ownership for its population.

Taking on a challenge of such enormous magnitude calls for a comprehensive action plan and concerted focus and efforts. The initiative and the willingness to change the ground situation was taken by the Central Government. Since 2014, the government's thrust on housing, through its various schemes and policies, has helped realise the dreams and aspirations of millions of Indians to own a house. Several developments in the housing sector over the last few years have encouraged many Indians to take the first step towards owning their home. The situation is changing rapidly and the results, as elucidated in data as well as development on the ground, is for everyone to see.

The ball was set rolling by the announcement of Hon'ble President of India, in his address to the Joint Session of Parliament, on June 9, 2014, where he announced that family will have a pucca house with water connection, toilet facilities, 24x7 electricity supply and access." To blueprint to translate the vision shared by Hon'ble President of India, was shared by Hon'ble Prime Minister when he announced the Mission 'Housing for All'. Various schemes and incentives were outlined with an objective of achieving this Mission. The maximum focus and impetuous of these Schemes was aimed at affordable housing. The most important of which is Pradhan Mantri Awas Yojana – Urban (PMAY-U).

On a personal note, this Scheme really resonates with me as it addresses three issues which I personally think can be a game changer for India. Firstly, women empowerment envisioned in the Scheme through property ownership can really instil self confidence in women to come in the mainstream and contribute to the nation's development. Secondly, subsidy ensures promotion of home ownership in the younger cohorts, thereby helping them to come into the ambit of formal financial sector and inculcate a habit of saving and financial discipline. Thirdly, this scheme will lead to development of smaller locations in terms of affordable housing and prevent migration to larger cities resulting in development of these locations. Another indirect impact would be the saving of approximately ₹2,200 per month for 20 years, that a family accrues owing to the subsidy can be ploughed back into the education and saving of the family.

Affordable Housing

As we all are aware the highest demand for housing in India has always been and continues to be in the affordable segment. The demand for housing in the affordable

segments primarily emanates from the (EWS)/LIG) and (MIG) segments. Affordable housing will have long term positive impact to the overall well-being of the society. It is the future Government's thrust on affordable housing in the recent years that has revived the interest of first time home buyers, especially the salaried segment and small business owners (not catered to earlier). Affordable housing remains the most incentivised segment from both the perspective of developers as well as the end users.

The infrastructure status being accorded to affordable housing added new impetus to the segment. Government has been supporting the cause of home ownership by providing various incentives for both, developers and end-users, in the form of tax concessions and exemptions, apart from interest subsidies.

A major component of affordable housing programme is CLSS which aims at improving the affordability for home buyers by subsidising the interest on home loan availed from banks and financial institutions. This subsidy has been a huge attraction for home buyers and is helping new segments of population to enjoy the benefits of home ownership. 17,775 towns have been identified under the Mission and properties located in these towns only will be eligible for subsidiary.

HDFC's Contribution to Affordable Housing

For us at HDFC, 'Housing for All' holds a special place. The objective enumerated in the Mission exactly match HDFC's mission. HDFC was established in 1977 with a vision "to enhance the residential housing stock in the country through the provision of housing finance in a systematic and professional manner and to promote home ownership". One of the greatest strengths of a successful organisation is its ability to channelise its efforts in upholding its vision. Since our inception, it has been our resolve to help Indians experience the security and happiness of home ownership by providing them with housing finance in a systematic and professional manner. The Mission is in sync with our core philosophy and that is why we put our heart and soul in partnering with the Government to create awareness about the Mission and use HDFC's business ecosystem to reach out to as many people as possible to propagate and publicise the Mission.

We have invested over four decades in understanding markets, developing strategies, anticipating needs and responding with customised products and processes which help varied socio-economic segments of the population to live their dream of buying homes as easily as possible. In our large kitty of products catering to various segments, two products really stand out in terms of being tailor made to the needs of affordable housing. These are:

1. HDFC Reach loans – HDFC Reach is a product designed to housing finance needs of underserved segments of urban and semi-urban India. This segment, for a long time, was not covered by formal finance ecosystem and hence is hugely underserved. Most of the customers availing these loans are end users of affordable housing schemes.
2. HDFC's Rural Housing Finance – This product is designed to provide housing finance to

Photo 40: Trainings conducted by Lucknow Development Authority

Photo 41: HDFC thrust interaction with BSF Jawans

We continue to be one of the main players in the country to be involved in developing home-building and home-buying ecosystem. In the recent years, we have partnered with leading developers from across the country for development of affordable and middle-income housing projects. We have also taken several initiatives with a multitude of stakeholders such as working with the regulators, training the developers and their employees, guiding customers and focusing on effective execution of plans, to ensure that the ecosystem remains robust and healthy. The resultant momentum can be seen in the increased number of better affordable housing options in the market.

HDFC's thrust on digitalisation has also given impetus to affordable housing and reaching out to the end users. With very high mobile penetration, that too smartphones, and lowering of mobile data charges, digital becomes an important tool to reach out at very low costs. Digital products and services have really helped HDFC reach out to masses and in future can be an important tool to scale up affordable housing.

HDFC's CLSS Reach Out Programme – Cadres Galvanised !

CLSS outreach programme was one of its kind in the annals of HDFC. The entire cadre was galvanised and a sense of achievement and purpose it gave the teams was unprecedented. As time progressed and results started coming in the sense of excitement took the shape of a competition where teams across the country trying to outdo others in terms of number of beneficiaries, awareness camps and activities undertaken and reaching out to far flung geographies of the branches to create awareness about the Scheme.

To be honest various social media and communication applications deserve a big credit for fomenting this completion and ensuring that shared vision of the government, team and the management percolates down to the last person. Sharing of details and photographs of outreach events, new ideas and congratulatory messages pinged late into the night for months on end! The WhatsApp group might have been a bane for proponents of eight hours of sleep cycle but was in fact a boon believer in the power and impact of CLSS.

In order to create widespread awareness about CLSS Scheme, HDFC undertook a massive exercise to reach out to all its stakeholders, be it customers, developers or channel executives. With the extensive training programme, our endeavour was to provide all the stakeholders an opportunity to learn the best practices as well as be aware of the new schemes and trends in the industry. The team really took up the challenge. HDFC team fanned out to the borders to meet Military and Paramilitary forces, police forces across the country, municipal workers, teachers of government as well as private schools, railways, private manufacturing units and the list goes on and on. Seminars, classroom presentations and various other formats were used to drive across the message.

The images of these gatherings, what I saw in photographs shared, are imprinted in my mind. The images of orderly rows of army jawans sitting and listening to the benefits of the Scheme, teachers and school staff huddled in an auditorium together, workers from factory crowding our help desk in the factory premises, our staff enlightening government servants over tea and samosa are a testimony to the impact of a powerful idea and vision.

Four vital components of this programme were:

1. **Training of HDFC staff-** Over 2400 HDFC employees were trained about the Scheme its salient features and benefits. Training programmes included classroom training, special online modules which detailed CLSS Scheme, and quizzes. Similarly, over 5000 sales channel employees were also trained. The employees and sales personnel trained are HDFC's interface with customers and prospective beneficiaries. Hence, the comprehensive knowledge about CLSS garnered by them during the course of training really helped them to enlighten the end users about the benefits of the Scheme.
2. **Creating awareness amongst the developers and corporates** – Training was imparted by HDFC staff to over 1000 developers across the country to detail the benefits of the Scheme and impress upon them the fact that the Scheme can really give a fillip to their sales. The training programme included presentations, question and answer sessions and on-the-spot counselling to customers. Various seminars were also organised across the country and officials from National Housing Bank and MoHUA also shared their inputs and addressed several queries by the developers and their staff. Similarly corporates, especially large employers, across the country were visited by our staff and important details about CLSS, especially the benefits to the end users, were shared with them.
3. **Advertising** – We also used the power and reach of internet to reach out to the beneficiaries. HDFCs website, social media handles and display advertising, all were used to popularise the Scheme. In office display using standees, posters and danglers were used to spread the message. All our print ads in dailies and magazines carried the PMAY-U- CLSS message.
4. **Monitoring** – A senior person of the organisation was earmarked to plan, execute and lead various activities pertaining to PMAY-U-CLSS. In each branch, a CLSS coordinator was identified to hand hold branches. Various daily reporting formats were created to capture all the training details and other activities being undertaken at the branch level.

Emotional connect transcends transactional

While home buying for most Indians is a highly emotional event, the finance part of it is very transactional. To make this entire journey for these first time home buyers seamless, we instituted special on the spot sanctions and different queues for underwriting to make it quick and hassle free for them.

We didn't just stop at that and went a step further. We interacted with the beneficiaries and their families, across all branches, and personally handed over the subsidy letter and became a part of their celebrations. We were no longer a financial institution but we became a part of their journey. This worked for us at two levels. Firstly, the beneficiaries realised the ease of process right from application to subsidy and thus acted as a brand ambassador for the Scheme amongst its peer groups. Secondly, the interaction with the beneficiaries and being a part of their celebrations gave a sense of purpose, achievement and most importantly, motivation to HDFC team to reach out to more and more such people and help them achieve their dreams.

I firmly believe that this emotional connect really helped us achieve the results that we saw both in terms of connecting with the customer and achieving full involvement of our team to make CLSS a success.

Rest is History

The results of these well-coordinated activities was overwhelming. As on date, the number of beneficiaries is over ₹2.4 million with subsidy amount of ₹550 billion. In 2020, we were the first lending institution in India to approve home loans of over ₹470 billion crore and disburse a subsidy of over ₹47 billion to ₹200 thousand home buyers under PMAY-U-CLSS.

We were also recognised for our contribution in this segment. In July 2018, Hon'ble Prime Minister Shri Narendra Modi recognised HDFC as the best performing Primary Lending Institution in the EWS and LIG segments, and the second best in the MIG segment of the CLSS. In March 2019, HDFC was awarded 'Best Private Sector Financial Institution' for PMAY-U- CLSS at PMAY-U Awards, 2019.

More the Merrier

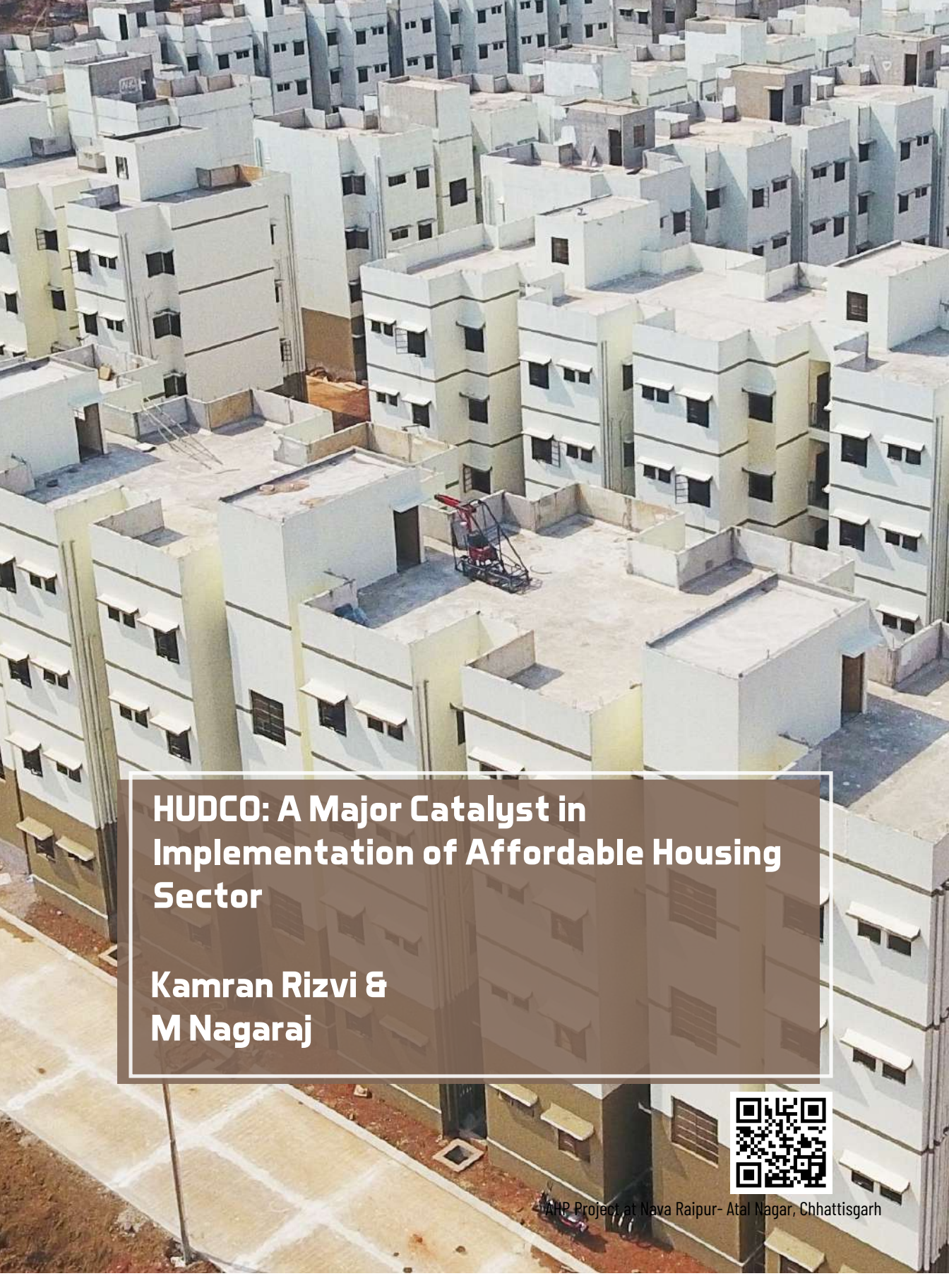
The Scheme, at present, is available to properties constructed in notified locations. During our course of journey, we encountered several customers who could not join the CLSS bandwagon owing to the location of the property. A few persevered in their representation and in one case, that I know of, the perseverance did pay and the location was eventually included in the notified locations list. Though I would like to add for the benefit of the reader that the perseverance paid off after more than a 1000 representations were made by the individual as per my estimate! Here I would like to also point out the receptiveness and

positive attitude of the Ministry in appreciating the facts and including the location in the list. The point that I am trying to impress upon is that as long as the individual is making or acquiring their first house, the subsidy should be granted irrespective of the location. This will help broad base the representation of the Scheme and help achieve and accelerate the objectives of 'Housing for All' that our Hon'ble Prime Minster has envisioned.

The trust we have earned over the years has enabled us to be the perfect meeting ground for homes and potential audiences. We look forward to empowering many more Indians in their quest for home buying.

HUDCO: A Major Catalyst in Implementation of Affordable Housing Sector

Kamran Rizvi &
M Nagaraj



AHP Project at Nava Raipur- Atal Nagar, Chhattisgarh

HUDCO – A Major Catalyst in Implementation of Affordable Housing Sector

Affordable Housing provision is a social and economic goal of all the regimes, be it Centre or State/UT in a federal system. The definition of Affordable Housing has undergone changes over a period of time. MoHUA has set the norms for Economically Weaker Section (EWS) category based on income and carpet area criteria (presently the income ceiling of EWS is ₹300 thousand annum and dwelling units smaller than 30 sqm). The idea of Government of India (GoI) is to provide, facilitate, incentivise and augment the availability of houses for EWS category at an affordable rate with the involvement of State/UT Governments and their agencies who are implementing the Scheme at ground level. As a provider of affordable housing schemes, both Central and State/UT Governments bring in subsidy interventions, technological innovations, provision of land at subsidised rate, smooth governance including planning clearance, Floor Area Ratio (FAR) / Floor Space Index (FSI) relaxation and not the least in hand holding of the beneficiaries from the proper systematic selection stage to monitoring and to make sure such affordable home / house of EWS beneficiary becomes a reality.

Housing and Urban Development Corporation Ltd. (HUDCO) is a techno-financial institution and a Government of India enterprise, mandated to support the Action Plan and schemes of MoHUA. It has facilitated to act as a major catalyst assisting Ministry for formulation of affordable housing schemes including preparation of guidelines and propagation of such schemes. HUDCO also supports State/ UT Governments by financing the needs of State/UT/Urban Local Bodies (ULB) / beneficiaries for achieving the goal of Housing for all. HUDCO, based on the directions of MoHUA from time to time, has been involved in monitoring of schemes at state level for various Schemes initiated by the Ministry, such as Integrated Low Cost Sanitation (ILCS), Nehru Rozgar Yojana (NRY), Night Shelters, Valmiki Ambedkar Awas Yojana (VAMBAY), Jawaharlal Nehru National Urban Renewal Mission (JnNURM), Infrastructure Development for Small and Medium Towns (IDSMT), Rajiv Awas Yojana (RAY) and Rajiv Rinn Yojana (RRY), Pradhan Mantri Awas Yojana- Urban (PMAY-U) – 'Housing For All'

HUDCO's support to PMAY (U) – 'Housing for All'

HUDCO is offering its services for scrutiny of Detailed Project Reports (DPRs), Housing for All Plan of Action (HFAPoA) and Annual Implementation Plans (AIPs), monitoring, site inspections, capacity building programmes for the Government/ State/ UT/ ULB officials and handholding support to State/UT Government for preparation of DPRs. Cumulatively, HUDCO has carried out site and/or desk scrutiny of 492 projects for construction of 991 thousand Dwelling Units (DU) (including 983 thousand EWS DUs) in 366 towns/ cities under 34 states/ UTs of India with project cost of ₹470 billion crore having central share of ₹145.9 billion. The above 492 projects undertaken include 45 Affordable Housing in Partnership (AHP), 427 Beneficiary-led Construction (BLC) (new construction/ enhancement) and 20 In situ Slum Redevelopment (ISSR) projects.

HUDCO being appointed a Central Nodal Agency (CNA) under the Credit Link Subsidy Scheme vertical of PMAY-U , has so far executed Memorandum of Understanding (MoU) with 91 banks/ Primary Lending Institutions (PLIs) for EWS/ LIG category and with 87 banks/PLIs for Middle Income Group (MIG) I and II. HUDCO, as a CNA has disbursed ₹11.05 billion as CLSS subsidy to 49,761 number of beneficiaries under EWS/LIG/MIG category up to 31 March 2021. In addition to processing of the subsidy, HUDCO along with other CNA– National Housing Bank (NHB) and State Bank of India (SBI) has been actively participating in propagation of the Scheme since inception and has been hand holding all the PLIs including support for data management and other softwares and supported the development of the CLSS Awas Portal (CLAP).

HUDCO has also supported MoHUA for augmenting National Urban Housing Fund (NUHF) as Extra Budgetary Resources (EBR) by raising resources from Bond holders and providing loan assistance of ₹200 billion to Building Material and Technology Promotion Council (BMTPC) (borrowing agency appointed by MoHUA) for disbursal as Central Assistance to States/UTs /CNAs on behalf of the Central Government, for implementation of PMAY-U.

Various state agencies implementing PMAY-U, either under the BLC or AHP verticals have sought financial assistance from HUDCO to meet their State/ULB/beneficiary share. HUDCO has sanctioned seven such schemes in the states of Uttarakhand, Andhra Pradesh, Telangana and Kerala for a loan amount of ₹106.7 billion covering 552 thousand housing units. Similarly, even under PMAY- Rural, HUDCO has sanctioned loan assistance of ₹28.39 billion covering 625 thousand DUs in rural areas of Uttar Pradesh.

The aforementioned mammoth contribution by a Techno-Financial Institution is only possible with the inherent strength and experience gained over a period of time. Before we go into details of above achievements and the nitty gritty of performance of HUDCO, a brief introduction of HUDCO would provide better picture.

About HUDCO

HUDCO, an ISO 9001– Mini Ratan Company, completed its Golden Jubilee Year in 2020. Initially, HUDCO was a completely owned GoI institution and in 2017, the government disinvested shareholding in HUDCO to the extent of 10.193% by listing HUDCO equity on NSE and BSE. The main objective of HUDCO is to provide long term finance opportunities for construction of housing for residential purposes or undertake housing and urban development programme in the country. Accordingly, HUDCO is facilitating housing and infrastructure development in the country with a special thrust on meeting the housing needs of the 'deprived' i.e. EWS and LIG.

Today, HUDCO has evolved as one of the leading techno-financial institutions with a pan-India presence. Its wide outreach is reflected by the fact that in addition to the Corporate Office at Delhi, it has a network of Regional Offices and Development Offices

mostly in the respective state capitals spread across the entire country to cater to the needs of the State/UT Government Agencies who are embarked into creation of mass housing and urban development schemes. HUDCO's retail housing finance window – HUDCO Niwas offices operate in all Regional and Development Offices and cater to individuals to fulfil the dream of owning a home.

HUDCO with the above motive, since inception has cumulatively sanctioned 17,301 Housing and Urban infrastructure projects with total aggregate loan amount of ₹2.2 trillion up to 31 May 2021, out of which 14,953 projects were sanctioned under Housing with loan assistance of ₹919.72 billion which facilitated the construction of 19.6 million housing units in the country and 2,348 projects were sanctioned under Urban Infrastructure with loan assistance of ₹1.28 trillion.

As per Census 2011, there are 236 million occupied dwelling units in the country, it can be said that every 12th house in the country is a HUDCO-financed house. The social orientation of HUDCO is reflected in the fact that it has financed over 93% housing units pertaining to EWS and LIGs, with lower interest rates and longer repayment period.

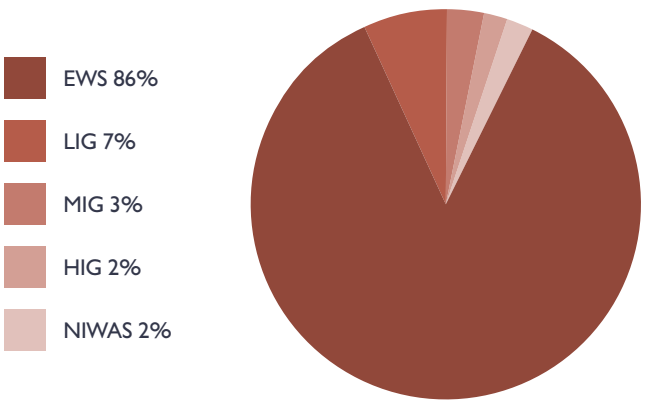


Figure 71: Share of housing units sanctioned by HUDCO

HUDCO, while supporting the creation of above stated assets across the country, has been also serving with the social mandate to the 'un-served' and thus bridging the 'housing divide' in the country and has been creating habitable houses by linking them with essential infrastructure services. HUDCO has always stood up to the tests of time and never let down the needy sections of the population. It has also been assisting the country in times of crises like earthquakes, tsunami, etc., by picking up pieces from the scattered lives of the affected and giving them a shape and hope all over again.

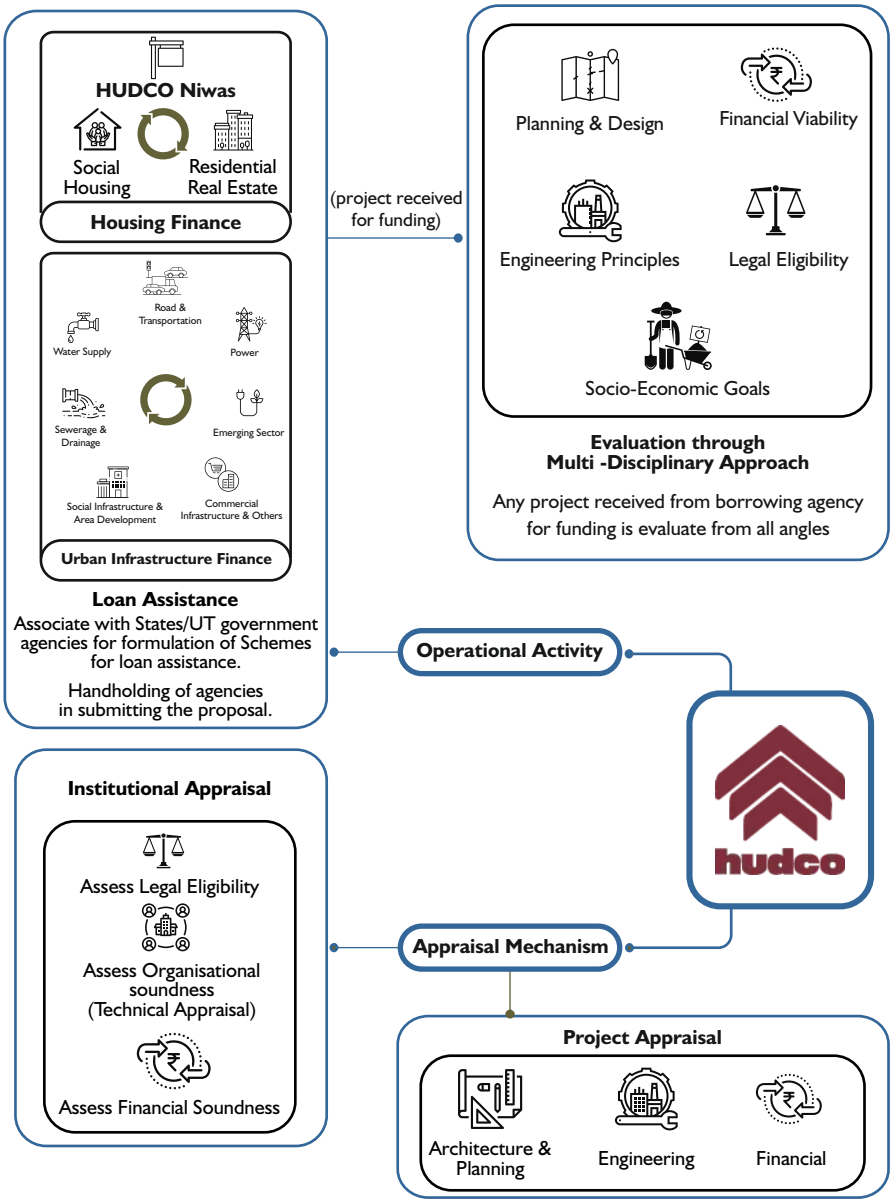


Figure 72: HUDCO Project Appraisal Mechanism

Subsequent to sanction based on the above appraisal mechanism, the State/UT Government agencies carry out documentation along with the submission of security document to enable them to seek release. HUDCO, through its wide network of Regional Offices, has a robust mechanism to monitor the product by carrying out site inspection to ensure pre- and post-utilisation of disbursed amount. It also ensures completion of the project so that the assets created thus get dedicated to the nation and maintained in a proper way.

Viability Gap Funding (VGF) to State/UT Governments/Agencies

The massive housing scheme spurts construction activities, thereby engaging labour and construction related economic activities. In order to support these Schemes, the requirement of funds is humongous and State budgets are stretched with limitation, they resort to borrow from outside sources to cater to this demand. Such borrowings are generally long term and State/UT Government can easily set aside budgetary provision in part for facilitating repayments. State/UT Government capital support is towards subsidy provisions to the beneficiaries who cannot afford their contribution. In the federal system, the State/UT Government also depends upon Central Government Housing Scheme and they try to dovetail the State Housing Scheme to maximise the subsidy portion. The present PMAY-U, being the largest mass housing scheme in the world being implemented by the State/ UT Government with support of Central Government, is a classic federal mix of a scheme wherein the subsidy amount is shared equally by the Central and State/UT Government. Wherever the housing scheme aspiration of the State is huge in nature, there would be certain shortfall in the budget for the State Subsidy portion and there comes the requirement of viability gap funding, also needed to meet the beneficiary's contribution at times.

As most of the GoI schemes, including PMAY-U, are for social welfare and such projects may not be financially viable (though they are economically justified and necessary), need support of borrower for replacing the subsidy portion. As HUDCO also has a mandate of 'profitability with social justice', it provide financial assistance to meet State/UT Government/ULB share as per the structure of the projects.

Innovative Financing under VGF

It has been a constant endeavour of HUDCO to innovate the products as well as to do innovative financing to suit the requirements of its clients. To illustrate VGF of HUDCO and to comprehend the best practices adopted by the States under PMAY-U, the following scheme of Government of Kerala is enumerated:

Leveraging resources for PMAY-U under Extra- Budgetary Resource (EBR) Route

In addition to the above stated viability gap funding to various States/ UTs for their housing programmes under PMAY-U, HUDCO also supports Ministry of Finance (MoF)

and MoHUA for augmentation of extra budgetary support. The Union Cabinet had approved creation of National Urban Housing Fund (NUHF) for raising of funds through EBR to the extent of up to ₹60,000 crore over a period of four years. The fund will facilitate the requisite funding for a sustained flow of central assistance under the PMAY (U) Scheme.

MoHUA has engaged BMTPC to avail loan for NUHF (through EBR), to release central assistance to the State/UT Governments and CNAs as per sanction orders issued by MoHUA for implementation of projects under PMAY-U and also repayment of loan and interest to the lending institution. BMTPC would aggregate the loans from lending agencies or financial institutions and for the instant proposal, MoF has designated HUDCO as a lending agency for the EBR for PMAY-U.

HUDCO has raised funds for the EBR through GoI serviced bonds from the market over a period of time in four tranches and each tranche has been treated as a separate loan wherein interest will be serviced on a bi-annual basis and principle in the end as a bullet payment. HUDCO ensures the end utilisation of EBR funds allocated to States/UTs and the CNAs by obtaining the release statements made by BMTPC as per the order of MoHUA.

Conclusion

In a nutshell, HUDCO represents an institutional financing delivery vehicle created by GoI to conceive, operationalise and realise the goal of various housing schemes of the various State/UT Governments and the Government of India including the Mission in all aspects from conception to implementation stage. HUDCO acquired its own vitality and went on to deliver the objectives by apt infusion of technical and financial assistance at the ground level and supported the State/ UT Governments in creation of national assets, which is most needed for shelter to the deprived sections of the society.

Fulfilling Dreams of Middle Class

Dinesh Kumar Khara

Mandhalapu Ananthalakshmi & family beside her BLC House at Addanki, Andhra Pradesh

The world is becoming increasingly urban and India is no exception. Large scale industrialisation has been a key catalyst for urbanisation; opportunities for education being the other. Globally, currently over 55% of the population lives in urban area, according to World Bank. It is likely to become 70% by the year 2050. United Nations calls urbanisation one of four 'demographic mega-trends' (UNDESA 2019), along with population growth, aging and international migration. As per the last census, the percentage of urban population to the total population of India stood at 31.6% and as is clearly visible, this percentage is steadily growing. Recent estimates peg this number to 34.5% in 2019. There has been a 4% rise in the urban population over a decade. Over the years, growing concentration of people in urban areas has resulted in an increase in the number of people living in slums and squatter settlements. Excessively high prices of land and real estate in urban areas have induced the poor and the economically weaker sections of the society to occupy marginal lands typified by poor housing stock, congestion and obsolescence.

Urbanisation requires to be matched with improved living conditions of those moving to the cities. While it provides a platform to transform the economy and contribute to prosperity and liveability, unbridled urbanisation will be of little help to the cause or the populace. This results in a glaring divide in the socio- economic conditions prevailing in cities. Provision of housing, infrastructure and basic urban services to this population is very important. The cost of living in cities being prohibitive, about 18% of the urban population in India resides in slums. Here people live in unhealthy and risky conditions due to lack of quick access to healthcare and vulnerability to disasters. This defeats the very purpose for which they move to cities – for better opportunities and living conditions. To have sustained development in the cities coping with rise in population, affordable housing has to be provided to the people. In India, the housing market has always been characterised by excess demand for affordable dwellings and this demand cannot be met by the supply of high-cost housing.

The Government understands the need of housing and under the aegis of MoHUA, Pradhan Mantri Awas Yojana-Urban PMAY-U was launched with a mission for 'Housing for All'. This is a dream project of Hon'ble Prime Minister and it aims to meet the needs of the economically vulnerable strata of the society. A home is one of the most valued possessions of any individual, with a deep sense of security and social pride attached. Housing sector in India is fast growing, with banks and financial institutions helping people realise their dream to own a house via home loans. To make the home loan affordable under CLSS, interest subsidy is given upfront by MoHUA to eligible home loan borrowers. Subsidy is being granted to those of (EWS), (LIG) and (MIG) I and II for a house in select urban locations all over the country. This makes them feel confident of borrowing and making a house of their own. Requirement of the house being pucca and with sanitation facility as eligibility conditions helps ensure that the beneficiaries' living conditions improve.

Release of the subsidy is implemented by Central Nodal Agencies (CNAs). They release the subsidy amount to different Primary Lending Institutions (PLIs) – banks/ Housing Finance Companies (HFCs) for onward credit to the home loan accounts of the

eligible beneficiaries. The credit of subsidy in the home loan account results in reduced Equated Monthly Instalment (EMI) for the borrower. Under the Scheme, interest subsidies of ₹267 thousand/ ₹235 thousand/ ₹230 thousand are provided to EWS and LIG/MIG-I/MIG-II categories respectively.

It is a matter of pride and privilege for State Bank of India (SBI) that MoHUA has nominated it as the third CNA w.e.f. 25 November 2019 for processing of subsidy exclusively for home loan borrowers of SBI. The bank has a unique distinction of working both as CNA and PLI. In the new process, SBI Corporate Centre is acting as CNA and 17 local Head Offices are acting as PLIs "for and on behalf" of branches controlled by them. SBI is leveraging its world class technology to make the process of loan and subsidy disbursal efficient. New CNA software is now used for subsidy processing in the revamped process. This software is robust and has multiple checkpoints to avoid any kind of mistakes or duplicate entries. The software was extensively tested at our IT Centre with variety of claims under all schemes.

Apart from implementing the necessary infrastructure, at SBI we are increasing the number of beneficiaries of the Scheme by undertaking many initiatives. We are creating awareness among public about the benefits of CLSS- PMAY-U by utilising various marketing strategies. We are also arranging various home loan melas, visiting companies as well as giving wide publicity at all prominent places. Also, suitable advertisements are being given in print as well as visual media. In all our property fairs, publicity is given to the Scheme. We are utilising dedicated work force, who are our 'Feet on Street' in our sales and marketing team for home loans. Also, officers are available at all branches for giving PMAY-U information to prospective borrowers. We frequently arrange workshops/ seminars for knowledge dissemination among operating functionaries. In the process, we have shared knowledge regarding PMAY-U Scheme around more than 1000+ of our staff through Team Meetings.

A Standard Operating Procedure (SOP) for functionaries at CNA and PLIs was launched in December 2020. We also sponsor various workshops on 'Affordable Housing' and 'Housing for All' Mission of Government of India (GoI), which are attended by government functionaries, builders, NGOs, etc. We also conduct 'Angikaar' campaign, a GoI programme, pan India, for change management, cleanliness and financial literacy among beneficiaries of EWS/LIG. 73 programmes have been conducted by all our PLIs. SBI is promoting CLSS at various public establishments and is in constant touch with builders to support the potential buyers. We have specialised Home Loan Sales team, who are

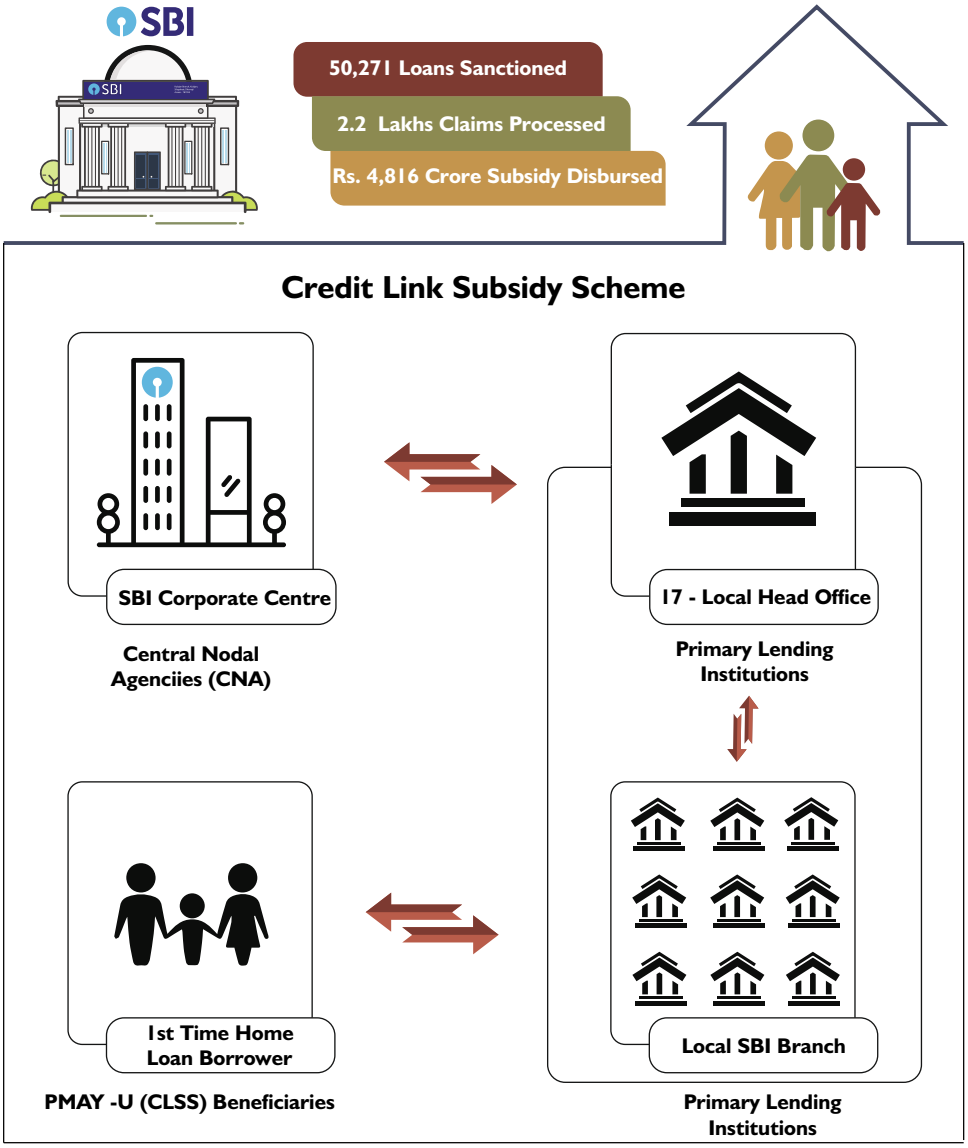


Figure 73: Role of SBI as CNA and PLI

exclusively involved in marketing of Affordable Housing Loans to all sections of society. Bank has tie-up arrangements with consultant agencies to get real estate market insight report for assessment of demand of Home Loan buyers. Bank is also arranging local property fairs in coordination with CREDAI (Confederation of Real Estate Developers' Associations of India), builders and local authorities.

As the Indian banking sector has an expansive reach and is well-geared to serve all segments of the society, including the underprivileged, it is expected to play a pivotal role in the success of the Scheme. The banking sector has been actively involved in lending to the housing sector under this Scheme. We are glad to share that in a short span of 15 months, SBI as CNA has sanctioned 50,271 loans, processed 220 thousand claims and disbursed subsidy amount is ₹48.16 billion. We are in process of launching a new product which satisfies government norms of PMAY-U and RBI norms.

The year 2020 has been a tumultuous year with the outbreak of Covid-19 emerging as the black swan event of the century. Besides having its devastating effects on the healthcare systems of the world and the psyche of people, the pandemic has left almost all the economies of the world in a bad shape. The ensuing lockdowns have massively impacted the supply chain and have resulted in plummeting of their respective GDPs. However, the year 2021 has brought a ray of optimism – hope for a brighter future with the coronavirus vaccines hitting the market. The lockdown impacted the urban housing segment the most as stricter restrictions on movement and business activity were imposed in Q1 FY 2020-21. Within the affordable segment, volume growth in loans of 1.5-3.5 million over the last 4-5 years, coupled with increasing share in overall originations across rural, semi – urban and urban segments indicate shifting preferences of buyers towards higher ticket sizes.

Affordable Housing segment (ticket size up to ₹3.5 million) constitutes 90% of the market by volume and nearly 60% by value as of December 2020. Within Affordable Housing, loans under ticket size ₹1.5 million comprises 70% by volume and 38% by value. Originations for loans above ₹1.5 million ticket size grew at 4.3% Q-o-Q between Q2 and Q3 FY 2020-21, twice the pace of Q-o-Q growth between Q3 and Q4 FY 2019-20, i.e., prior to COVID-19 disruptions.

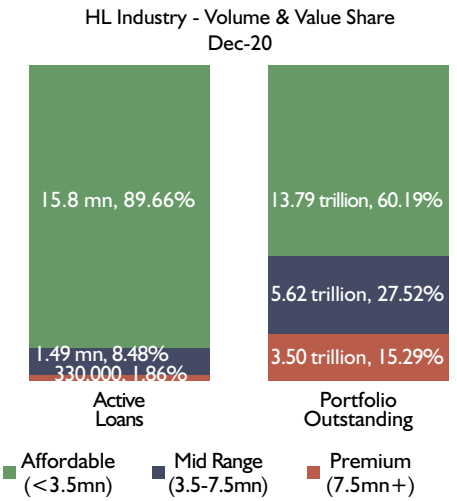


Figure 74: HL Industry - Volume & Value Share, Dec-2020

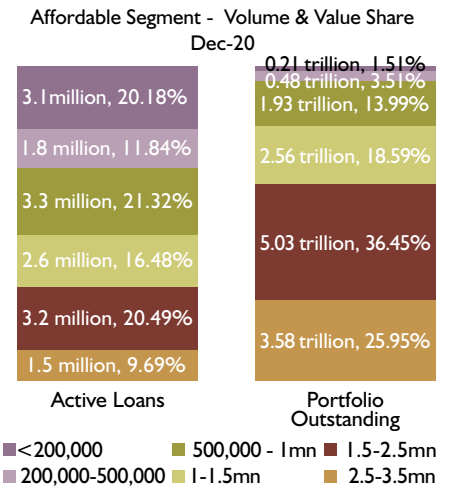


Figure 75: Affordable Segment - Volume & Value Share, Dec-2020

The housing loans market, which was growing at an annual rate of 18%, in December 2018, witnessed demand slump coming into 2019, leading to comparatively slower pace of growth at 10.4% as of December 2019. Home Loan sector after witnessing set back in Q1 FY 2020-21 in terms of originations, bounced back in Q2 and Q3 FY 2020-21, ending the year with 9.6% growth in Portfolio Outstanding compared to 10.4% growth during previous year.

The affordable housing segment (up to ₹3.5 million ticket size) has a market share of 60% by value and nearly 90% by volume as of December 2020. Having received strong support from the government through its 'Housing for All' project under PMAY-U, this segment is increasingly becoming more relevant with rise in population, rapid urbanisation and migration to cities causing severe urban housing shortages in India, particularly for the EWSs.

At the same time, mid-range and premium housing segments are gaining traction with millennials and young borrowers demanding higher ticket sized housing loans annually. Rising per capita disposable income, India's growing middle class and affordable mortgage rates due to competition as well as government's CLSS have made home buying easier for common people.

Housing Segments		Public Sector Banks	HFCs (Incl. NBFCs)	Private Banks	Others (Incl. Foreign Banks)	Total
Affordable (<3.5 mn)	Portfolio Outstanding (Cr)	6,09,580	5,06,583	1,72967	48,137	13,37,266
	% Market Share	45.58%	37.88%	12.93%	3.60%	100.00%
	Active Loans (Lakh)	74.5	51.2	15.2	9.9	150.9
	Amount Delinquency 90+%	1.96%	2.59%	2.31%	10.85%	2.56%
	Loan Delinquency 90+%	3.74%	3.37%	2.44%	18.76%	4.48%
	Annual Originations (Volume) % Share	48.45%	32.73%	11.64%	7.18%	100.00%
Mid Range (3.5-7.5mn)	Portfolio Outstanding (Cr)	2,40,338	2,00,168	98,643	11,538	5,50,688
	% Market Share	43.64%	36.35%	17.91%	2.10%	100.00%
	Active Loans (Lakh)	6.5	5.3	2.5	0.3	14.6
	Amount Delinquency 90+%	1.51%	2.30%	2.12%	5.46%	1.99%
	Loan Delinquency 90+%	1.30%	1.78%	1.75%	4.00%	1.61%
	Annual Originations (Volume) % Share	47.10%	34.21	16.76%	1.94%	100.00%
Premium (7.5mn+)	Portfolio Outstanding (Cr)	92,635	1,12,848	1,16,665	15,920	3,38068
	% Market Share	27.40%	33.38%	34.51%	4.71%	100.00%
	Active Loans (Lakh)	0.9	1.1	1	0.2	3.2
	Amount Delinquency 90+%	2.33%	4.41%	2.04%	4.18%	3.01%
	Loan Delinquency 90+%	1.89%	2.86%	1.79%	2.53%	2.22%
	Annual Originations (Volume) % Share	32.84%	30.48%	32.96%	3.72%	100.00%
Grand Total	Portfolio Outstanding (Cr)	9,42,553	8,19,600	3,88,275	75,595	22,26,022
	% Market Share	42.34%	36.82%	17.44%	3.40%	100.00%
	Active Loans (Lakh)	81.9	57.6	18.7	10.4	168.7
	Amount Delinquency 90+%	1.88%	2.77%	2.18%	8.62%	2.49%
	Loan Delinquency 90+%	3.53%	3.22%	2.31%	18.04%	4.19%
	Annual Originations (Volume) % Share	47.84%	32.85%	12.87%	6.44%	100.00%

Even in these testing times, continuous fund availability for PMAY-U- CLSS was ensured by the Ministry which enabled subsidy disbursement without any hassles, benefiting lakhs of home loan beneficiaries, in the process. SBI alone processed and disbursed PMAY-U subsidy for more than ₹160 thousand claims in the FY 2020-21. We are thankful to the Ministry in arranging for fund even in such a challenging situation, which is no mean feat.

While efforts to provide low cost housing have been made for many years (National Housing Policy, 1994; Jawaharlal Nehru National Urban Renewal Mission, 2005; Rajiv Awas Yojana 2013), PMAY-U has provided a fresh impetus with resounding success. It gives me immense pleasure to know that under PMAY-U,10.1 million houses have been grounded, over 6 million houses completed and delivered, with a committed Central assistance of 2.03 trillion. I place on record my heartiest congratulations to MoHUA on achieving this milestone. I am sure PMAY-U will be a story of glory in the annals of global history of urbanisation.

PART SIX
Role of Private Sector

Opportunities in Indian Urban Housing and Regulatory Systems

Dr. Niranjan Hiranandani

AHP Project at Rajkot, Gujarat

Over time, several structural policies have rebooted the Indian real estate sector like Real Estate (Regulation and Development) Act, 2016 (RERA), Goods and Service Tax 2017 (GST), Insolvency and Bankruptcy Code 2016 (IBC) etc. By 2025, it will contribute 13% to the country's Gross Domestic Product (GDP) and is expected to reach US $1 trillion by 2030. The growth of this sector is well complemented by growth in corporate environment, demand for office space, urban and semi-urban accommodation. Healthcare, logistics, e-commerce, hospitality, data centres and commercial real estate will be the new growth engines. Though, the short-term sight looks grim in the wake of events, but long growth of real estate sector is pegged at 10% Compound Annual Growth Rate (CAGR) Year-over-Year (YoY) basis.

Indian economy is jolted with the twin assault of COVID-19 global pandemic and pinning hope on positive economic growth recovery to shore up the lost opportunity. The pandemic disrupted the Indian real estate sector by bringing it to a grind halt. As it impacted differently across different regions and asset class, it was a long overhaul for the sector. The liquidity and labour crisis also had a profound impact. Business models were realigned by asset restructuring, monetisation, consolidating and joint developments. During this unprecedented crisis, residential real estate has emerged a clear winner on grounds of safety, security and stability. The fate of commercial real estate will see uptick in growth curve in parallel to the GDP growth as foreign investment influx data denominates its poised growth anticipation. The rich demographic dividend, diversified consumer market and highly young working populace are growth levers to accelerate the cogwheel of Indian economic growth. Going forward, let's read the script of Indian real estate industry, then, now and future.

Level of Urbanisation

In 2007, for the first time ever, more people in the world lived in urban areas than in rural areas.[1] Rapid urbanisation is propelling the growth cogwheel in the backdrop of better employment opportunities and socio-economic standards. Many countries like Japan, Singapore, Belgium, Netherlands are completely urbanised and thereby expedited their economic growth, whereas India's urban mobilisation stands at 34% currently. It is estimated that by 2050, more than two-thirds of the world will live in urban areas (close to seven billion). India too, is estimated to have 53% of its population living in urban areas.

India is witnessing large scale migration to urban areas. Cities enjoy economies of agglomeration, where higher density of population provides businesses with greater opportunities for growth. As the economy grows, the market opportunities grow for every strata of the society and with this the migration becomes inevitable. Therefore, millions of people migrate into cities every year, leading to further growth. Recognising this fact, there is a skewed interest towards emphasising on rapid urban development and housing to accelerate India's growth rate in order to achieve its objective of $5 trillion economy. Government of India has initiated and introduced many innovative policy reforms and schemes encompassing regulatory, financial, environmental and economic aspects.

[1] *Source: UN World Urbanization Prospects, 2018*

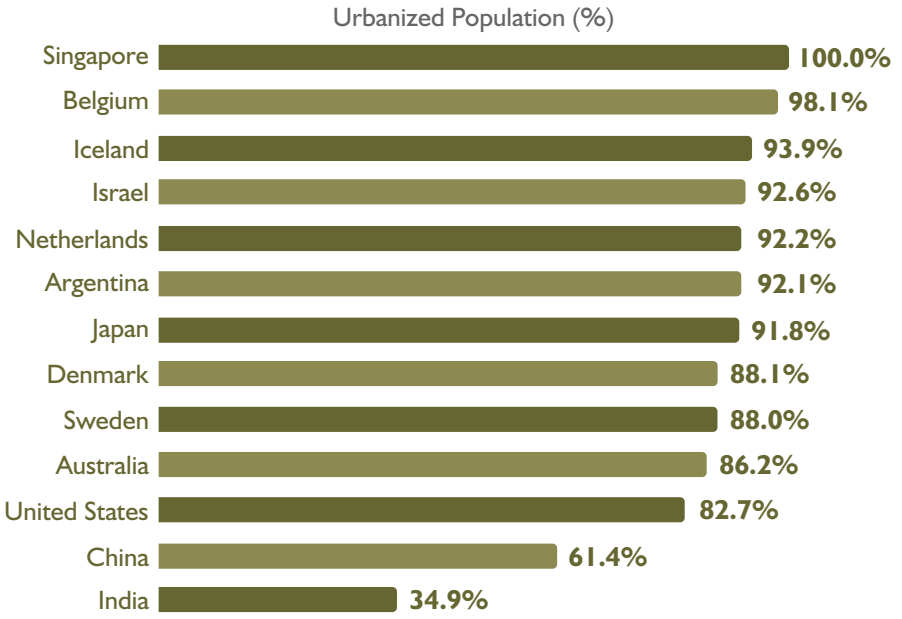


Figure 76: Chart depicting current percentage of urbanised population in major countries in the world

Evolution of Indian Real Estate

Real estate is globally a crucial indicator of economies' true health and same is applicable to the Indian real estate. The Indian landscape has undergone major tectonic shift recently because of innovative economic policies and structural reforms rebooting the sector. It plays a vital role in contributing nearly 15% to the nation's employment generation and around 7% to GDP growth.

The old age adage of 'Roti, Kapda aur Makaan', literally meaning food, clothing and shelter, gained immense significance post the unprecedented COVID-19 global pandemic crisis, where shelter emerged as a clear winner in terms of necessitated commodity. The importance to own a house has been underpinned in wake of pandemic crisis on grounds of safety, security and stability. Hence, the dearth of housing revolution begins to establish the prime objective of 'Housing for All' .

Indian real estate sector held a perception of being an unorganised sector and needed a major facelift. The gap was intended to be bridged by introducing a strong regulatory mechanism to streamline compliances, process and approvals systems in Indian real estate sector. This paradigm shift was accomplished by the Central Government by implementing RERA. It played a crucial role in bringing stringent regulation to promote transparency, trust, professionalism and ease of doing business in the real estate ecosystem. It became instrumental in disrupting the Indian real estate sector and uplifting it at global level, par

Figure 77: Urban Transformation and Smart Cities flagship missions

excellence by following global best practices. It primarily focused on establishing accountability, financial discipline and customer centricity to strengthen its growth. The wireframe of the enacted Act predominantly mandated online registration of any real estate project, irrespective of location, developer, scale and size. This intended to protect consumers from irregularities and assure timely completion of projects without any financial slippages, thus reconciling the trust deficit between home buyers and real estate developers.

An important milestone implemented in RERA is the imposition of setting up of an Escrow account. This stipulates all the developers to transfer 70% of the receivables from the customer to an Escrow account maintained with a neutral third party, mostly a scheduled commercial bank. This tool rightly prevents the developers to incessantly divert funds to other projects, cause delay in the committed deliverables and mitigate the risk of insolvency. All these effective measures have been instrumental in cleaning up the night fly operators from the sector, making more space for the renowned professional players.

New-age digital services have enabled quick and periodic updating of the mandatory RERA fulfilments, which are open and accessible to all. The online projects and agents registrations, online complaints redressal and online conciliation forums have fast tracked the much-awaited regulatory solutions.

The implementation of RERA is at a nascent stage in India and is yet to gain momentum to become an integral part of an opaque real estate sector. It holds a huge potential and an equally great scope for growth. Though Indian real estate sector is still grappling with rude shock of economic slowdown, the gradual resumption of economic activities with fiscal stimulus and booster dose is turning the economic cogwheels towards the positive scale. Thus, regulatory intervention, incremental forward-looking measures and the new Model Tenancy Act will augment a structurally sound ecosystem in the near future.

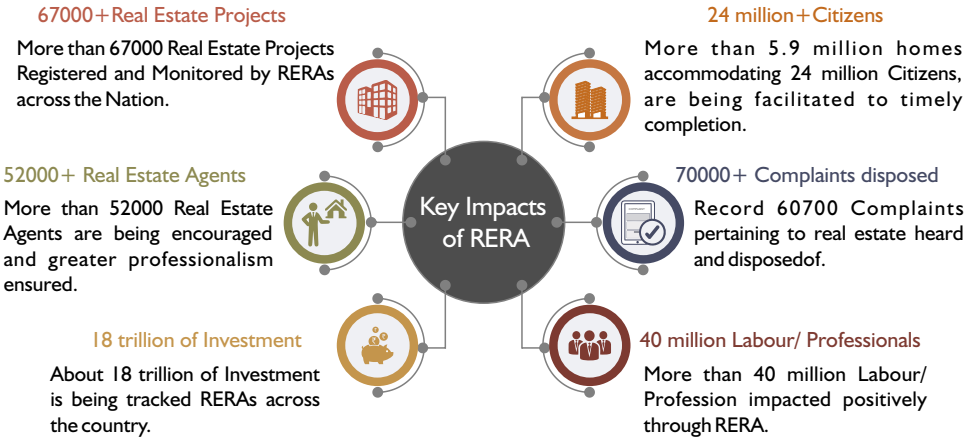


Figure 78: Key impacts of RERA

The aspects of transparency and accountability are twin pillars on which India's real estate regulation is based. RERA has positively impacted home buyers and investors alike. From a single-owned, physical asset class to Real Estate Investment Trusts (REITs) and Infrastructure Investment Trusts (InvITs), the investor now has options.

Now, it is time for RERA 2.0, an act for not just regulation but also development of the sector. It is now time for the authorities to implement Sections 32 and 33 of the Act, facilitating the growth and promotion of a healthy, efficient and competitive real estate sector by:

1. ensuring time bound approvals and clearances for timely completion of the project,
2. promote environmentally sustainable and Green Buildings,
3. encourage investments in real estate sector including measures to increase financial assistance to Affordable Housing segment,
4. get ancillary sectors in formal network including brick kilns, construction materials, fittings, fixtures, etc., and encourage labour welfare.

Policy Directive

Real estate is driven by transparency, accountability and structured modus operandi attracting huge private investments globally. Also, for a Non Resident Indian (NRI), the country offers tremendous opportunities for investment and wealth building. Government of India has initiated top notch policies at crux that have a deep impact on the Indian real estate sector and have stimulated its growth. With time, this sector is evolving and there is a dire need to relook at the ease of doing construction in India. Government has been constantly working towards improving this and the remarkable achievement is reflected in its growth in rankings from 185 in 2007 to 27 in 2020 as per the World Bank's Doing Business Report. However, more needs to be done in order to have better co-ordination of different

departments responsible to issue the required permits. To continue this path and sustain the pace of reforms, all the stakeholders need to work cohesively and collaboratively. Accountability and responsibility towards project development must be equally borne to bear fruitful results.

Digitisation has enabled timely submission, approvals and close monitoring of work, thus reducing the time lag. Single window clearances and ease of doing business are fundamental for futuristic growth. Policy interventions in land acquisition, approval processes, rental housing and taxation are much needed to expedite development of housing, which will act as a catalyst by creating a multiplier effect on job creation and double-digit GDP growth.

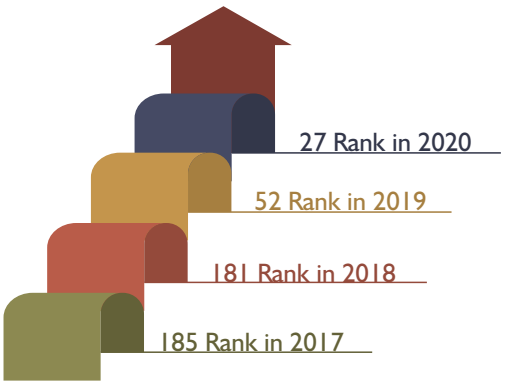


Figure 79: India's ranking in construction permits over the past few years as per Doing Business Report by The World Bank

Rental Housing

Another major reform being undertaken by Government is encouragement of rental housing. Internationally, it is witnessing an increasing trend and for the first time in India, it is getting the attention it deserves. In Switzerland, 56.6% of the population lives in rental housing, Hong Kong has 49%, Germany has 48.1%, South Korea has 44.8%, Austria has 44.3%, while India has 11.1% of households living in rental housing. It is important for India to focus on rental housing on a priority basis as it would not only provide greater mobility but would also offer better economic opportunities.

Towards this objective, Model Tenancy Act has recently been approved by the Union Cabinet with a strong intent legal framework. Union Cabinet has recently approved it and will revolutionise Rental Housing in India. This act is a progressive step towards addressing bottlenecks of erstwhile rent control legislations and encourages development of balanced rental housing markets, protecting interests of both landlords and tenants. Affordable Rental Housing Complexes (ARHCs) scheme for urban migrants, as part of AatmaNirbhar Bharat Abhiyan, is a key to provide affordable and sustainable housing provisions. This greatly aids in the development of affordable rental stock in India, preventing slum developments in urban colonies. It is a landmark step to formalise rental

housing in India. It will revive India's rental housing market by effectuating a multitude of reforms and will institutionalise it by giving fillip to private sector to address the huge housing shortage. Together, affordable and rental housing will help the country achieve its ambitious goal of 'Housing for All'. Natural disruptions followed by structural and policies tsunami's is constantly transforming the way we build and live-in coming future. Self-sustainable developments like mixed- used integrated township models have gained traction that enable holistic living with convenience, comfort and community living, all at one stop.

Sustainable Housing

Housing is a crucial factor of the economy; it depicts its prosperity in urban development and its sustainability. Indian real estate sector has charted its sustainable development goals and Indian Housing Development needs to rekindle sustainability at the core of its future development. Providing quality housing incorporating sustainability at both environmental and social levels, and application of newer innovative technologies are important for future housing projects. Urbanisation will steer the path of economic growth and sustainable urban housing will go a long way to accord their growth targets. Reduction in energy, minimal waste, reuse and recycling of waste materials improve the efficiency of resources, integrate design, utility and sustainable development, inclining towards mitigating the risks of climatic changes. Government must incentivise the industry to go for Green Building development, ensuring resource optimisation and safeguarding the environment.

A sustainable urbane offers good quality of life to its citizens and makes provision for future citizens simultaneously. Many renowned global nations have developed 'sustainable cities', 'smart cities' or 'eco-towns' to safeguard Next-gen demographic living quotient. These eco-friendly developments comprise affordable housing, sustainable living, controlled carbon footprint, higher rate of reuse and recycling of waste resources, integrated efficiency of air, water energy, more robust public infrastructure, ample of open and green spaces, and inward investment for continuous upscaling and maintenance. The new metropolitan 'sustainable smart cities' must be a reflection of best urban Master Plan, robust infrastructure, excellent connectivity, sustainable technology, broadways and boardwalk for pedestrianisation, well designed green landscaping, renewable energies and construction materials, comfortable environment boosting ample natural light and ventilation, water bodies, rapid transit systems and smart homes. All these will effectively lead to multiple employment opportunities and attract much needed investment for growth.

The government and the industry need to work hand in glove to consistently develop the urban construction industry through the creation of sustainable cities, with planning for expansion and growth. To build this, effective Green Building norms and regulations must be practiced and ensure sustainability of housing throughout its lifecycle- from design to construction to operation. Modern housing design should consider the social, economic, and environmental aspects in order to achieve maximum effect by respecting the cultural, psychological, physiological, financial, and historical characteristics and preferences of

residents or the community. Thus, for successful sustainable housing development, an optimal balance between sustainable housing and customer satisfaction must be a priority.

Way Forward

There are many factors that are going to further change the real estate sector in India for the good and if time is right, to secure industry status. Revamping of business models, emerging new asset class like industrial and logistics, data centres, co-living and co-working spaces, emergence of prop techs, launch of housing data index are the few developments that stand as future growth drivers. Private Equity investment will garner inwards flow to the tune of $ 6 billion in 2021, up 30% YoY as per media research report. Improvement in the economic scenario, boosted by positive reform initiatives and vaccination drives will back the growth.

The vision of Government is to develop a vibrant and thriving real estate market in India, that caters to all strata of society, needs combined with efforts by various stakeholders including Central Government and State/UT Government, private sector and local communities. It is important to establish an encouraging policy and a regulatory environment, conducive for investments in housing. The dream for India to become a global superpower and fastest growing economy will be catalysed by Housing Revolution and 'Housing for All' . This will assist in achieving the Hon'ble Prime Minister's ambitious target of $ 5 trillion economy by 2024.

Mobilising Private Sector for 'Housing for All'

Jaxay Shah

AHP Project at Kanchipuram, Tamil Nadu

Background

The private sector has been playing an exemplary role in the growth and economic development of India. Since the opening up of Indian economy in early 1990s and increasing Foreign Direct Investment (FDI) across sectors, job and livelihood prospects have been on a rise in urban India. As a result, migration from rural areas to cities in search of livelihoods has ensued rapid urbanisation, leading to change of the demographic profile of Indian cities. Large population requires larger infrastructure, transport facilities and the most important of all-housing. This led to an unprecedented demand for housing, majorly in (EWS) and (LIG), alongwith the Middle Income Group (MIG). .

Our country, the second most populous nation of the world, has come a long way in providing these amenities to its citizens. Since Independence, through various schemes, Government of the day ensured *'roti & kapda'* to the masses by creating livelihood and employment; the quintessential need of *'makaan'* was always a dream beyond the reach for most Indians. Government of the day is working towards the realisation of this dream through 'Housing for All' .

The Seventh Plan (1985-1990) recognised the problems of the urban poor. Subsequently, the National Housing Policy (NHP) was announced in 1988 with an aim to resolve the housing shortage problem. 1990s witnessed a remarkable shift in how the private sector and housing was once perceived. The Eighth Plan (1992-1997) recognised the role of private sector in driving the economy and realised its importance for resolving housing issues, building infrastructure and propelling investment. The Ninth Plan (1997–2002), perhaps, highlighted provision of public housing assistance. Ever since the private residential sector in India started venturing into multi-storey apartments, it largely catered to middle class and upper middle-class families. Clearly, these 'apartments' were out of the reach of LIG and EWS families. It continued to stay so till the need to provide housing for all sections of the society was recognised by the Government. Hon'ble Prime Minister Shri Narendra Modi, in June 2015, announced his vision of 'Housing for All'.

Engaging Private Sector through AHP

States/UTs which initiate Affordable Housing projects in their own capacity or in partnership with the private sector are eligible for Central assistance, provided such projects satisfy certain stipulated criteria. More specifically, a housing project in which 35% of the housing stock is earmarked for EWS category and the aggregate size of the project is at least 250 houses, it becomes eligible for a Central grant of ₹150 thousand per EWS house for all EWS houses in the project. It is estimated that only half of India's population owns a house and the other half lives either on rent or in slums and shanties. Hence, this announcement ensured much needed focus on 'Affordable Housing' and highlighted the important role of private sector in 'Housing for All' . Real estate developers continue to play an important role in this realisation. Developers are sensitive towards the aspirations of all income groups that are eligible to avail benefits under the Affordable Housing scheme. Private sector is not just

building flats but is developing communities which provide habitat that focuses on 'Holistic Living' by ensuring green spaces, water recycling, solid waste management, sewage treatment and above all, safe and secure living spaces to homebuyers.

To supplement and contribute to Hon'ble Prime Minister's vision, in 2017, Confederation of Real Estate Developers' Associations of India (CREDAI) announced 352 Affordable Housing projects across India. The members of CREDAI committed to build around 200 thousand low-cost affordable homes in 53 cities across 17 states in the country. Over one lakh units were planned to be constructed in Maharashtra, 42,000 houses in National Capital Region (NCR), 28,000 in Gujarat, 7,000 in Karnataka and 6,000 in Uttar Pradesh to name a few. As per the report compiled by Liases Foras for CREDAI, approximately 1.8 million residential housing units were constructed between 2016 and 2019, out of which more than 1million met the affordable housing definition (Data for 2020 is yet to be collated). The table below shows year-wise number of houses constructed under Affordable Housing segment.

Prominent CREDAI member developers like Ashiana Housing Limited, Gaursons India Limited, Supertech Limited, Janapriya have launched and handed over several Affordable Housing projects across the country.

Gujarat Case Study

As a result of the demand survey carried out in 2016 across various parts of Gujarat, a total demand of 764 thousand houses was identified under four components of the PMAY-U Scheme. Government of Gujarat developed a strategy to leverage the four components of the Scheme to achieve the set target. Besides AHP and In-situ Slum Redevelopment (ISSR) through Public-Private Partnership (PPP), Gujarat has been at the top amongst the states under Credit Linked Subsidy Scheme (CLSS), where more than two lakh beneficiaries have been benefitted for interest subvention. Beneficiary-led Construction (BLC) has been rolled out especially for those under the EWS category. For new houses, the state provides an assistance of ₹200 thousand per house, against Central Government's assistance of ₹150 thousand per house. A total of 82,670 houses have been approved under this component. In October 2020, Hon'ble Chief Minister of Gujarat announced a series of measures to help real-estate developers execute affordable housing projects in the state like:

1. Housing units measuring 90 sqm shall be considered as affordable homes instead of the earlier limit of 80 sqm.
2. Approval for low rise building projects will be given on the same day through the online approval system.
3. Proposal to implement a uniform policy throughout the state for interest payments on installments of chargeable Floor Space Index (FSI).

So far, under the four components of PMAY-U, around 563 thousand houses have been sanctioned, out of which about 275 thousand houses have been completed, and rest are at various stages of construction.

Figure 80: Cost Range wise Real Estate Production trend - Housing production in units,
Source: Report on Contribution of Real Estate to Indian economy, prepared by Liases Foras for CREDAI

Slum Rehabilitation Projects

According to 2011 census report, 13.8 million households and about 64 million people were located in city slums in India and this number is growing every year. As the number increases, so does the number of unhealthy and unsafe homes. These factors hinder the overall development of a city. While slums provide cheap housing for migrants, including daily wage labour, maids, drivers, they also nurture illiteracy and anti-social elements. Slum redevelopment using land as a resource with private participation for providing houses to eligible slum dwellers is an important component of 'Housing for All' Mission. This approach aims to leverage the locked potential of land under slums to provide houses to the eligible slum dwellers, bringing them into the formal urban settlement.

Maharashtra Case Study

To facilitate Slum Rehabilitation at a fast pace, Government of Maharashtra brought an amendment to the Maharashtra Regional and Town Planning Act 56 and introduced a

nodal agency, Slum Rehabilitation Authority (SRA). It brought forth a Slum Rehabilitation Programme that analyses existing positions of slum areas in a city. After examining, the committee devises plans for rehabilitation of these identified slum areas and ensures that the Slum Rehabilitation scheme planned is executed to the best of SRA's abilities. It enables property developers to rehabilitate slum dwellers in situ and compensates the landowner and developer by awarding them with Transferable Development Rights (TDR).

As part of this programme, Naiknavare Developers Pvt. Ltd., a member of CREDAI Pune chapter, has undertaken projects for slum rehabilitation across different cities like Pune and Mumbai. With an aim to provide a permanent roof to maximum slum-dwellers and enhance their standard of living, the developer successfully completed slum rehabilitation projects such as Prathama, Parivartan in Pune and is currently working on a project in Vakola, Mumbai. The Slum Rehabilitation policy was framed almost two decades ago and with an objective to complete the rehabilitation in 5-10 years. However, many bottlenecks including delays in approvals and uncertain roadmap for private developers hindered the progress. We, therefore, need a complete revamp of the existing Slum Rehabilitation policy and restructuring of the entire financing mechanism.

Impact of COVID -19 on Indian Real Estate in 2020-21

COVID-19 pandemic-triggered lockdown had increased the number of quarters taken to clear unsold real estate inventory to over 15 at the end of 2019-20 (Fy20). This number has increased to over 19 quarters at the end of the first half of 2020-21, exacerbated by muted sales in the first quarter and slow recovery in the second quarter (Liases Foras). Residential sales were down 50% year-on-year (YoY) to 68 million sqft in first half of FY21 across major six cities. Delhi-NCR and Bengaluru saw maximum decline YoY in H1FY21 (over 55%) due to the lockdown. Also, the share of total sales for the Affordable Housing segment (homes valued up to ₹ 45 lakh) witnessed slight decline (33%) YoY as compared to H1FY20 (35%).

Notwithstanding the downturn and related challenges, many real estate developers across the country continue to launch affordable housing projects with a hope to tap into the new segment of home buyers willing to shell out up to ₹ 45 lakh for a house of 60 sqm area in urban and 90 sqm area elsewhere. To ensure affordability, most of the EWS/LIG projects are located in outskirts of the cities as the land cost is much lower compared to city limits. The connectivity and infrastructure pose a challenge for the aspiring homebuyers to make a purchase decision. Though majority of the beneficiaries lie in EWS/LIG category, there is a gap between demand and supply for the housing units. Developers are focusing equally on Middle Income Group (MIG) units as well.

Affordable Rental Housing Complexes (ARHCs)

Percentage of rental housing is low in rural areas than in urban. Even in urban areas, the share of rented housing has decreased from 54% in 1961 to 29% in 2018 for various

reasons, including high rentals. The differences are huge from state to state, i.e, from almost 37% in Delhi to less than 8% in Bihar and Uttar Pradesh (Liases Foras). Most of the rentals are informal without any agreements to avoid taxes and related litigations. The lockdown announced by Central Government to contain the spread of Coronavirus led to migrant workers going back to their native states. Inability to afford home rent because of no steady income was the main reason.

To address this problem, Hon'ble Finance Minister Nirmala Sitharaman unveiled a plan to build affordable rental homes for the urban poor with an objective to incentivise migrant workers to stay back. Private Real Estate Developers are keen to explore this new asset class as this potentially could solve the unsold inventory challenge.

The Government may, however, replicate models from other countries that promote rental housing for poor. In the early 2000s in Brazil, the municipality of São Paulo developed a rental housing programme based on government ownership and rent subsidies for poor people. The programme consisted of upgrading slums and constructing new houses. A targeted system of rental vouchers was further implemented to support rent for poor families in privately-owned units. In China, municipal governments are responsible for building and managing rental housing for low and middle income groups. In 2015 in Beijing, government subsidised apartments were rented at 80% of the market rates.

Challenges Galore

Launching affordable housing project was never as easy as envisaged. Private developers had to factor-in many challenges while contemplating an 'Affordable Housing' project. Few of the challenges are:

1. Availability of land at lower price with proper connectivity is difficult to find. According to a CRISIL report, at least 30,000 acres of land is required to build one crore homes and its availability in metros and other cities is next to impossible and if available, it will be expensive.
2. Demand for bigger houses and meagre profits act as deterrent for developers to launch affordable housing projects.
3. There is limited awareness of the benefits under PMAY-U amongst homebuyers.
4. Majority of working population in India is employed in the unorganised sector. They do not have income documents to substantiate their earnings and hence, their Home Loan applications are not approved.
5. Principal amount of up to ₹150 thousand in a Home Loan and Housing Loan interest amount of up to ₹200 thousand is rebatable under section 80C and section 24 of Income Tax Act respectively. If the rebate limit is increased, applicants can save more and aspiring homebuyers will be prompted towards applying for home loans.

Policy Recommendations

Government is well on-track to achieve targets set under 'Housing for All' but a few policy changes will definitely aid the Government in reaching the milestone at a faster pace. The following recommendations may be considered:

1. Allowing the usage of idle Government land for Affordable Housing projects in and around cities.
2. Affordable Housing projects for LIG and MIG may be exempted from paying the Building and Other Construction Workers (BoCW) cess and expedited clearances and approvals.
3. Government, through Non- Banking Financial Companies (NBFCs) and Housing Finance Companies (HFCs), may launch special schemes to cater to the people employed in the unorganised sector.
4. Government may consider increasing the area of a house that qualifies as Affordable Housing.
5. Allow Input Tax Credit (ITC) on Goods and Services Tax (GST) for all Housing projects.

Planned Urbanisation: A Game Changer

Governments, both Centre and State/UT, focus on improving services on the basis of public feedback and through (ULBs). This becomes more and more challenging as there is a continuous influx of migrating population and increase in the internal population of respective cities. This also creates stress on the existing systems leading to their collapse at times and hence, services need to be upgraded or redesigned bearing in mind the increasing demand.

Development of housing must be sensitive towards perils of unplanned urbanisation and should ensure quality public services, sanitation, urban transport and access to employment opportunities. Most Indian cities witnessed rapid urbanisation, leading to shortage in water supply, energy, public transport, education, waste management and health care. Since 2014, there has been a conscious shift in policy that focuses on planned urban development. Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Mission, PMAY (U) – 'Housing for All', and Swachh Bharat Mission – Urban (SBM (U)) are some of the major urban development programmes that the current National Democratic Alliance (NDA) Government has launched.

While the issue of eco-friendly public transport is being addressed by introduction of Compressed Natural Gas (CNG) buses, metro rail services, promoting usage of Electric Vehicles by respective State/UT Governments, other aspects still remain a challenge. The challenges over the next few years will be immense if urbanisation must support economic development and not become a bottleneck in India's growth. Ever increasing urban population will require competent and technologically driven systems, besides safe and environmentally conscious housing.

Building Affordable Homes: An Indian Experience

Anand G. Mahindra

AHP Project at Chindwara, Madhya Pradesh

Housing for All

India is projected to surpass China as the world's most populous nation by 2027. We already know that much of this population growth will be concentrated in our cities and large towns, which are expected to add nearly 300 million new residents by 2050. An urban transformation with deep social, economic and environmental implications is taking shape in our country at this very moment, even as our planet contends with an unprecedented global health crisis that has upended lives and livelihood.

With or without the pandemic, our cities today are overcrowded hubs of economic growth. How can we use our previous experience and the lessons that COVID-19 has taught us to transform Urban India to ensure livability, social integration and cohesion for all city dwellers? How can we ensure that the largest number of people have access to all the opportunities for a better quality of life that cities potentially have to offer? The first step could well be affordable and sustainable housing.

'Adequate Housing' is a right that is recognised under the Universal Declaration of Human Rights. In the best of all worlds, adequate housing is more than just a roof and four walls. A human habitation, whether it be a hut or a palace, is not just an enclosed space to live in. 'Home' is a feeling, an emotion, a place of safety and security. As the old song goes "Be it ever so humble, there's no place like home." If we do not build homes that connect to our heart strings, we will merely be building shelters, and not homes. Design, empathy, architecture, affordability, connectedness, environmental consciousness, and technology must all come together to build a house that is truly a home.

We are at an inflexion point in the building industry. We, today, live in a world where development and sustainability cannot be opposing forces – they have to complement each other. It is obvious to me therefore, that the future of urban housing has to be 'green' – which means it has to be affordable and sustainable. More than 50% of our country's population is projected to reside in urban areas by 2050. Demand for social housing will continue to intensify. Since significant residential stock in India is yet to be built, it gives us a chance to get things first time right and evolve a model that takes care of people as well as planet. I see this as a great opportunity.

Today, sad to say, the building industry is part of the problem. Building operations and construction now account for nearly 40% of global energy-related carbon emissions, and consumption of raw materials, energy, and water. India's burgeoning thermal energy demand is expected to grow by almost 700% by 2050, compared to 2005 levels; and associated carbon emissions are likely to increase tenfold within the same time. We cannot wait for this dystopian future to overwhelm us. The time to outline a long-term vision of anticipated urban growth in India for the next 25-30 years is 'today'; and sustainable housing that is both affordable and environmentally conscious must be incorporated as a critical component of our plans for the future. Our industry must move from being part of the problem to being part of the solution.

Unfortunately, popular perception correlates sustainable homes with expensive technological advances and other associated costs. The truth is that 'affordability is at the core of sustainability' when it pertains to housing. This holds particularly true for low-income families that are disproportionately impacted by variable living expenses such as project maintenance costs, public utility bills and transportation outlays, all of which can be contained by green building strategies that augment the core values of Affordable Housing. Moreover, when evaluated from a lifecycle cost perspective, the operating savings of an affordable, green-built home far exceed any incremental capital costs. That is why in my book, the field of sustainable and affordable housing is one of the most exciting and satisfying business opportunities available today.

Real Estate Development is a field where the Mahindra Group is backed by a quarter century of experience. We see it as a business that cannot only serve the shareholder profitably, but also serve the nation. Under our Rise philosophy, serving the nation includes serving the planet, the environment, and the communities we live in. The Mahindra Group anticipated the accelerating urbanisation trends in India as far back as the 1990s, when we made the strategic choice to be a part of India's urban growth story, with the establishment of Mahindra Lifespace Developers Ltd. in 1994. Our vision was to develop inclusive, economically vibrant, and environmentally responsible urban communities that would support connectedness and culture.

Today, 27 years after we started, we operate in nine Indian cities, across three lines of business – value housing under the 'Mahindra Happinest' brand; mid-premium residential developments under 'Mahindra Lifespaces'; and integrated cities and industrial clusters under the 'Mahindra World City' and 'ORIGINS by Mahindra World City' brands. Our driving vision is to build not just houses but homes, regardless of their price. It's one thing to build a house. It's quite another to build a home that is affordable, environmentally responsible and also fulfils aspirations for a better life.

Our focus, from day one, has been on 'building green'. All our projects are today third-party certified on sustainability aspects. We have committed to the global Science Based Targets initiative (SBTi). We drive sustainability across all aspects of our work, including design, supply chain management, energy-efficient building materials and construction methods, and operations and maintenance. We are happy to share our knowledge in public domain to ensure widespread adoption by developers, policy-makers, architects, and homeowners.

Of all the segments we are in, Affordable Housing has the greatest potential to fulfil our ideal of doing well and doing good at the same time. The foundations for our entry into affordable housing were laid as early as in 2011, when we began to explore the segment and the unique needs of the affordable home consumer. Increasing urbanisation and inward migration into cities over the past few decades had already resulted in significant shifts in the demographic profile of India's urban centres. There was a growing demand for quality affordable homes. Rental markets were limited and there was an oversupply of high-end

housing. The share of people living in substandard housing in India was high, compared to other emerging market economies (and continues to be so). Affordable, resource-efficient housing was thus the need of the hour.

We realised early on that the average first-time homebuyer in India is typically forced to make multiple compromises along the purchase journey. Our effort has been to change this experience and enable all homebuyers to dream big, irrespective of social standing or wallet size. Our research has been geared towards better understanding the value homebuyer in India, and have identified several unstated yet deeply desired needs and wants in the process.

Our research confirmed that first time homebuyers were not just looking for shelter or status; they were looking at a home as a springboard for better economic prospects, a better quality of life, for better educational opportunities for their children and for a more prosperous and secure future. The fact that their budget ran to value homes was not a reason to shortchange the buyer on these aspirations. Hence, our goal has always been to redefine and demonstrate 'value' in the affordable homes segment in multiple ways. To give just a few examples, all our Affordable Housing projects are located on key transport networks in fast growing metropolitan suburbs. The houses may be small, but they are efficiently planned, naturally lit and well ventilated, with open spaces and amenities for sports and wellness activities and organic farming. We provide differentiated amenities such as classrooms with assisted learning; creches to enable parents of young families to work while their children are cared for; and retail facilities. There are family zones and spaces for community activities. Sustainability interventions reduce the long-term cost of ownership and technology is deployed for waste and water management. Hybrid technology results in faster construction. We offer price transparency and refundable booking mechanisms and our latest affordable project in Tathawade (Pune) offers more than 50 specially curated features and amenities for the changing needs of modern Indian families. It is India's first affordable project with solar-powered outdoor work pods and designated 'hobby rooms' for residents to pursue personal passions such as art or music.

We must be doing something right because we sold 1000 'Happinest' units in the first year after launching the brand. Today, our development footprint in the segment spans nearly 6 million sqft of completed, ongoing and forthcoming projects. We have been able to achieve this because we started with the vision that every homebuyer, particularly in the affordable segment, deserves the best, and we will leverage innovation to give it to them. In the process, we discovered the joy of serving the underserved. Our 'Happinest' teams know that they are making a difference.

To our great good fortune, current government policy is supportive of our aspirations. The Pradhan Mantri Awas Yojana-Urban (PMAY-U) takes a far sighted and holistic approach, thus demonstrating a deep understanding of multiplier effects of housing on human lives and outcomes. Initiatives such as 'Housing for All', the Smart Cities Mission and Swachh Bharat Mission mark positive shifts in policy emphasis that underscore the

importance of planned urban development and the real estate sector as critical to our nation's future. They also serve as global benchmarks in urban policy development and implementation.

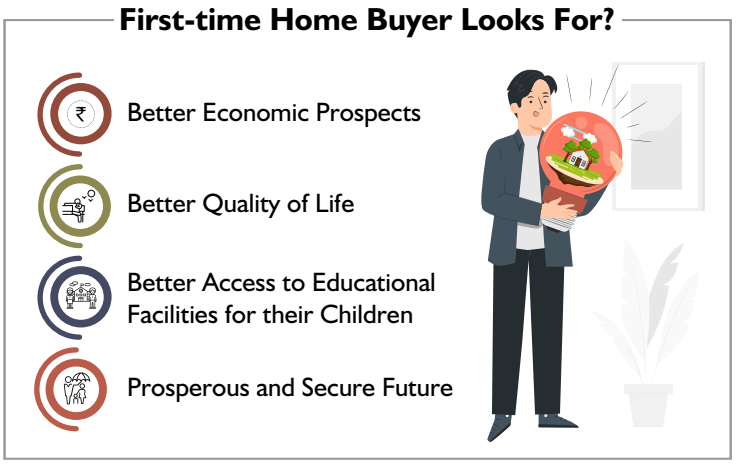


Figure 81: First-time home buyer's preference and priorities

The PMAY-U Mission's focus on differently abled persons, senior citizens, single women, transgender and other weaker, vulnerable sections of society addresses the need for social inclusion and equity in housing. The support for Affordable Housing development through provisioning of land, subsidies and incentives has spurred private sector participation in the segment, resulting in a narrowing of the existing demand-supply gap in urban housing. In particular, the Credit Linked Subsidy Scheme (CLSS) under PMAY-U has helped boost both affordability and demand.

The PMAY-U also leverages technology innovation through its Technology Sub-Mission, that focuses on faster and cost-effective construction of houses suited to India's geo-climatic conditions. The 'Global Housing Technology Challenge' (GHTC-India), opens the door for relevant mainstream innovative housing construction technologies from across the globe. This focus on green technologies and materials is timely, since much of India's future Affordable Housing stock is yet to take shape, and we have a significant window of opportunity to shape an environmentally robust and inclusive urban future for our country.

Most importantly, Affordable Rental Housing Complexes (ARHCs) and the schemes under it, facilitate the provision of rental housing at affordable rates for industrial workers close to their workplaces and guarantees a decent living environment for migrant workers for 25 years after allocation of homes on rental basis.

As an organisation committed to responsible business with a positive impact on communities, the Mahindra Group lauds Indian Government's initiatives to institutionalise

enabling frameworks for Affordable Housing development that is both socially and economically inclusive and environmentally resilient.

If I were to provide a further wish list to the Government, it would include promotion of opportunities for public-private co-operation; application of global green building standards, adapted to Indian conditions; stakeholder participation in the planning process; release of idle land for Affordable Housing; and expedition of approvals and clearances and introduction of additional benefits for green and Affordable Housing.

Affordable Housing for the bulk of our people is still a dream today. But our experience shows that with idealism and innovation, it is possible to make dreams come true. Today, all the portents are favourable for converting the dream of Affordable 'Housing For All' into a reality. All that's required is the mindset that buyers deserve the best, and the persistence to think outside the box and to innovate to give them the best. We have made a small beginning but there is a long way to go. I dream of an India where every person has not just a roof over their heads but a home that, however small, is nevertheless truly their castle. I dream of an India where the poor have access to beauty in their everyday environments, because they need beauty more than the wealthy do, to enrich their lives. I dream of an India where Affordable Housing stands for something that is aesthetically and functionally pleasing, and not ugly and shoddy. Above all, I dream of an India that will find its inherent 'design voice' so that Affordable Housing design with the 'Make In India' stamp will point the way to a better life for the homeless, across the world. I am optimistic that I will see that dream come true, within my lifetime.

PART SEVEN
State's Participation

Realising Cooperative Federalism through PMAY-U

Manoj Joshi

Pawan Devi, Mathura, Uttar Pradesh

Cooperative Federalism forms the very existence of Pradhan Mantri Awas Yojana (Urban). Over time, different design elements have been developed within the system of the Scheme to meet the housing needs of the eligible beneficiaries thus, helping them in providing a dignified living. How important cooperative federalism is and the pivotal role it would play in fulfilling the goal of providing affordable housing to people was realised at the beginning when the Scheme skeleton was being laid down. As this book gets launched, it's been seven years since PMAY-U was introduced. We have come a long way and many milestones have been achieved through the years; however, some are yet to be accomplished.

The States/UTs have been vested with the major power to implement the scheme as per the requirements in their respective areas. This was the first step which led us in winning the trust of the States/UTs which build the core of PMAY-U. As anticipated, it yielded the results and helped in implementing the Scheme swiftly at all levels.

PMAY-U follows a multi-pronged approach and allows beneficiaries to choose from one out of four verticals as per their eligibility and preference based on the geographical conditions, topography, economic conditions, availability of land, infrastructure, etc. This freedom of selecting the preference is first met at the State/UT level; meanwhile, the States/UTs have the independence to implement the Scheme by adopting the best-suited practices, in consultation with their respective government.

As this point, I would give credit to the policy-makers of PMAY-U who chalked out the Scheme and knew how important the role of cooperative federalism will be in implementing a Scheme of such magnitude.

The various State/UT governments have taken special interest in running PMAY-U at their level – thus, helping the Central government in its implementation and monitoring. The different governments have, over the years, come up with several policies and practices which deserve a special mention. The participation of States in building trust in beneficiaries, in building partnerships, the different public-private partnerships, participatory development, and the other initiatives have been well-articulated in the form of seven exclusive chapters in this book by Hon'ble Chief Ministers of Uttar Pradesh, Madhya Pradesh, Tripura, Gujarat, Andhra Pradesh, Tamil Nadu and Kerala.

In Uttar Pradesh, for example, to facilitate the implementation of PMAY-U, the State provides first installment of ₹50,000 at the first stage to the beneficiaries, along with other challenges like e-records, operational and fund management. The initiative thus has built the trust of the beneficiaries on PMAY-U and enhanced the pace of implementation of the Mission.

Andhra Pradesh, meanwhile, has undertaken a special drive to provide house sites to eligible poor families throughout the State. For this purpose, pattas were issued to eligible beneficiary households on the name of female head of the household. Various other

rehabilitation programmes have also been implemented across Andhra Pradesh for the welfare of special groups.

Likewise in Madhya Pradesh, land title (patta) is provided to the landless families. Also, additional subsidy is granted to construction labourers who were unable to give their beneficiary share to avail the benefits of PMAY-U. The State has also been doing commendable work in providing relief to people whose houses have been affected or destroyed due to flood/heavy rainfall

Coming to Chhattisgarh. The State has laid down an easy finance model to help people avail the benefits of the scheme, especially for those who do not have proper document proof of income, lack financial literacy, or for those who cannot afford exorbitant rate of interest. The objective is to fill up these missing links to increase the access to housing finance to people at large. Chhattisgarh Government is also providing maximum benefits to Left Wing Extremism (LWE) affected community, leprosy affected families with provision of adequate house including all basic amenities.

Gujarat, on the other hand, is facilitating in situ slum rehabilitation on private land parcels through Public-Private Partnership (PPP) model; is redeveloping public colonies which are either in dilapidated condition or/and where FSI is not fully utilized and ensuring the cities are slum free.

Jammu & Kashmir grants interest free loan of ₹200 thousand per beneficiary under BLC component of PMAY-U in addition to the Central Assistance & UT Share. This step has ensured fast paced progress in implementation of PMAY-U across the UT has gives major fillip in providing roof over the heads of eligible beneficiaries.

Kerala is well known for its convergence policies. PMAY-U has been converged with LIFE Mission and unit cost under BLC new component has been enhanced from ₹250 thousand to ₹400 thousand without any beneficiary contribution and the additional assistance is provided as share of ULB. The initiative has resulted in achieving the voluntary participation from the part of corporate houses. It has succeeded in the effective engagement of multiple stakeholders and thus creating a positive impact on the society and guiding them for community's empowerment. The multi-faceted convergence model helps in completion of unfinished houses already designed under the previous schemes; building of 645.8 sq. ft. houses under the budget of ₹400 thousand on the beneficiaries' land; Building flats for landless beneficiaries under AHP vertical of PMAY-U.

Maharashtra envisages to meet the housing needs of building and construction workers registered under Maharashtra Building and Other Construction Workers Welfare Board who do not own a pucca house. The State Government provides additional subsidy of ₹200 thousand to eligible construction workers apart from the ₹250 thousand (₹150 thousand Centre Share and ₹100 thousand State Share) offered as subsidy.

State Government of Jharkhand came out with an innovative practice of issuing passbooks to BLC beneficiaries to spread awareness and create a more accountable and transparent system. It aimed at providing a documentary proof to the beneficiaries which would enhance the transparency of the scheme as well as establish a great sense of ownership. The passbook contains beneficiary details, scheme information, installment details – paid and due, physical progress, geotagging details, etc.

In the North-East region, Tripura has stood out in the implementation of PMAY-U scheme in the State. Owing to the geographical and other constraints, Tripura has focussed mainly on BLC and CLSS verticals of PMAY-U and accomplished a great feat.

Tamil Nadu provides government lands free of cost to promote AHP projects. The government also provides free house site pattas to landless urban poor households to facilitate implementation of BLC projects. Regulatory relaxations, infusion of technology, policy reforms and institutional actions are also adopted to facilitate implementation of PMAY-U in the State.

A major leap has also been taken in the field of CLSS vertical of PMAY-U which deserves a special mention. CLSS or Credit Linked Subsidy Scheme provides interest subvention on housing loans for EWS/LIG categories. The MIG was also included for the first time ever in any affordable housing scheme. A total of 2.39 million beneficiaries have availed benefits of CLSS, out of which 610 thousand are from MIG category.

A comprehensive and Robust MIS System is in place that helps all stakeholders to seamlessly manage information pertaining to physical and financial progress. The MIS allows submitting on-line demand survey with tracking facility and helps in housekeeping of various records through digitisation such as Survey, Project information, Beneficiary details, fund utilisation, etc. The MIS is equipped with geotagging features for monitoring the progress of construction of houses under the BLC and projects under AHP and ISSR verticals.

There is no denying the fact that States/UTs have played a crucial role in the success of PMAY-U in all these seven years and the success of the Mission is a testimony to the fact. The very approach of working as a team has brought fruitful results and continues to do so. Like the above-mentioned best practices, other States too have come up with innovative measures to take the Scheme way ahead. Today, we are at a crucial stage when it comes to implementation of the Mission and the constant support of States/UTs will help us in delivering the smiles that we wish to see on the faces of PMAY-U beneficiaries.

The Mission has traversed across India, touched the hearts of millions of Indians, delivered happiness in the form of a pucca house to these families. It has been a journey of challenges, surprises and opportunities. We have overcome all challenges and taken all surprises and opportunities in our stride to meet our goal of Housing for All.

We realise how important a house is for a person and his family. In the last seven years, efforts have been made to ensure that all eligible beneficiaries get a home under the Mission. We are also aligned to the commitment of building an AatmaNirbhar Bharat. The attempts will ensure no urban household is left without a pucca house and 'Ghar Hua Apna, Pura Hua Sapna' reverberates.

Building Trust in Beneficiaries : Initiatives in Uttar Pradesh

Yogi Adityanath

Pawan Devi, Mathura, Uttar Pradesh

Pradhan Mantri Awas Yojana-Urban (PMAY-U) has been implemented in Uttar Pradesh since March 2016, after the approval from the State Cabinet. However, till 2017, only a few projects were accepted with 30,441 sanctioned houses. When my Government came into power in 2017, changes were initiated in PMAY-U policy and subsequently, the on-ground scenario changed rapidly. The State Government was keen on performing in PMAY-U Scheme to solve the housing crisis of the State, making sure that the intent and initiative of the policy reaches to all levels of the society. At all public events, the Scheme was promoted and propagated using different media of communication. With extensive travelling, interactions with beneficiaries across the State were conducted, along with quarterly review meetings to monitor the progress of the Scheme.

Releasing of State Share to the Beneficiaries

During the implementation of PMAY-U in the State, several issues were identified and dealt with at an earlier stage, for its better and effective implementation. One of the initiatives was to provide first installment of ₹50,000 at the first stage (before the beginning of construction) to the beneficiaries for house construction. As per the Scheme guidelines, financial assistance under Beneficiary led Construction (BLC) (New and Enhancement), the State Government should release financial assistance to beneficiaries in 3-4 installments, depending on progress of construction of the house. The guidelines prescribe that the fund should be released to the beneficiary commensurate to the construction. It means that the beneficiary should mobilise his own resources and does some construction, say up to plinth level, and then only the first installment is released to him. While interacting with beneficiaries during site visits, it was observed that the pace of construction of houses was very slow as the beneficiaries were not able to mobilise enough savings to invest on construction of the house. It was also learnt that they were borrowing money from the market at a very high rate of interest.

On detailed discussion, it was realised that more harm is being done to the beneficiary in this process of house construction under PMAY-U, as by the time their houses are completed, they will be under huge debt burden due to exorbitant interest rate. It was then decided that the first installment of ₹50,000 from the State share of ₹100 thousand per house to the beneficiary under BLC should be given as advance, immediately after the sanctioning of houses by the Central Sanctioning and Monitoring Committee (CSMC). Further, it was learnt that the first installment of ₹ 50 thousand is not enough for construction upto lintel level. Therefore, State Government decided to release the second instalment after the construction reaches plinth level. The assistance of ₹250 thousand (comprising of Central assistance of ₹150 thousand and State share of ₹100 thousand) is being released to the beneficiaries in three instalments, which is as follows:

Instalment	Stage	Percentage of Release	Amount of Instalment
First Installment	After approval of the house by the CSMC	20%	50,000/-
Second Installment	After construction till plinth level	60%	150,000/-
Third Installment	Completion of House	20%	50,000/-

Installments Disbursement

The above two interventions at State level have led to significant improvement in the performance of the Scheme. This can be seen in the figures pertaining to the progress of the Scheme in just two years:

Head	Status as on 31.05.2017	Status as on 23.07.2019	Status as on 25.09.2022
No. of houses sanctioned by the CSMC	30,441	1,110,580	1,705,967
No. of Beneficiaries to whom first installment released	0	395,869	1,237,704
No. of houses on which roof has been casted	0	291,266	1,328,911
No. of houses completed	0	264,983	1,186,066
Total Expenditure	0	₹56.97 billion	₹258.00 billion

Progress of PMAY (U) comparison till May 2017 and July 2019

Direct Transfer of State Share into Beneficiaries Bank Account

This provision helped the Scheme reach its optimum speed to meet the huge demand of houses under the BLC vertical. Central Assistance and State share for BLC beneficiaries received by State Level Nodal Agency (SLNA) are being transferred to the beneficiaries' account directly, which speeds up the entire process of construction. It also makes the beneficiaries believe in the Scheme. This, in turn, encourages other probable beneficiaries living in kutcha houses to be a part of PMAY-U. This step not only sped up the entire process but also created a positive environment by reducing corruption in the system. A beneficiary can check the status of his funding by going to the Public Financial Management System (PFMS) portal of Government of India and can himself check the amount and instances on which the money has been transferred to his/ her account. This helps in maintaining transparency of the entire funds transfer process.

The Institutional Structure

The Bureaucratic Effort

Due to the huge demand and involvement of large volume of finance, authorities need to be very attentive to keep a check on the irregularities. Bureaucrats of the State also put their best foot forward for performance in this policy. Chief Secretary of Uttar Pradesh conducts review meeting with all District Magistrates (DMs) and Divisional Commissioners on every alternate week regarding the progress of the Scheme. Under his guidance, issues are resolved, and these weekly reviews help in ensuring that all districts are equally performing to meet the targets. Principal Secretary of the department also conducts weekly review meetings with DM and other responsible officials of the districts, along with visiting the low performing districts. Timely changes in government orders (GO) and through Demi Official (DO) letters, officials are instructed to take personal interest in implementation of the programme, as it is related to the basic necessities of life. Occasional field visits and addressing not just District Officials but also meeting the surveyors and City Level Technical Cell engineers, they are motivated to complete their targets. DMs play a crucial role in the implementation of PMAY-U in Uttar Pradesh. From fund transfer to checking the authenticity of the beneficiaries of the approved projects, a team of experts, including Additional District Magistrate (ADM), Sub-Divisional Magistrates (SDMs), Probationary Officer (PO) and Enforcement Officers (EOs) in the districts, make sure that only valid beneficiaries benefit from the Scheme. DMs are always in coordination with the Principal Secretary of the department and SLNA. Regular reports are exchanged to keep a check on the progress of the Scheme on weekly and monthly basis.

District Urban Development Agency (DUDA)

District Urban Development Agency (DUDA) performs its functions in the supervision of respective DMs and is responsible for implementation of PMAY-U Scheme in the districts and at the Urban Local Body (ULB) level. Programme Officer of DUDA is appointed the SLNC in the district, along with Civil Engineer in the City Level Technical Cell, to provide the necessary technical help. Professionals for Management Information System (MIS) are provided by the Project Management Consultancy (PMC) to DUDA level, so that the data can be compiled and entered in PMAY-U-MIS in a proper manner to generate important reports related to the Scheme. Based on these reports, evaluation is done where SUDA, the SLNA and DUDA takes a call on the important points to be addressed. Regular meetings and workshops are organised by SLNA to give necessary instruction, review of monthly progress and to train the concerned personnel for the new changes in the technical part of the Scheme.

Urban Local Bodies

Under the supervision of DM, DUDA plays an important role in churning out housing demands from the ground level and implementing the Scheme. Commissioner/ EO

of the respective ULB validates the beneficiaries under the project. In this regard, advertisement of the Scheme in various Information, Education, Communication (IEC) activities (newspapers, radio, pamphlets, posters, banners, camps, etc.) is done in order to attract maximum beneficiaries. Also, maximum numbers of beneficiaries fill their forms online or in the office of the ULBs. Yearly targets are given to meet this housing demand in a stipulated time.

Project Management Consultancies (PMC)

PMC was introduced in December 2016 to provide necessary technical support to DUDA and ULBs for implementation of the Scheme. The role of PMC is to assist the beneficiaries and monitor the quality of construction of BLC houses, assist in preparation of Detailed Project Reports (DPRs) and also undertake geotagging of BLC houses at various stages of construction and data management.

Inaugural Session of India@75- New Urban India, Conference-cum-Expo

Innovative Monitoring Initiatives

Public Financial Management System (PFMS)

Uttar Pradesh is the first State to adopt PFMS from the first day. The funds received are transferred from SLNA to the beneficiary account directly and hence, helps the policy to reach its optimum pace to meet the huge demand in the BLC vertical. This speeds up the entire construction process and also encourages other probable beneficiaries living in same condition to be a part of the Scheme. This step creates a positive environment by reducing

corruption from the system and also helps in maintaining the transparency in the funds transfer process.

Smt. Rajmati Devi, Gorakhpur, Uttar Pradesh

Smt. Chandramati, Lucknow, Uttar Pradesh

Mobile App

A user-friendly Hindi version app, especially for beneficiaries has been made to bridge the gap amongst the beneficiaries and DPR, PMC, City Level Technical Cell (CLTC) and State Level Technical Cell (SLTC). Important information like working drawing, No Objection Certificate (NOC), affidavit, along with all offline records, that are being submitted in hard copy, are stored and saved in the server for future reference in case of damage to the physical hard copy. Beneficiaries, while scanning the QR code of their Aadhar card, can view immediately all details along with the submitted documents such as drawings, date wise geotagging, date-wise fund transfer to beneficiaries, etc. With this app, beneficiaries now know when geotagging is done, whether the drawings and documents are available on the record along with the photographs of various construction stages, along with the installment details. This user-friendly app also has a unique request feature that facilitates the beneficiaries to appraise the senior officer, in case of any delay in geotagging, payment or any other irregularity. Subsequently, an app has been developed for surveyors with following features:

e-filing and digitisation: Since it is difficult to keep record of a huge database of beneficiaries in files, this app helps in keeping the digitised records. It helps in proper e-filing of documents and saves time and efforts.

Monitoring: From the database available on this app, a surveyor can monitor the progress of construction for all the beneficiaries. It is his duty to collect the documents, geotag the files and submit them timely to DUDA. If the surveyor fails to deliver the document, this e-record feature also enables real time sharing of data, as and when required.

Conclusion

Due to the continuous effort of the teams at all levels and the guidance received from Government of India, in 2019 Uttar Pradesh bagged the first prize for Best Performance

throughout the country, due to its sheer political will and policy initiatives. Collective efforts of the entire team are to be credited for this recognition. Mirzapur won the first prize for Best Performing Nagar Palika Parishad, Malihabad ULB under Lucknow District won first prize for Best Performing Nagar Panchayat and Nagar Panchayat Hari Harpur, a ULB of Sant Kabir Nagar District won third prize for Best Performance among Nagar Panchayats. PMAY-U has helped in improving the quality of life of people of Uttar Pradesh by providing them one of the necessity of life – Housing. This helps in filling the gaps across the different sections of the society and gives confidence to the poor section to live with pride and confidence. Their inclusion in the mainstream society helps them take the benefits of different programmes of Central and State Governments. It is a proven fact that the beneficiaries receiving benefits in this Scheme are living a prosperous and peaceful life as compared to their earlier.

Building Partnerships : Initiatives in Madhya Pradesh

Shivraj Singh Chouhan

AHP Project at Chhindwara, Madhya Pradesh

Housing for All

Housing is the key to inclusive growth and everyone needs an all-weather pucca house for a safe and comfortable life. The surrounding areas also have important implications on the health, education and employment of the people.The ongoing Covid-19 pandemic has further highlighted the need of an abode for all the citizens. However, affordability acts as a barrier to inclusive growth,especially for the vulnerable section of society.

It gives me immense pleasure to mention that all these years, Madhya Pradesh has made every possible effort to ensure that the benefit of Pradhan Mantri Awas Yojana (Urban) is provided to all the eligible beneficiaries of the State. We have formulated new strategies to implement Hon'ble Prime Minister's mantra of *"Sabka Saath, Sabka Vikas, Sabka Prayas"*,in order to facilitate the beneficiaries in availing the benefits of Housing For All.

Through continuous efforts by the Government of Madhya Pradesh many milestones are achieved on the way including several recognitions from the Government of India. Madhya Pradesh is one of the States to get recognised for the successful implementation of HFA under PMAY-U Awards 2019. The efforts made are commendable and hence Madhya Pradesh was ranked as the 2nd Best Performing State for overall implementation of HFA. Madhya Pradesh was also adjudged as the Best AHP on Public Land for implementation of AHP vertical in special category. Our municipal corporations were also praised for their dedication and the overall implementation of the scheme. Chhindwara was the 2nd Best Performing Municipal Corporation across the country in overall implementation of HFA under PMAY-U Awards 2019 and Khurai stood 5th as the Best Performing Municipal Council across the country in overall implementation of HFA under PMAY-U Awards2019.

Photo 42: PMAY-U Awards 2019

Various Initiatives of Madhya Pradesh Under "Housing For All"

While we cherish the recognition of our efforts at national level, the journey of accomplishments over last seven years has not been easy. Multiple ingredients at various levels of governance have made it possible. The cornerstone of our approach was affordability for all and development of inclusive communities. The success of "Housing for All" in Madhya Pradesh is largely attributed to the Nine Key Initiatives taken by the State.

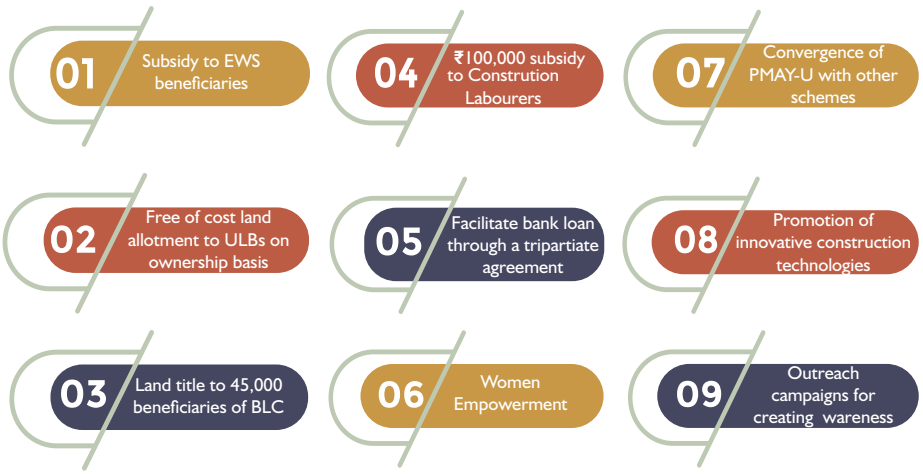


Figure 82: Various Initiatives Of Madhya Pradesh Under "Housing For All"

Subsidy to EWS Beneficiaries and Construction Labourers

In addition to the Central Assistance, the Government of Madhya Pradesh provisioned for the subsidies to help the beneficiaries achieving their dreams of owning a house. For this, assistance of ₹150 thousand per dwelling unit were provided to slum dwellers under Affordable Housing in Partnership (AHP) vertical and ₹100 thousand per Dwelling Unit under Beneficiary-Led Construction (BLC) vertical. Apart from that assistance of ₹150 thousand were sanctioned for the EWS beneficiaries residing on rent or in non-slum locations.

Most people in the State prefer to own a plotted house due to the traditional trends of the country, therefore it is seen that BLC vertical under PMAY-U is one of the popular verticals in small and medium towns of Madhya Pradesh. The estimated cost of construction of a 30 sq.mt. house under BLC vertical is ₹385 thousand. This vertical provides the freedom to construct the dwelling units in a way they aspire and location is not restricted therefore beneficiaries are able to conveniently construct their individual houses with a total subsidy of ₹250 thousand and by contributing the balance amount through labour and own savings.

Photo 43: Houses under PMAY-U in Madhya Pradesh

AHP vertical of PMAY-U is also paving its way towards success as the cost of one dwelling unit costs between ₹550 - 850 thousand in Madhya Pradesh and slum dwellers are required to contribute only ₹200 thousand per Dwelling Unit and sourcing of the balance amount is done out of cross-subsidy model adopted by the State. The beneficiaries can contribute their share by means of Bank Loan in easy EMI. The State is committed to provide Best-in-Class construction quality to ensure durability as well as liveability under AHP vertical. LIG, MIG and commercial units are constructed along with EWS units and profits earned from the sale are utilized to cross-subsidize the cost of DUs for EWS. In cross-subsidy model, beneficiaries of all segments (EWS/LIG/MIG) are housed in a single housing society. This not only makes the project financially viable, but also ensures inclusive communities.

For improving conditions of workers in Informal Sector; additional grant of ₹100 thousand per DU has been provided to building & other construction workers under AHP projects. Funds with the Labour Department in the form of 'Labour Cess' were utilized for this purpose and further, a subsidy of ₹100 thousand per beneficiary was released to ULBs which is adjusted against beneficiary contribution, reducing the financial burden on them.

Land Disbursement Initiatives

The Madhya Pradesh Government is committed to provide houses to all, including landless families residing in urban areas. To extend the benefit of PMAY-U, Pattas (Land Titles) are provided as per "Madhya Pradesh Nagariya Kshetro Ke Bhoomihin Vyakti

(Pattadhriti Adhikaron Ka Pradan Kiya Jana) Adhiniyam, 1984". For the fulfilment of this vision, in many ULBs, parcels of Government land have been identified for allotment of Pattas to the beneficiaries. ULB is providing these pattas as developed plots with all basic infrastructures like roads, drains, streetlight, etc. As a part of success; more than 45,000 Pattas have been distributed so far.

Another initiative includes reducing the cost of DUs for beneficiaries, by allotting land in the middle of the city to Urban Local Bodies (ULBs) for construction of HFA projects at zero premiums. Further, this land is allotted to ULBs on ownership basis so that they can allot the DUs to beneficiaries on full title basis instead of lease.

Many poor families living on "*Abadi Land*" were not able to avail the benefits of the Mission due to lack of rightful ownership document. Therefore, the State Government issued instructions to provide benefit of BLC vertical on the basis of property tax receipt of last 5 years and notarized sale/gift deed to all those residing on "*Abadi Land*" having undisputed ownership.

Easing the Financial Contribution

Recognizing the fact that EWS beneficiaries face difficulties in availing home loans from banks/HFIs due to various reasons such as inadequate proof of income, non-filing of ITR, inadequate guarantee and low CIBIL score, the State came up with a unique solution by designing a Model Tripartite Agreement to be executed among (i) Banks/HFCs (ii) ULBs and (iii) Beneficiaries, wherein the ULB acts as a 'Guarantor' for home loan availed by EWS beneficiaries. Through this measure, EWS beneficiaries conveniently availed home loans. This step has improved the financial accountability of EWS beneficiaries as almost all them who have availed home loan by means of tripartite agreement are paying EMI as per schedule. As a reformative step, the State Government also provisioned for 100% exemption of Stamp Duty on such loans.

The 'Tripartite Agreement Model' was also helpful in improving the occupancy of vacant houses constructed under Jawaharlal Nehru National Urban Renewal Mission (JnNURM) – that were lying vacant for a long time,owing to pending beneficiary share. The MP Government has approved a scheme to provide 5% interest subsidy to all the EWS beneficiaries availing home loans for houses constructed under JnNURM to reduce their interest burden. Through collective implementation of Tripartite Agreement, 5% Interest Subsidy Scheme and Loan-Camps organized by ULBs, houses constructed under JnNURM lying vacant were occupied in a short period of 1.5 years.

Women Empowerment

True to the core of the Mission, ownership of PMAY (U) house in the name of the female head of the household or in joint ownership was made compulsory. To facilitate this, the registration cost of making female as a co-owner was reduced to ₹ 1,100, to avail the benefit of CLSS vertical. This encouraged change in ownership in the favour of women.

Convergence of PMAY-U With Other Schemes

The government ensured quality infrastructure of water supply, sewerage, public transport, roads, etc., through convergence of funds from various sources. Schemes like Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Mukhyamantri Adhosanrachna Vikas Yojana, Ashray Nidhi and Vishesh Nidhi helped in providing not only a dwelling unit but also basic services associated with a house for leading a decent lifestyle.

Promotion of Innovative Construction Technologies

Madhya Pradesh is aggressively promoting new building technology throughout the state. The state's nomination for the implementation of LHP is another feather in our cap. On January 1, 2021, the Hon'ble Prime Minister laid the foundation stone for the Light House Project (LHP) in Indore. A total of 1,024 DUs are being built utilising technology that has been implemented successfully across the world. MoHUA has also approved a Demonstration Housing Project (DHP) in Sundarlal Patwa, National Institute of Urban Management, Bhopal.

Outreach Campaigns for Creating Awareness

In Madhya Pradesh, various events have been organized for creating awareness about the Mission and its benefits. Through Shahari Vikas Mahotsav and Shahari Vikas Parv; Madhya Pradesh became the first State to organize e-GrahPravesh and e-Lokarpan of 1 Lakh PMAY (U) beneficiaries. Foundation stones of 150 thousand houses were laid on 2018 and Grah-Pravesh was performed for over 11,000 houses.

Mission Nagar Uday helped to create awareness in economically vulnerable section about PMAY-U and to ensure proactive participation of citizens and other agencies. ₹12.60 billion were transferred in a single click under 'Mission Nagar Uday' to initiate transfer of funds to more than 160 thousand beneficiaries of BLC vertical 280 thousand beneficiaries were provided Adhikar Patra for fulfilling their dream of owning a house during the closing ceremony of Mission Nagar Uday. To facilitate beneficiaries in availing home loan for their contribution, regular loan camps at construction sites and other accessible locations were organized by ULBs.

The State takes different measures for effective information distribution through Information Education and Communication (IEC). As a result of the active use of social media channels to highlight the state's excellent achievements, the Madhya Pradesh PMAY-U twitter handle is one of the most followed accounts. Madhya Pradesh is also one of the best-performing states in terms of implementing outreach activities under PMAY-U, such as Women's Day celebrations, the Angikaar Campaign, and the registration of Technograhis, among other things. Need evaluations were carried out through various initiatives, particularly the Angikaar Campaign, in order to extend the benefits of other schemes.

Photo 44: Inauguration of LHP at Indore by the Hon'ble Prime Minister on 1st January 2021

Photo 45: Prespective view of LHP - Indore

Photo 46: Visit of LHP – Indore by Secretary MoHUA

Impact of 'Housing For All' Mission

Prior to 2015, under various housing schemes for EWS, namely, 'Basic Services for Urban Poor' (BSUP) and 'Integrated Housing and Slum Development Programme' (IHSDP) component of Jawaharlal Nehru National Urban Renewal Mission (JnNURM) and Rajiv Awas Yojana (RAY), only 46 thousand houses were approved in Madhya Pradesh over a period of 10 years, i.e., from 2005 to 2015. However, under PMAY-U, 968 thousand houses have been approved in a short period.

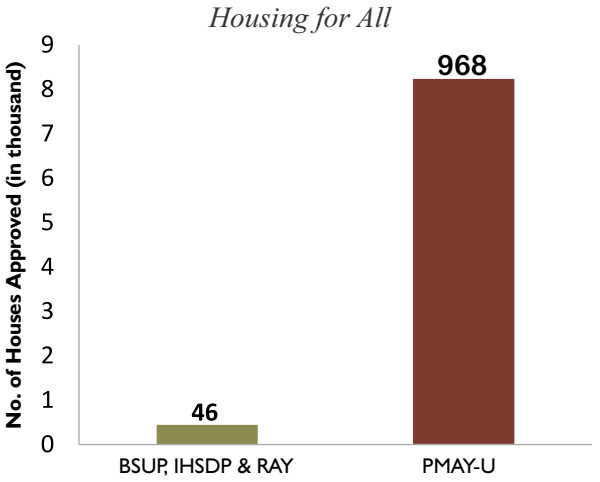


Figure 83: Comparative Delivery of Houses under various schemes

1. Out of 968 thousand houses approved by MoHUA, more than 545 thousand houses have already been completed which includes 176,853 beneficiaries that are benefitted under CLSS.

2. In Madhya Pradesh, projects worth around ₹400 billion are in various stages of implementation out of which Central and States share is ₹192 billion.

The inclusive approach built-in under 'Housing for All' and the strategies adopted by the State brought a paradigm shift to provide housing to vulnerable section in the MP. We are committed to achieve the desired outcomes of the PMAY-U and the State is working proactively to provide a "pucca house" to every eligible beneficiary of the State.

My heartiest congratulations to all the team members of Pradhan Mantri Awas Yojana (Urban), whose tireless efforts and sincerity have helped in providing an abode to millions of people throughout the country. I am confident that with such devotion and diligence, we would soon be able to realise our Hon'ble Prime Minister's vision of 'Housing for All'.

Photo 47: Visit of LHP – Indore by Technograhis

Photo 48: Visit of LHP – Indore by JS & MD, HFA

Photo 49: Shahari Vikas Mahotsav (23 Jun 2018)

Photo 50: Shahari Vikas Parv (7 Jul 2018)

Photo 51: Mission Nagar Uday (12 Mar 2021)

Photo 52: Nagar Uday Abhiyan (25 Dec 2016)

PMAY-U: A Reality for Urban Homeless in Tripura

Manik Saha

Nisha Rani Das beside her BLC House at Agartala, Tripura

Introduction

Housing is considered as an 'Engine of Economic Growth'. It has immense potential to boost the economy through its strong backward and forward linkages with about 250 ancillary industries. According to a study, housing investment has inter- industry linkages and investment in housing /construction sector has strong multiplier effects on the economy. Investment in housing has the capacity of employment generation in eight different areas of the economy. Considering the immense importance of Urban Housing, Government of Tripura actively participated in Pradhan Mantri Awas Yojana- Urban (PMAY-U) to turn the vision of 'Housing for All' into reality.

Tripura has emerged as a leading state amongst all North-Eastern states in successful implementation of PMAY-U, along with its 20 Urban Local Bodies (ULBs). Given the terrain and geographical contours, Tripura chose to focus on the two verticals of the Scheme out of the four:

(a) Subsidy for Beneficiary-Led Individual House Construction or Enhancement (BLC)

(b) Credit Linked Subsidy Scheme (CLSS)

The scope for In situ Slum Redevelopment (ISSR) component is limited through adopting land as a resource model, the land prices being low, making it financially unviable. Similarly, option for Affordable Housing Partnership (AHP) component does not seem to be feasible due to constraint of availability of Government land for construction of houses.

Overview of Urban Development of Tripura

The share of urban population in Tripura is 21% of the entire population of the state spread in its 20 statutory towns. With regard to urban structure, the state has one Municipal Corporation (Agartala), 13 Municipal Councils and six Nagar Panchayats. Various Central and State Government schemes are being implemented such as Smart City Mission (SCM) AMRUT, Swachh Bharat Mission-Urban (SBM(U)), Deendayal Antyodaya Yojana-National Urban Livelihoods Mission (DAY-NULM), 10% Lumpsum Scheme, Tripura Urban Employment Program (TUEP), Fifteenth Finance Commission (FFC) Grants, etc.

Enduring with challenges on account of geographical position, transportation issues, prolonged rainy season, procurement of construction materials from outside the state, it proved to be a leader in the implementation of housing schemes. Various National Awards under JnNURM and PMAY-U are testimony to Tripura's outstanding performance.

Achievement so far under various Housing Schemes

Since 2007 to 2016, the State has implemented various housing schemes other than PMAY-U as launched by MoHUA, under which total 10,831 houses have been constructed so far in various ULBs of the state. The list is as follows:

Scheme	Sanction Year	DUs constructed	Remarks
IHSDP	2007-08 to 2009-10	3115 (in 5 towns)	All completed and 100% occupied. National Awards: 2011-12 (for Teliamura), 2012-13 (for Sonamura).
BSUP	2008-09	256 (at Agartala)	All completed and 100% occupied. Received JnNURM Award in 2010-11.
10% Lumpsum	2010-11	192 (at Radha Nagar)	Completed
10% Lumpsum	2013-14	763 (at Dharmanagar)	Nearing Completion
RAY	2014-15	3005 (in 4 towns)	In progress.
TSGHS	2013-14 & 2015-16	3500 (at 16 ULBs)	State Govt Scheme. All DUs completed.

Year on Year Progress

Implementation of PMAY-U

With the launch of PMAY-U, the housing industry of Tripura has got an unprecedented pace. A comprehensive housing demand survey, as mandated in PMAY-U guidelines, was conducted by an Individual Facilitating Agency, in all 20 ULBs of the state, where a total demand for 87,300 houses under BLC component were received, making it a most popular option. Tripura has got sanctioned all the houses as per the actual demand, achieving 100% saturation. The cost of BLC houses is estimated to be ₹ 271 thousand. The beneficiaries are getting a total of ₹167 thousand as Central and State contribution (₹150 thousand by GoI and ₹17 thousand by State) released in four installments, based on progress of construction and remaining amount is invested by the beneficiary to complete the house. There is a feeling of pride that after getting approval of entire housing demand by MoHUA of the state, construction of 64%, which is 60,585 has been completed and the rest are in various stages of construction.

Based on the status of implementation, it may not be an exaggeration to say that the state has emerged as a champion in achieving the goal 'Housing for All' . The performance of the state was appreciated and recognised by Government of India (GoI) through PMAY-U Award-2019 and the state was felicitated by Hon'ble Prime Minister. In addition, various ULBs and beneficiaries were also awarded under this Scheme. Available data states that 2,864 numbers of beneficiaries have been covered under CLSS component through various

banks of the state with the sanction of total loan amount of ₹19.4 billion. Moreover, subsidy for an amount of ₹224.8 million has been credited to the account of beneficiaries.

Strategy of Implementation

Housing being a State subject, the Scheme has provided a liberty to implement it with alterations necessary for the respective States/ UTs as per the local condition. Since Tripura is prone to disasters, therefore, certain precautionary building codes are mandated in the state. It is a fact that spaces of a house depend on person to person; therefore, restricted building plans somehow create hindrance in achieving the perfect space. A proto-type of house design was provided by the state and flexibility of suitable amendment by the beneficiaries while maintaining basic quality standards has helped the Scheme for faster implementation. Keeping this view in mind, beneficiaries are given relaxation in constructing their house in a way they want, maintaining the basic condition of floor area not less than 30 square metres.

Since this Scheme encourages people to build their houses on their own, therefore quality checks from the domain experts on regular time interval is needed. For this reason, Tripura has ensured and delegated the responsibility of monitoring and supervision to the respective Municipal engineers to evaluate the quality of houses being constructed by the beneficiaries. Not only in-house engineers but Social Audit and Third Party Quality Monitoring were also put in place through Individual Facilitating Agency to avoid any unfair means and smooth implementation of the Scheme.

India has various social challenges and gender discrimination has been seen in the country since early ages. To break this stereotype thinking of patriarchal society and help Indian women to empower themselves by getting a home ownership, efforts have been made to award houses in the name of female member of the family. This step is helping women to achieve respect and security in the society and enable them to protect from any social evils.

Geotaggers also acted as a catalyst who were suitably sensitised to motivate beneficiaries regarding stages of construction and mode of payments against each geo-tagged points, as they are closely associated with the beneficiaries as stakeholder. Several workshops were conducted with the geotaggers to ensure smooth implementation of the Scheme. Such practices helped in continuous monitoring of the construction process and smooth disbursement of funds at each stage of construction. Trainings, workshops and seminars are conducted at regular time intervals in order provide right information and modifications (if any), needed for the swift and organised implementation process. Workshop/ seminars with the beneficiaries were also conducted by the respective implementing agencies (ULBs) before issuing of work orders. Getting a home loan with zero-hassle is highly desirable as this helps the beneficiary trust the government and lending agencies and provide an impression of a transparent system. Therefore, beneficiaries were

also set free to obtain bank loan from any bank or any lending institutions for beneficiary contribution, with government assistance.

Since this Scheme has multiple stakeholders, therefore managing its implementation in a uniform way can be tough and confusing at times. If not monitored properly, this can lead to discrepancies at various levels. Therefore, multilevel monitoring and supervising agencies, i.e., ULB, District Magistrate of respective districts, Mission Directorate and State Level Sanctioning and Monitoring Committee (SLSMC), were put in the system for tracking the progress and cross verification. Another major challenge is disbursement of funds into beneficiaries account, as lenient approach can lead to misuse of the funds. To minimise the risk of fund mismanagement, Mission Directorate has efficiently handled the issue and ensured timely release of assistance in favour of the beneficiaries through Public Financial Management System (PFMS). It should be highlighted that without the active engagement of public officials from metropolitan regions, the state would not have been able to meet the Scheme's objectives. In fact, the Ministry's Central Sanctioning and Monitoring Committee (CSMC), officers, and technical support teams have provided constant and unwavering assistance to the state in order to achieve the intended goal.

Smt. Gouri Rani Saha, Bishalgarh, Tripura

Smt. Rani Bala Bhowmik, Belonia, Tripura

Light House Project – Agartala

Under Global Housing Technology Challenge (GHTC)-India, MoHUA has selected Agartala amongst the six Light House Projects (LHPs) in six states, using latest, modern, innovative, disaster proof, eco-friendly and affordable housing construction technologies. Tripura is fortunate that Agartala, the capital city, has been chosen to demonstrate the new construction technologies as a representative of the region. Under this project, 1,000 dwelling units are being constructed at Akhowrah, Goal Chakkar area of Agartala Municipal Corporation using Light Gauge Steel Structural System and Pre-engineered Steel Structural System. The project is at its faster pace of implementation.

Conclusion

It is believed that the visionary Scheme of PMAY-U, along with a host of other initiatives will definitely usher a new horizon in alleviating poverty from all over the country as well as create jobs in the economy. To materialise the same, Government of Tripura has taken up the flagship programme as one of its topmost priorities. The intention is explicit through the information and statistics already stated above.

To uphold the positive trajectory, Government of Tripura has been working hard and the resultant awards like Best Performing State under the category of North-Eastern and Hilly states, Best Municipal Corporation, Best Municipal Council and Best Beneficiary for House Construction have been the impetus to fulfil the vision of 'Housing for All' . These awards have further enthused the government for best performance and compete for other rounds of PMAY-U Awards. At the same time, it will remain committed to carry forward the aspirations of urban people of Tripura in fulfilling their dreams of having a pucca house with all amenities as enshrined in the Scheme. Tripura will remain steadfast with the dynamic conditions to lead the journey of making our motherland the 'Viswaguru' in foreseeable future.

Public - Private Partnerships : Initiatives in Gujarat

Bhupendrabhai Patel

AHP Project at Rajkot, Gujarat

Pradhan Mantri Awas Yojana-Urban, a flagship Mission of Government of India is being implemented successfully and is showing exemplary success in Gujarat since its inception in 2015. Today, Gujarat is at the forefront of implementation of PMAY-U across the nation with 1.06 million houses already sanctioned amongst all verticals of PMAY-U. Out of these, 726 thousand units are already completed and remaining are under progress. The reformatory steps taken to realise the dream of 'Housing for All' have not only redefined the urban landscape of Gujarat but also transformed the lives of millions of populaces. The determinants of implementation and success of the Scheme in the state includes four important pillars – Urban Local Bodies (ULBs), State Level Nodal Agencies, Primary Lending Institutes (PLIs) and the citizens.

In 2013, Government of Gujarat introduced Mukhaya Mantri GRUH Yojana for creation of 'slum free cities' in the state by providing Affordable Housing to the slum population. Under this scheme, Gujarat Government envisaged to provide pucca house to every slum family and household belonging to Economically Weaker Section (EWS), in tune with the spirit and objective of PMAY-U programme. In addition, various housing policies were introduced by the State Government for slums in order to reduce the homeless population. By focusing on providing pucca house to the slum dwellers free of cost with proper ownership documents and better quality of the house, environment, proper health, the quality of life for beneficiaries and their next generation remarkably improved. The cities became more liveable and this is how it led to formalisation of slums.

In Gujarat, to ensure dignified living along with a sense of security and pride of ownership to the beneficiaries, a house has all the basic amenities like electricity, water supply, kitchen and toilet to name a few. This has made PMAY-U an immensely successful programme in Gujarat. Responding to the needs of individuals based on geographical conditions, topology, economic conditions, availability of land, infrastructure, etc., the state has adopted various models in its implementation. The flexibility to choose from the four verticals of PMAY-U based on the needs, proved to be success factor in the state.

The State Government introduced Policy of Redevelopment of Slums situated on the Private land in Municipal Corporation areas of Gujarat in August 2019. This policy is designed explicitly for slum dwellers residing on private land, enabling them to have pucca houses free of cost on the same location with all basic facilities. It is expected that this scheme will provide benefit to 150 thousand families residing in the slums situated on private land.

The state has initiated the Scheme of In situ Slum Redevelopment (ISSR) through public-private partnership (PPP) model, where higher Floor Space Index (FSI) and Transferrable Development Rights are to be given to private developers in lieu of the cost of construction. Apart from the provision of physical infrastructure like underground drainage, water supply, internal roads, social infrastructure like schools, Anganwadis, healthcare centres, they will also be provided with State assistance of ₹100 thousand against Central

Assistance of ₹100 thousand per house. Slum redevelopment under the PPP model has also received encouraging response from slum dwellers and developers alike.

Hon'ble Prime Minister presenting key of the house to a PMAY -U beneficiary

Under Affordable Housing in Partnership (AHP) of the PMAY-U Scheme, the State Government provides an assistance of ₹150 thousand against Central Government share of ₹150 thousand per house. Moreover, under the Scheme, a residential Affordable Housing zone has been created in Ahmedabad. Planning norms specific to Affordable Housing have also been laid down for inclusive planning for the first time, along with building bye-laws and zoning regulation including relaxation in height restriction.

Credit Linked Subsidy Scheme (CLSS) has demonstrated commendable success in Gujarat. As the real estate sector is growing and with the increase in demand of housing in urban areas of Gujarat, State Government has been putting in efforts to attract private developers to build more and more houses in urban areas. Government of Gujarat has taken strenuous efforts to promote CLSS Scheme in Gujarat so that more families can benefit under the Scheme and thereby the objective of 'Housing for All' can be achieved. All efforts have resulted in increasing number of beneficiaries from Gujarat to get covered under CLSS. Gujarat State has emerged as a leader amongst all the states in the country, with more than 658 thousand sanctioned cases with subsidy disbursement worth ₹79.86 billion under CLSS.

Covid-19 pandemic threw a lot of challenges on the entire economy, the biggest being reverse migration of urban migrants/ poor in the country. These urban migrants stay in slums, informal settlements, unauthorised colonies and peri-urban areas to save cost on housing. Hence, they need decent rental housing at affordable rates near their worksites. Affordable Rental Housing Complexes (ARHCs) will provide ease of living to urban

Smt. Kalpanaben Alpeshkumar Purohit, Palanpur, Gujarat

Smt. Rathod Vijyaben Laljibhai, Junagadh, Gujarat

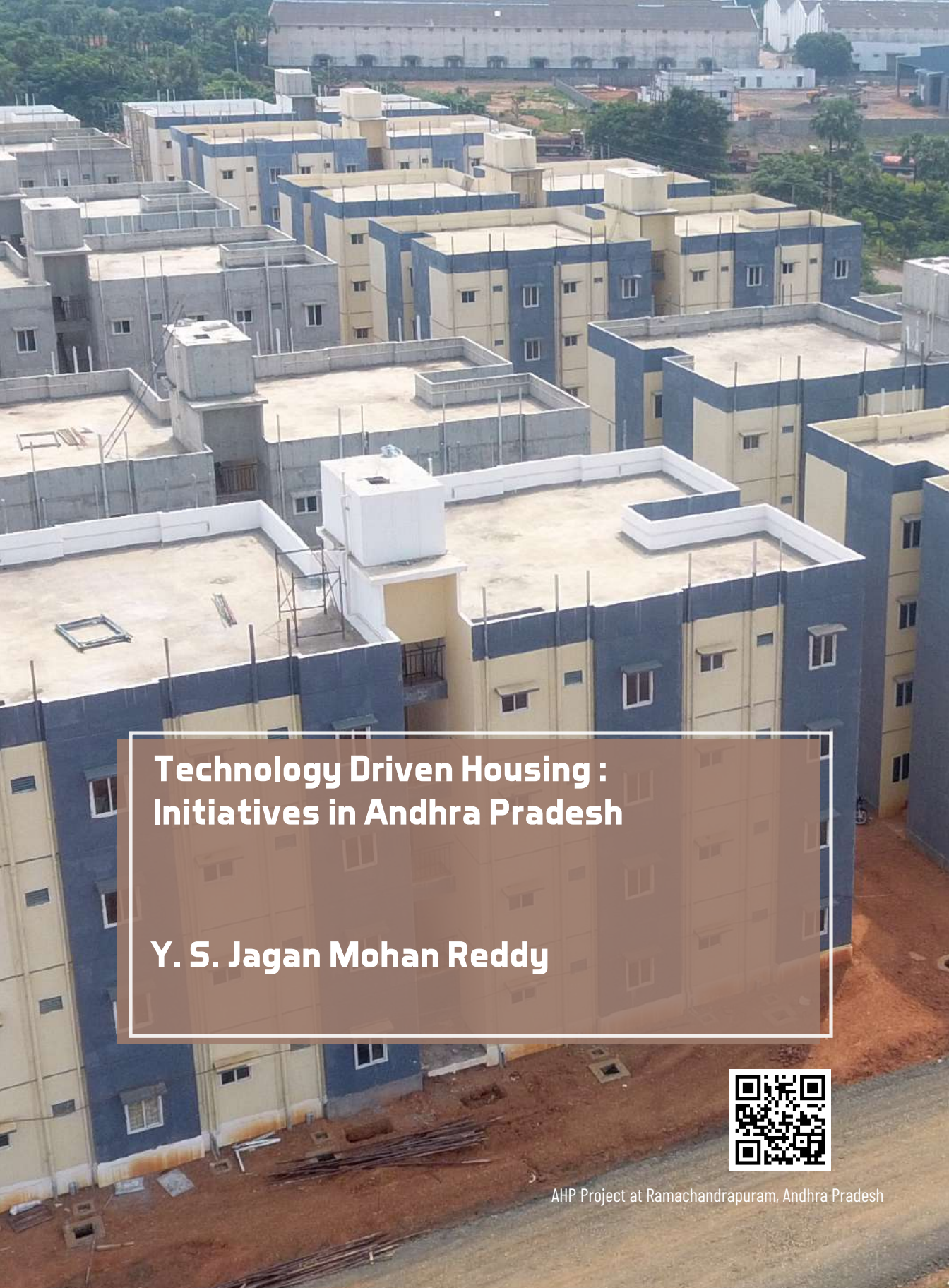
migrants/ poor in industrial sector as well as in non-formal urban economy to get access to dignified affordable rental housing close to their workplace. In Gujarat, a total of 4,414 units are identified to convert into ARHCs (till May 2021). Surat Urban Development Authority has already operationalised through selection of a concessionaire for managing 393 houses, with an offering of ₹180 million over a period of 25 years to ULB.

As a part of Global Housing Technology Challenge (GHTC)- India, Hon'ble Prime Minister laid the foundation stone of Light House Projects (LHPs) on January 1, 2021. Six distinct innovative technologies identified through GHTC-India have been adopted for construction and Rajkot is among the six LHPs across the country which has been shortlisted to have approximately 1,144 houses, each with physical and social infrastructure facilities. These LHPs will act as Live Laboratories for all stakeholders including Research and Development, leading to mainstreaming of these global technologies in the Indian context.

Hence, considering the above mentioned schemes, policies and measures taken by the Government of Gujarat to boost Affordable Housing sector in the state, it will not be incorrect to say that Gujarat is among the frontrunners in terms of development in the housing sector across the nation. PMAY-U has brought a paradigm shift in urban housing which resonates with the fast paced urbanisation of the state. As envisioned by Hon'ble Prime Minister Shri Narendra Modi, PMAY-U truly reflects the spirit of "Sabka Saath, Sabka Vikas, Sabka Vishwas, Sabka Prayas" and will continue to do so in the times to come.

Technology Driven Housing : Initiatives in Andhra Pradesh

Y. S. Jagan Mohan Reddy



AHP Project at Ramachandrapuram, Andhra Pradesh

Need for Affordable Housing for All

The country's vision of 'Housing for All', to provide safe, affordable and resilient housing to the poor and vulnerable families, serves as a platform to lead a dignified life and means for social transformation. The Indian Constitution Part IV – Directive Principles of State Policy encourages the State to secure a decent standard of living for all, which entails the need for providing adequate shelter to every citizen for basic dignified living.

The United Nations Committee on Economic, Social and Cultural Rights (UNCESCR), on the Right to Adequate Housing states that: "The rights to housing should not be interpreted in a narrow or restrictive sense, which equates it with for example, the shelter provided by merely having a roof over one's head or views, shelter exclusively as a commodity. Rather it should be seen as the right to live somewhere in security, peace and dignity." SDG 11 also put special emphasis with respect to Affordable Housing by 2030 and help the citizens to improve their standard of living by providing them basic urban services and healthy environment to dwell in.

Post seven decades of India's Independence, the government policies continue to struggle to realise the basic human need of shelter or upgrading slums in urban areas. Inspired and evolved from the best initiatives implemented in the previous housing schemes, Pradhan Mantri Awas Yojana-Urban (PMAY-U) was introduced with a concept of 'Housing for All' and emphasised on the objective of "every family shall own a pucca house with water connection, toilet facilities, 24 × 7 electricity supply and access". With total investment of more than ₹8.31 trillion, the Scheme focuses on building adequate houses for people, spinning off the positive outcomes in terms of employment, economic growth and boost to industrial sectors such as steel and cement has been changing the overall dynamics of the communities.

Resonating with the clarion and determined call of Hon'ble Prime Minister, the State has aligned its policies and initiatives with the New India Vision which lays down the goal of achieving Housing for All. The State Government of Andhra Pradesh has formulated targeted policies to achieve the ambitious goal, while duly developing strategies for access to finance, efficient use of land, adoption of latest technology for construction and evolving modes for reduced cost of construction. The Affordable Housing in urban areas is impetus to improve citizen's living conditions and ensure justness while providing a strong push to economic growth.

Vision and Policy Initiatives of Andhra Pradesh Government

During my Padayatra covering over 3,648 kilometres in 341 days across the state, I saw anguish amongst the people due to lack of a decent shelter and loopholes in the existing government policies with respect to housing initiatives. Realising the agony of the citizens of my state due to lack of an affordable house and vulnerability associated due to natural disasters like cyclones, heavy rains, floods, etc., in the second longest coastline in the

country, Government of Andhra Pradesh included a targeted scheme of 'YSR Pedalandariki Illu', which means 'Housing for All' under 'Navaratnalu' Flagship programme. Since then, the State Government has been in a mission mode towards providing permanent houses to the citizens of the state. One of my early decisions after assuming office as Chief Minister of the State was to develop comprehensive and sustainable plan which will ensure implementation of YSR Pedalandariki Illu scheme effectively.

Navaratnalu Pedalandariki Illu

'Pedalandariki Illu – Housing For All' is one of the major flagship programme of the Government of Andhra Pradesh under Navarathnalu. The government conducted a comprehensive survey to identify the families with housing requirements. According to the survey, 2.8 million families did not have access to adequate housing.

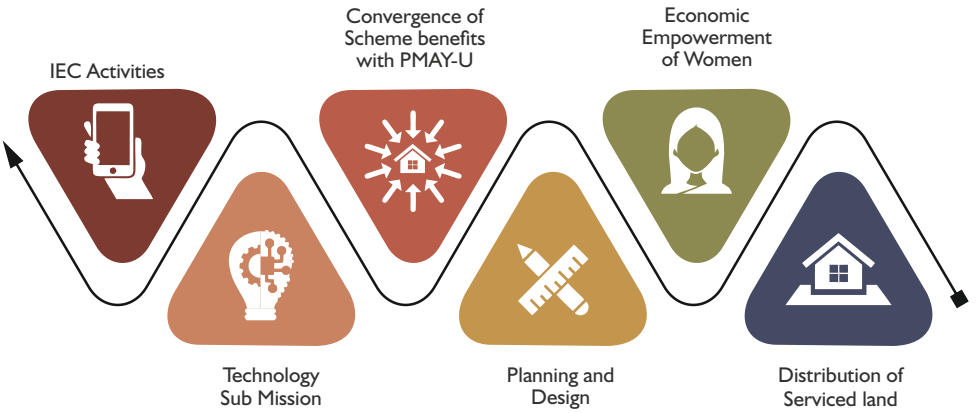


Figure 84: Initiatives of Andhra Pradesh Government

My government would sincerely like to thank Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI) for sanctioning 2.07 million houses with a total cost of ₹300 billion for the state of Andhra Pradesh. This has played a vital role in faster implementation of the programme. 1.8 million houses have already been grounded and around 623 thousand have been completed (June 2022). I personally monitor the programme on a weekly basis with the concerned departments and the district collectors.

Reforms: Initiatives of Andhra Pradesh Government

Housing Colonies with Land tenure and basic infrastructure for urban poor at affordable rates

Embracing the objective of GoI's PMAY-U Mission of 'Housing for All', Government of Andhra Pradesh has undertaken a special drive to provide house sites to 3.07

million eligible poor families throughout the state. For this purpose, 68,677 acres of land, inclusive of 25,433 acres of government land, has been acquired and distributed to the eligible beneficiaries. Layouts have been developed by involving Revenue Department and Panchayat Raj (PR) and Rural Development (RD) Department, Urban Local Bodies (ULBs) and Development Authorities for acquiring land and to promote the same road access. So far, 17,005 Economically Weaker Section (EWS) housing colonies (layouts) are being developed in ULBs and Urban Development Authority areas, duly mapping the required infrastructure in terms of roads, drains, water and electricity along with necessary social infrastructure. The house sites have been allotted at the rate of 1 percent for eligible beneficiaries in urban settings, by Revenue Department in a transparent manner through a process of lottery. It is inclusive of 1.25 million landless households out of 1.7 million houses sanctioned under the vertical of Beneficiary led Construction (BLC) of PMAY-U. The State Government has proposed for construction of 2.8 million houses in two Phases, i.e., 1.56 million houses in the first phase under PMAY-U and around 1.27 million houses in the second phase covering all the beneficiaries to whom house site pattas are distributed.

Felicitation of winners of PMAY(U) Awards 2019

Economic Empowerment of Women under PMAY-U

Government of Andhra Pradesh undertook an impact-strategy while executing a policy initiative for promotion of women empowerment and ensuring economic security. Plots are registered in the name of women beneficiaries only and the plot along with beneficiary has been geotagged.

Convergence of other Schemes with PMAY-U

Andhra Pradesh has leveraged the maximum potential benefit of the housing programme through convergence of various Central and State Government programmes. Benefits were undertaken from Pradhan Mantri Ujjwala Yojana for providing LPG to households, electricity under Pradhan Mantri Sahaj Bijli Har Ghar Yojana – 'Saubhagya', drinking water under Jal Jeevan Mission, and bank accounts under Jan Dhan Yojana.

Additionally, various State Government initiatives such as Jagananna Ammavodi scheme to empower mothers to educate her child/ children, YSR Cheyutha for empowering women of SC/ST/OBC/minority castes to create their own employment opportunities, YSR Aasara for empowering women economically and socially, among many other schemes have enabled a considerable earning ranging from ₹30,000 to ₹40,000 at each household level.

PMAY-U is considered as both a welfare and a development programme. Construction of the houses at such large scale will give a huge boost to the economy, besides providing massive employment to people belonging to 30 occupational categories such as masonry, carpentry, plumbing and other low-income groups, daily wagers and other informal sector migrant workers, contributing to post-Covid economic revival.

The State Government is proud to share that with the above stated convergence, each household on an average has been able to save around ₹100 thousand per year due to construction of their own house and savings in rent. The substantial savings empowers them to spend on other basic amenities of life such as education, healthcare, etc., and improvise on their respective living standards. PMAY-U has further contributed at large scale community initiatives through better convergence among different missions, such as Deendayal Antyodaya Yojana, National Urban Livelihoods Mission and Swachh Bharat Mission. The State Government has directed to develop all YSR - PMAY-U Green Field colonies as New Towns by providing required physical and social infrastructure through the line departments duly dovetailing funds available under different schemes.

Execution and Monitoring Mechanism

Keeping in view the importance of the programme, State Government have created a new post, Joint Collector – Housing, in each district and young IAS officers have been posted to govern the PMAY Housing Programme, for completion of construction within the Mission period. Government re-orchestrated the modus operandi of entire service delivery, to make the apparatus closer to the citizen through the secretariates by developing Village and Ward Secretariat System. It has recruited and positioned over 73,000 volunteers with a group of 50 households each and 4,000 population in urban areas for door to door household surveys. Requisite trainings were imparted to the Secretariat workforce to ensure seamless and efficient service delivery at the doorsteps of the citizens.

Volunteers have conducted door to door survey in every ward in impartial manner, checked their eligibility and did handholding activity to fill up necessary forms and documentation as required to fulfil the Central and State Government norms. All the administrative sanction proceedings are generated in local language (Telugu) through housing website and distributed to the eligible beneficiaries to choose the plan according to the site conditions. Volunteer visit the beneficiaries and undertakes required discussion with respect to material supply and other requisite components and subsequently facilitate beneficiaries to get construction materials with their consent at lower rates, lesser than the market rate, either from the approved agency or any other agency of his/her choice.

State Government has adopted latest Information Technologies to monitor the project progress through Command Communication Centre (CCC). The housing project sites are fitted with CCTV cameras and internet. The images and audio from the sites are linked to the CCC and the projects are monitored centrally by using mobile application. To monitor the physical progress, a software module is developed for data capturing under various parameters. Contracting agencies are given access to this module to update the progress. In addition, a Flat Allotment Software Module is developed with the objective to allot flats transparently based on certain conditions like disabled, age, etc., Beneficiary will get a SMS regarding flat allotment with ULB name, block number and flat number.

Smt. Malapati Malleswari, Pulivendla, Andhra Pradesh

Smt. Yeturi Latha, Nellore, Andhra Pradesh

Adoption of Innovative Construction Technology

State Government has set up Andhra Pradesh Township and Infrastructure Development Corporation (APTIDCO) exclusively for implementation of Affordable Housing in Partnership (AHP) project and Credit Linked Subsidy Scheme (CLSS) of PMAY-U under the administrative control of Municipal Administration and Urban Development (MA&UD) Department. APTIDCO has undertaken building of multistoried housing with integrated infrastructure and as of now, 268 thousand houses have been completed. The houses are made by using shear wall technology, which are faster in construction and prevents damage to the houses due to wind and seismic loads.

Information, Education and Communication (IEC) Activities

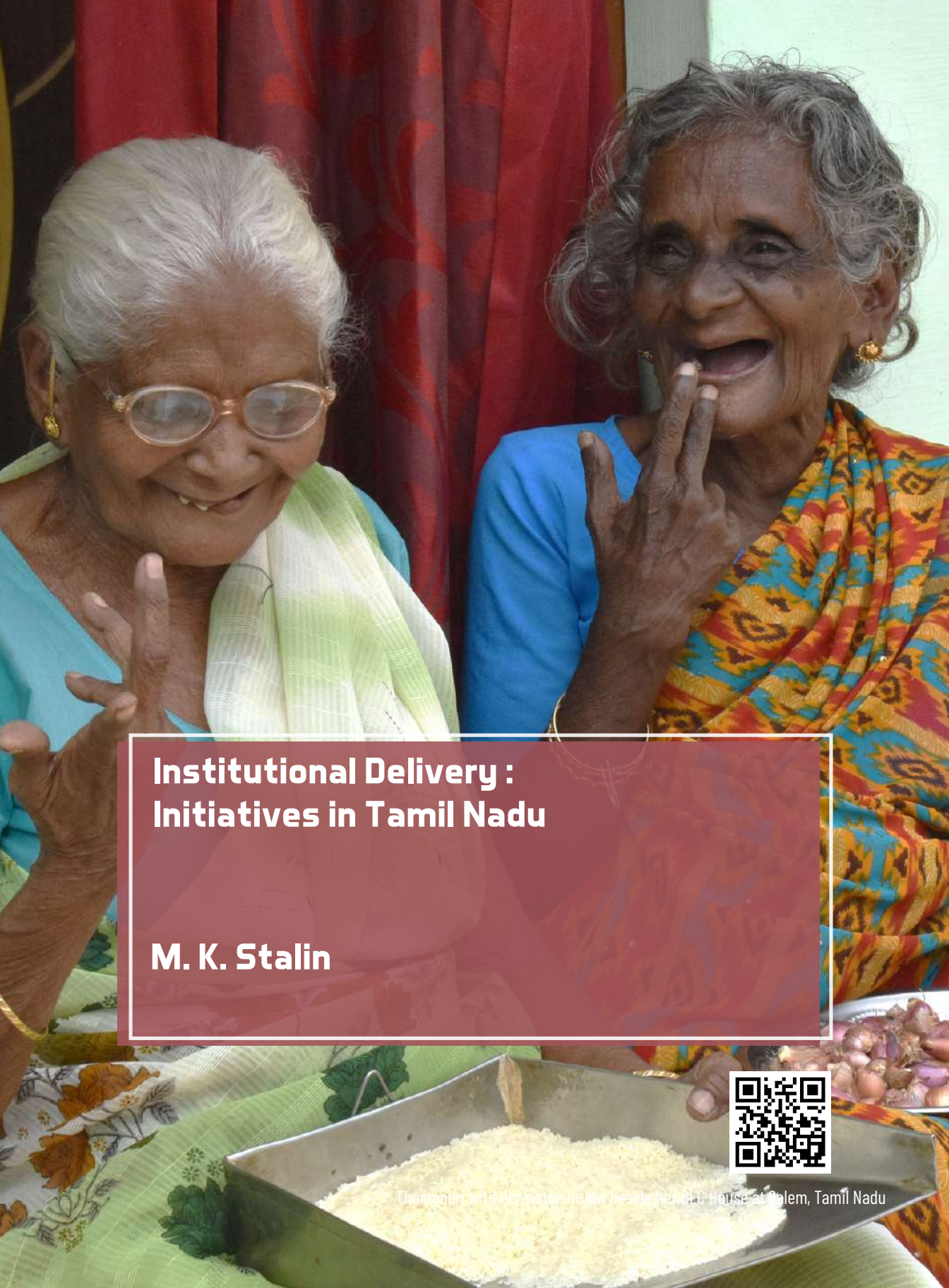
As a part of promoting comprehensive well-being of beneficiaries under the Scheme. beyond housing, the State Government partnered with MoHUA's initiative under Angikaar – a campaign for change management and conducted thematic events, featured events and activities which make beneficiaries 'Healthy, Wealthy and Wise'. Accordingly, the campaigns such as 'Freedom Run' under 'Fit India' campaign, participation in 'PMAY-U Awas Quiz' where Andhra Pradesh became a role model for the other States/ UTs in terms of highest number of participants have been organised.

For the purpose of gaining confidence of beneficiaries on housing projects and create buy-in for full occupancy, PMAY-U- AHP brochure was prepared detailing the grounded AHP houses in all ULBs, floor plans, model internal view, technology adopted,

construction specifications, physical infrastructure, social infrastructure and photographs of Minister MA&UD visit, and officials visit to construction site. In addition, PMAY-U YSR Jagananna Colonies – Pedalandariki Illu Vehicle campaign activity depicting model houses constructed and progress with a running progress videos of housing colonies in that ULB playing on the LED display was organised in all the 105 ULBs to create awareness among the masses on the flagship programme of State and Central Government.

Conclusion

The focused approach coupled with bringing housing at the center-stage of States' priorities has paid off in making Andhra Pradesh a forerunner among other states of the country. We thank and congratulate Government of India for the unified implementation of one of the largest welfare and development initiative across the world. Housing sector being considered as one of the most complex and multifaceted in nature, we look forward to bringing similar ideas together and address them at a strategic level from a viewpoint of necessary reforms, innovative and sustainable design and infrastructure, residential occupancies, among other inclusive parameters to achieve the vision of 'Housing for All'.



Institutional Delivery : Initiatives in Tamil Nadu

M. K. Stalin

Thamendri with her sister-in-law beside her, BLC House at Salem, Tamil Nadu

Tamil Nadu has always been at the forefront of economic dynamism and spatial transformation in India. The state tops the list of urbanised states with more than 50% of the population living in urban areas. It is estimated that by 2030, about 67% of the population of Tamil Nadu will live in urban areas. The state has identified universal access to housing as a key priority within its Strategic Plan for Infrastructure Development. The demand for urban housing in Tamil Nadu is likely to increase, as the state continues to see rural to urban migration and changing demographic profiles. Government of Tamil Nadu (GoTN) is working towards the goal of ensuring access to universal, equitable and affordable housing for all urban residents of the state.

Tamil Nadu has been progressive in terms of designing and implementing housing and habitat centric schemes and programmes. Several pioneering institutions have been set up (many are first in the country), to address the issues relating to affordable housing. It includes Tamil Nadu Housing Board (TNHB), Tamil Nadu Urban Habitat Development Board (TNUHDB) formally known as Tamil Nadu Slum Clearance Board (TNSCB), Tamil Nadu Cooperative Housing Federation (TNCHF) and Tamil Nadu Shelter Fund (TNSF). TNSCB and TNHB are the main providers of Affordable Housing. The state is implementing Pradhan Mantri Awas Yojana-Urban (PMAY-U)- 'Housing for All' through these agencies to realise the vision of creating slum free cities in Tamil Nadu.

TNUHDB is the State Level Nodal Agency (SLNA) for implementation of PMAY-U, acting as the leading provider of Affordable Housing in the state. It was created in 1971 with a primary focus on slum redevelopment. Its role is growing as most of the housing shortage is in the urban poor segment, increasingly focusing on housing for people who are marginalised, who have either squatted on public spaces or who lack shelter because of poverty and consequent unaffordability. It implements a variety of housing schemes including in situ development, reconstruction and rehabilitation.

Inauguration ceremony of Light House Project, Chennai

Innovative Funding Models

GoTN has set up a two-tier Tamil Nadu Shelter Fund, which is India's first impact investment fund for funding urban Affordable Housing projects. Under the Tamil Nadu Combined Development Building Rules, if the Floor Space Index (FSI) area of the housing development exceeds 4,000 square meters, developers can either provide housing for lower income groups to the extent of 10% of FSI area or pay a shelter charge. The shelter charge is routed into Shelter Fund Tier-I setup for subsidising Economic Weaker Section (EWS) and Low Income Group (LIG) housing to be built by the public sector, or to housing projects to be built under public private partnerships (PPP). Tier-II of the Shelter Fund is a Category I Social Alternative Investment Fund registered with the Securities and Exchange Board of India and has been set up to attract domestic and global investors providing 'Social Impact Investments'. The fund is being deployed to create environment friendly, quality Affordable Housing for sale to the poor and middle class families.

Under PMAY-U, GoTN is primarily implementing Affordable Housing in Partnership (AHP), Beneficiary led Construction (BLC) and Credit Linked Subsidy Scheme (CLSS) to address the housing shortage. Under AHP, tenements having a plinth area of 400 square feet with basic and social infrastructure being constructed at an average unit cost of ₹1 million (GoI share of ₹150 thousand, GoTN share of ₹700 thousand and beneficiary contribution of ₹150 thousand) both as in situ reconstruction and resettlement at alternate locations, to provide houses for families living in dense slums, water bodies and other objectionable locations. Under this component, GoTN has got sanction for 156 thousand houses so far, grounded 128 thousand houses, completed over 69 thousand houses and remaining are in progress (September 2022).

Photo 53: AHP units: Kesava Pillai Park Phase II, Chennai, No. of Tenements: 1056

Under BLC, financial assistance of ₹210 thousand (GoI share of ₹150 thousand and GoTN share of ₹60 thousand) is given to the eligible urban households, to construct house on their own with not less than 325 square feet of carpet area. Under this component, GoTN got sanction for 404 thousand houses, grounded 382 thousand houses, completed 288 thousand houses and remaining are in progress (June 2022). Under CLSS component 1,22,973 houses have been sanctioned in Tamil Nadu. The concerned banks release funds to the beneficiaries. GoTN is committed to build 975 thousand concrete houses. To facilitate the implementation of PMAY-U and to achieve the goal of 'Housing for All', GoTN has taken various initiatives, introduced new regulations and policy reforms as outlined below:

Prime Lands for Housing – A Tamil Nadu Initiative

Land is a scarce resource in urban areas for the implementation of Affordable Housing projects. GoTN therefore, provides government lands owned by various departments to Tamil Nadu Slum Clearance Board, free of cost to promote AHP projects. GoTN issues free house site patta (land title) to the landless urban poor households to facilitate the implementation of BLC projects.

Regulatory Relaxations

GoTN has amended urban regulations through the Tamil Nadu Combined Development Building Rules (TNCDBR), to increase the FSI from 1.5 to 2.0, to allow higher densities in urban areas and to make housing more affordable. The regulatory change increases the supply of housing by allowing higher densities. To increase the supply of Affordable Housing under TNCDBR, developers are required to allocate 10% of layout area for EWS plots in residential layouts exceeding 1 hectare.

Infusion of Technology

GoTN is swift to accept and adapt to new initiatives and technologies. TNSCB adopted new and innovative construction technologies such as Precast Concrete Construction system and Monolithic Concrete Construction, to improve the pace and quality of work. The state was selected for implementation of Light House Project (LHP), through Global Housing Technology Challenge (GHTC)-India to construct 1,152 housing units with precast concrete construction system at Perumbakkam, Chennai. The project acted as Live Laboratory to demonstrate innovative, proven construction technologies for speedier and cost-effective construction of houses which are sustainable, green, eco-friendly and disaster resilient. With all infrastructure in place, LHP Chennai was constructed in 12 months and inaugurated by Hon'ble Prime Minister on 26th May 2022.

Ease of Doing Housing

GoTN has exempted houses constructed under the BLC vertical of PMAY-U from obtaining planning permission from Urban Local Bodies (ULBs). This has reduced the cost

and time required for obtaining planning permission. In order to reduce the cost of construction, State Government provides cement at concessional rate to the EWS urban poor households constructing houses under the BLC vertical. TNSCB coordinates with the Affordable Housing Finance Companies, Small Finance Banks and Non-Banking Financial Companies (NBFC) – Micro Finance Institutions to facilitate housing loan to the beneficiaries of the BLC projects.

New Legislative Provisions for Facilitating Rental Housing

Tamil Nadu Buildings (Lease and Rent Control) Act, 1960 was enacted many years ago, when the supply of rental accommodation was limited, real estate business had not evolved and properties were held by very few people. The robust growth of real estate sector, broad basing of home ownership and availability of more housing stock has rendered the Rent Control Act redundant. GoTN has enacted the Tamil Nadu Regulation of Rights and Responsibilities of Landlords and Tenants Act, replacing the Tamil Nadu Buildings (Lease and Rent Control) Act, 1960 to promote the development of rental housing. The act regulates the rent as per the terms and conditions of the agreement entered between the owner of the premises and the tenant. It balances the rights and responsibilities of the landlord and the tenant. The Act provides for compulsory registration of all rental agreements. The shift of the new rental regulatory regime is an important step to unlock the potential of rental housing in Tamil Nadu.

Sh. Balamurugan Thandayuthapan, Tiruchirappali, Tamil Nadu

Smt. Saradha, Krishnagiri, Tamil Nadu

The Changing role of Government

The objective of Tamil Nadu Affordable Urban Housing and Habitat Policy is to increase access to affordable urban housing solutions and to create a framework for the development of an Affordable Housing market. The policy envisions a robust market architecture where scarce fiscal resources are prioritised for the most vulnerable and the private sector (developers and financial institutions) bring in expertise and capital to the sector to increase housing options for all. The policy sets three guiding principles: (i) inclusion, (ii) sustainability, and (iii) transparency and participation. The principle of

inclusion focuses on the shift of the role of the state from a 'provider' to an 'enabler', bringing in the spirit of partnership with private sector and civil society. The principle of sustainability guides the housing programmes to address climate vulnerability of housing solutions and the principle of transparency and participation is key to create market conditions that will incentivise other players to participate in the provision of Affordable Housing.

The State Government mobilised financing for Affordable Housing projects through the World Bank. Tamil Nadu is implementing the First Tamil Nadu Housing Sector Strengthening Program Development Policy Loan, with the World Bank's financial assistance. This will help to increase the access to Affordable Housing by strengthening policy, institutions, and regulations of the housing sector. Under this programme, ₹14.92 billion has been received from the World Bank as financial support for the housing sector.

Conclusion

Several enabling provisions and dedicated institutional mechanism have led to Tamil Nadu being a leading state in the housing domain. The state contribution to the tune of ₹700 thousand is a testimony to the priority of housing in the overall development narrative. Undoubtedly, a pucca house under PMAY-U not only provides roof for the family, but also transforms the life of the beneficiary in terms of security, self-esteem and social upliftment, leading to dignified living. A PMAY-U house ensures dignified living along with a sense of security and pride of ownership to the beneficiaries. Every house acquired or constructed under the Scheme is in the name of the female member of the household or in a joint name, empowering women, by providing them ownership of the house. GoTN is committed to continue introduction of new regulations, programmes, policy reforms and institutional actions as per the requirement in order to facilitate the implementation of PMAY-U effectively and to achieve the goal of 'Housing for All'.

Participatory Development : Initiatives in Kerala

Pinarayi Vijayan

Valsala and her family in their BLC House at Kochi, Kerala

Kerala made a giant leap towards decentralisation with the launch of the People's Plan Campaign on August 17, 1996, based on the spirit of 73rd and 74th constitutional amendments. As part of the campaign, 35%- 40% of the State Plan was devolved, mostly as Untied Funds, to local governments. Local Self Government Institutions were empowered with the support of volunteers, experts, officials and people at large and local plans emerged through a bottom-up process. Over the years, every local government in Kerala has been preparing its local plan and implementing them. People's Plan Campaign has brought in qualitative changes and imparted a new perspective to development, which has created a positive impact on the quality of services like poverty alleviation, education, healthcare, sanitation, infrastructure developments and housing. People's Plan Campaign, which was Kerala's strategy for mass mobilisation for bottom-up planning in the wake of decentralisation of powers, has had a positive impact in the implementation of housing schemes in the state.

Kudumbashree has been a major outcome of People's Plan Campaign. It is a community network linked to the local governments, which function as a platform for convergence of anti-poverty programmes and an agency for women empowerment. Kudumbashree has become the most accessible source of micro-credit with a fund base of more than ₹110 billion, with 285 thousand Neighbourhood Groups (NHGs) with a membership of 4.3 million households. Kerala has made a commendable performance in implementing PMAY-U-LIFE. The scheme is converged with PMAY-U and till date, 262 thousand houses have been constructed under the PMAY-U-LIFE Mission. PMAY-U-LIFE Mission is implemented both in urban and rural areas with special priority to coastal population, plantation workers and those who stay in temporary shelters in government owned lands.

LIFE Mission– A Comprehensive Strategy

In 2016, the Government of Kerala launched a comprehensive housing scheme –LIFE (Livelihood Inclusion and Financial Empowerment) Mission, with a mandate of providing 'Housing for All' in the state. The target of the mission is to provide safe housing to the nearly 430 thousand homeless in the state. The scheme is implemented in three phases, which include completion of incomplete houses constructed under previous housing schemes. Financial assistance of ₹400 thousand is provided for the construction of individual houses for homeless families having land and addressal of landless beneficiaries.

With a total sanction of 155 thousand houses for beneficiaries having land; out of which 126 thousand have been grounded and 101 thousand houses have been made habitable, achieving 99.7% expenditure under the scheme. Also, sanction has been accorded for the construction of 970 dwelling units for the landless homeless families under the Affordable Housing in Partnership (AHP) component. As per the Credit Linked Subsidy Scheme (CLSS)

component, interest subsidy is provided on loans for the construction or purchase of houses. 33,293 loans have been sanctioned in Kerala, out of which subsidy has been released to 28,000 families.

Hon'ble Chief Minister, Kerala inauguration house of a PMAY(U)-LIFE beneficiary

Participatory Approach in the Implementation of Housing Schemes

Local bodies have played a key role in planning and implementation of housing schemes in Kerala. They identify and consolidate the housing demand and prepare local body level plans. They also play a significant role in accessing finance and ensuring community participation. It is stipulated that all local bodies in the state should earmark at least 20% of their Plan Fund for housing. Some of the Urban Local Bodies (ULBs) are earmarking upto 40% for housing.

Kudumbashree has been the nodal agency for the implementation of various housing projects over the years and now for PMAY-U-LIFE. Kudumbashree, with its strong community structure ensures community participation in various stages of the project such as beneficiary selection, planning, implementation and monitoring. Ward Sabhas played a key role in the selection of beneficiaries and ensuring quality of construction in the housing schemes. A probable list of beneficiaries is prepared by Ward Level Committees under the chairmanship of ward councillor with Anganwadi teacher, Kudumbashree representatives and surveyors as members. Preparation of probable list of beneficiaries, finalisation of beneficiary list at ward level and monitoring of implementation are the core responsibilities of the committee. Socio-economic survey conducted by Kudumbashree community network, based on the list prepared by Ward Sabha, enables us to ensure inclusion of eligible,

and exclusion of ineligible beneficiaries. The final beneficiary list is approved by the Ward Sabha and the ULB council.

Under LIFE Mission, a district level committee has been constituted under the chairmanship of District Panchayat President with Members of Parliament, Members of legislative assemblies, Municipal chairpersons and representatives of Gram Panchayats as members. District Collector is the secretary of the district level committee. The committee is responsible for the monitoring of the project at district level. Social audit is conducted through Ward Sabhas. Hand holding for completion of construction and intervention like community support and bulk procurement are geared by the network. Gap funding is provided through the thrift loans of Neighbourhood Groups. ₹72 million has been provided as additional assistance as NHG loan. Support from NGOs, Corporate Social Responsibility (CSR) assistance and various other fund sources are pooled to provide gap funding to the needy. Bulk procurement of construction materials and construction through women construction groups are promoted. Social audit was also conducted with the support of community network.

Best Practices

Certain best practices adopted in Kerala as part of the PMAY-U- LIFE scheme need special mention.

Enhanced Unit Cost

The enhanced unit cost provided in the state is the foremost best practice that ought to be highlighted. Through convergence with LIFE Mission, Kerala has been able to provide the highest unit cost among all the states under the Beneficiary led Construction (BLC) Scheme, i.e., ₹400 thousand per beneficiary, without any contribution from the beneficiary. Apart from ₹150 thousand of Central Assistance per unit the balance amount is shared by the State Government and ULBs. In urban areas, we are constructing apartment complexes in the land provided by local bodies through convergence with the LIFE Mission. Average cost for construction of an apartment unit ranges from ₹1.05 million to ₹1.25 million, out of which ₹150 thousand is provided as Central Assistance and additional cost is borne by the State Government. In rural areas, the entire cost of construction of apartment complexes is borne by the State Government. Apart from providing a decent shelter to homeless families, Kerala has adopted various steps for ensuring effective implementation.

Multi-Faceted Convergence Model

The second best practice is the development of a multi-faceted convergence model, which is integrated with the Scheme so that it enhances the quality of life of its beneficiaries. Support is provided to PMAY-U- LIFE beneficiaries through convergence with flagship programmes of the ministry, state schemes, ULBs, NGOs and private organisations.

Ayyankali Urban Employment Guarantee Scheme(AUEGS)

AUEGS, implemented in Kerala, is the urban counterpart of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), to solve the issue of unemployment in urban areas. Through convergence with AUEGS, 90 person days are provided to PMAY beneficiaries so as to give additional financial assistance of ₹26,190 per beneficiary (₹291 per person days), where 81,250 beneficiaries have availed the benefit of this scheme.

Convergence with National Urban Livelihood Mission (NULM)

Convergence with NULM is envisaged towards providing better income to the family along with a safe and secure abode. Skill training and placement for wage employment is provided to PMAY family members. 700 members of PMAY beneficiary families were oriented and 240 have been given placement till date. Training and handholding are also being provided to members of beneficiary families for starting enterprises, where 60 enterprises have been started by them so far.

Women Empowerment through 'All Women Construction Groups'

As part of empowering women through self-employment, Kudumbashree constitutes 'All Women Construction Groups'. Currently there are 288 units with 2,376 members in the state, of which 31 units consisting of 278 members are in urban areas, who have constructed 52 houses under PMAY-U so far.

Photo 55: All Women Construction Groups promoting Women Empowerment

Convergence with Urban Local Bodies

ULBs play a crucial role in the implementation of PMAY-U-LIFE in the state, primarily involved in beneficiary selection and implementation. Apart from providing their share, ULBs have earmarked funds to provide support to PMAY beneficiaries, so as to provide additional financial assistance or to improve their living environment. Development

projects taken up by the ULBs include providing land for landless beneficiaries, supply of waste management units such as bio bins, supply of solar lamps and saplings to PMAY beneficiaries. Kollam Municipal Corporation has implemented a rehabilitation project for 20 landless families engaged in dhobi work, in which 52 cents of land and additional financial assistance were provided by the Corporation. In addition to these, CSR assistance of public sector enterprises and private organisations are also mobilised to address the housing issue.

Special Initiatives

Additionally, certain special initiatives were also taken up by Government of Kerala, as part of the efforts to ensure housing for all.

Home Insurance Cover

State Government has provided insurance cover for the houses built under the LIFE Mission project. Each unit built under the scheme will have insurance cover of ₹400 thousand for a period of three years. For this, the premium will be paid by the State government, beyond which the owner may choose to renew at their own cost. So far, 63,449 houses constructed under PMAY-U-LIFE are included under the home insurance scheme.

Photo 56: Flood Resilient Houses (House on stilts) in Kerala

Flood Resilient Construction

Kerala was severely affected by the historic floods of 2018 and had to successively face another round of floods in 2019. A large number of houses were damaged in the floods. A comprehensive strategy was adopted in the state to rebuild them. Thrust was given to construct flood-resilient houses in Kerala's ecologically fragile regions. Accordingly, under the LIFE Mission, the State Government has constructed flood-resilient houses in Kerala's flood-prone areas.

Haritha Bhavanam (Green Home) Campaign

As part of promoting green initiatives among the PMAY beneficiaries, a city level competition was organised throughout the state to recognise 'Green Home' i.e., housing units adopting green practices. Green homes were selected based on energy efficiency, waste management, maintenance of greens pace, etc. The campaign was helpful in spreading the message of rainwater harvesting, kitchen garden, waste disposal mechanisms and green energy among PMAY beneficiaries. A cash prize of ₹10,000 was distributed to the best home in each ULB. A series of competitions, poster, debate, essay and quiz, were held among the students of educational institutions in various ULBs. The effort was to improve housing literacy and the theme was 'Our Home, Our Happiness: Adopting Environment Friendly Housing Practices'.

Photo 57: Environmental Friendly House Constructed under Haritha Bhavanam (Green Home) Campaign

Angikaar Campaign

The campaign was implemented with immense support from various stakeholders, and with massive public participation. Ward Councillors and Kudumbashree community network spearheaded the campaign. Ward level awareness programmes and Information, Education and Communication (IEC) programmes such as street plays, flash mobs, broadcasting of audio spots through radio stations, signature campaigns towards creating behavioural change in terms of waste management, energy conservation, health and hygiene were undertaken on a massive scale.

Social Entitlements

As part of the special initiatives, campaigns were also held to ensure social entitlements such as ration card and social security pensions to PMAY beneficiaries. As part of the campaign, free gas connection was provided to 7,490 beneficiaries under the Pradhan

Mantri Ujjwala Yojana and health insurance was provided to 12,881 beneficiaries under the Ayushman Bharat scheme. Solid waste management units were provided to 12,171 families and LED lamps were provided to 17,603 families, among the beneficiaries.

Awards and Accolades

Kerala has received various recognitions at national level for the commendable implementation of the PMAY in the state. It has received HUDCO Award for Best Practices to Improve the Living Environment 2018-19, and SKOCH Award 2019-20 for the Implementation of PMAY-U and construction of houses under it through Women Construction Groups. Ministry of Housing and Urban Affairs (MoHUA) selected Mukkam municipality in Kerala as one among the five best performing ULBs at the national level in 2019.

With regard to housing, instead of resorting to the prevalent 'one size fits all' logic, Kerala thought outside the box and brought together as many existing schemes as possible. LIFE Mission was thus envisaged as an umbrella project to realise the fundamental goal of 'Housing for All'. Apart from addressing the primary issue of homelessness, LIFE Mission also ensured financial empowerment; skill upgradation and livelihood enablement by enabling women empowerment initiatives. Thus, Kerala as a state has resorted to a participatory approach and ensured an active involvement of various stakeholders for the success of the Mission.

Epilogue: Policy Discourses beyond PMAY-U

Kuldip Narayan

Shanno Singh, Prayagraj, Uttar Pradesh

Meeting housing demand of a socio-economically diverse and transforming context of India is a dynamic process which calls for continuous and ever evolving strategic programme measures and policy actions. Since our country is rapidly urbanising, there is an enhanced demand for infrastructure including the supply of adequate and affordable housing in urban areas. Over the past seven years, Pradhan Mantri Awas Yojana (Urban) has facilitated millions of Indians in fulfilling their dream of owning a pucca house. It has emerged as one of the largest public housing programmes of the world.

Pradhan Mantri Awas Yojana-Urban (PMAY-U) Mission is more than just a Government programme. It changed the way how the housing sector was once perceived. India is witnessing construction activities at such a massive scale that has transformed the entire affordable housing sector in the country. In 2015, when Hon'ble Prime Minister committed to providing 'Housing for All', people believed that access to a house would not be a distant dream anymore. The collective efforts of the Central government, the States/UTs, banking sector, the private sector and the beneficiaries themselves, has re-defined and gave a new shape to the housing sector.

With the goal of providing houses to all eligible beneficiaries, PMAY-U brought a significant policy shift from 'slum-centric' to 'Housing for All' with a universal approach. The ISSR vertical of PMAY-U proposes an efficient solution to address the issues of slums. The Scheme aims to use land occupied by these informal settlements as a resource to subsidise housing for urban poor. This effectively addresses the problems of land shortage while subsidising the cost of housing for urban poor to as little as zero in most cases. The Government has articulated its policy of incentivising the private sector to participate in effective redevelopment of the slums. The magnitude of the incidence of slums in the country needs special focus – the vision of 'Slum-Free India'. In the years to come, a special drive builds on the principles of participatory planning, enhancing land rights of slum dwellers and infrastructure upgradation is under consideration.

In early 2022, it was felt that there is a need for a cohesive brainstorming with international organisations, civil society organisations, academic and research institutions and respective State/UT Governments and bring together an identified set of stakeholders for exchange of strategic, tactical to envisage the future of housing policies in the country. Therefore, we hosted 18 sessions with a wide variety of stakeholders under a series titled "Policy Dialogue for Beyond PMAY(U)". The initiative created an avenue for cross-learning and exchange of ideas on themes such as slum redevelopment, land titles to urban poor, infrastructure upgradation of existing settlements, convergence of housing with livelihood and other programmes, affordable housing in partnership with private sector, relocation programmes, funding mechanisms of housing programmes, women empowerment and other institutional mechanisms involved in housing programmes. The following sections build upon the deliberations and key take-aways of the Policy Dialogue Beyond PMAY(U) sessions, paving way for the future of housing policies in India.

Slum Redevelopment Initiatives

The approach builds on the belief that the lives and livelihood of the people are more important than land. The approach focuses on the principle that formal sector and informal sector are mutually dependent for sustenance. Therefore, the service provision in both areas should be adequate, meeting the minimum standards not just for human survival but for prospering livelihood opportunities. Various State/UT Governments have taken numerous measures and developed contextual measures to undertake slum redevelopment. One such initiative which has been well applauded is Jaga Mission initiated by the Government of Odisha. In 2017, Government of Odisha enacted the Odisha Land Rights to Slum Dwellers Act to assign land rights to slum dwellers in medium and small towns of the State. The State Government undertook partnerships with various civil society and technical agencies in provisioning land rights and to design liveable habitats through community participation and inclusive planning.

JAGA Mission has demonstrated successful examples of using advanced technologies such as drone mapping and geotagging at the community planning level which can solve the challenges of loss of data and participatory planning where participatory planning and engagement of beneficiaries from the project formulation and conceptualization is critical for gaining communities' support for slum rehabilitation programs. Slum Dwellers Association was formed from the beginning of the project planning to increase community engagement and promote a sense of ownership. Women's leadership and engagement have also played an important role in the entire process. The involvement of 50 per cent of women in the executive community was mandated while forming the executive community memberships. Women were encouraged to express their views on property rights and infrastructure gaps, which led to the building of women-friendly infrastructure at the neighbourhood level. The JAGA Mission became a successful model due to the strong network and synergies that existed between the implementing authority and academic institutions, technical agencies, civil society organisations, and knowledge partners from the beginning of the projects to the completion.

Another example from Gujarat has demonstrated the relevance of Civil Society Organisations (CSOs) in the rehabilitation process. Non-Profit Organisations have worked with the Gujarat Government to make ISSR project execution more efficient and engaging. With effective partnership and involvement of a CSO in monitoring and policy implementation and provides proposals for making policy procedures more inclusive.

The examples illustrate that there is a strong need to build partnerships with slum dwellers, civil society organisations and technical agencies which can facilitate people to act as accelerators for ensuring the success of such initiatives. Empowering identified local agents not only enhance the participation in the project but also shape resilient interventions. They also illustrated that technology plays an important role in marking the existing property lines, managing the dynamic data of urban poor and slum dwellers, undertaking participatory tools and measures to involve people from the inception of project itself, etc.

Land titles to slum dwellers

Along with the rehabilitation process, the Policy Dialogue sessions also highlighted the potential and importance of providing slum dwellers with land titles, which focuses on transitioning from a dwelling unit approach to a whole habitat approach that includes basic infrastructure and livelihood opportunities. Providing land titles to the beneficiaries not only enhances the trust in the scheme but also makes them empowered. With this vision, several states such as Odisha, Madhya Pradesh have initiated providing land rights/patta to the beneficiaries. These land rights are heritable but not transferable. In Odisha, Jaga Mission has emerged as the world's largest slum titling and upgrading programme. Presently, it covers 114 cities, 2936 slums, and more than 1.7 million slum dwellers. Govt. of Madhya Pradesh has also initiated this exercise by providing land titles to 45,000 beneficiaries. These programmes seek to foster long-term development by ensuring that all sectors of the urban poor have access to inexpensive land, shelter, and services.

Provisioning land rights to the people facilitate in situ redevelopment which does not alter their current livelihood and social networks. The approach of providing land rights can be coupled with consolidating neighbourhoods. The focus here may be on building resilient, integrated and upgraded neighbourhoods, moving away from the approach of building a dwelling unit to building a liveable habitat. Neighbourhood planning and design play an important role in the initiative as the houses are relatively small, therefore, the integration of semi-private and public spaces with the house play an important role in the overall design of the habitat.

In small and medium cities, provisioning of land rights is an easier task whereas in bigger cities and metros the approach can be slightly modified by providing community leases or collective land-use titles which ensures occupancy but not ownership. Further, there is a need to consolidate communities by provisioning holistic infrastructure and services, principles of energy efficiency, sustainable development can become an integral part of designing the redeveloped habitat. Along with provision of land rights, there is also a need to enhance the capacity and capability of the occupants, to make better decisions and build their own sustainable habitats. The already established Nirmith Kendras and organisations like BMTPC can play an important role in the endeavour of training the occupants.

Local Area Planning/ Town Planning Scheme Approach

Local Area Planning is one of the major parameters which are important for developing any planned neighbourhood. Since housing cannot be understood just as a single entity, therefore, there is a need of integrating a dwelling unit with associated services, larger master plans of the city and local area plans. Over the years, several schemes have been introduced to disburse sites and services, planning through land pooling, and also serviced land intending to ensure the development of the planned neighbourhood. Several States/UTs

have executed these planning techniques successfully and their initiatives have been considered the best practices or examples in Indian Town Planning approaches.

The overall Master Plan of the city must focus on the bigger vision or objective for the urban area but respond to the incremental housing needs. Housing should be highlighted as a central element of socio-economic developmental agendas of the city. Before drawing strategies to address the housing scenario of the city, there is a need to undertake exhaustive ground study using GIS and other mapping technologies to understand the trends existing and emerging in the housing market of the city. Based on the results of the study, a gap analysis may be undertaken which forms the basis of the strategies proposed as a part of the development plans of the region. There is a need to simultaneously undertake part to whole approach wherein each neighbourhood should be developed on the principles of self-sufficiency and sustainability. Attempts should be made at city level to create a dynamic data-base spatially mapping the demand and supply of housing both on rental and ownership basis which should form a strong feedback loop to the housing supply of the city.

States like Gujarat and Maharashtra have successfully implemented Town Planning Schemes, wherein they have earmarked areas available for affordable housing. Such initiatives ensure incremental development of affordable housing according to the growth patterns of the city, rather than moving affordable housing projects to the outskirts of the city.

Innovative measures to enhance the availability of land for affordable housing like creating public land banks, land readjustment mechanisms can be put in place to demarcate affordable housing zones can be created with integrated affordable transit and transportation measures should become an integral part of the master plans of the city. Further, the residential pockets as decided in the master plan, should be placed around the livelihood opportunities for the urban poor. There should be a special emphasis on designing and layout of these residential pockets with an aim to design liveable habitats.

Infrastructure upgradation approach

The right to adequate housing must be considered as the right to live some place with security, peace, and dignity. There are multiple dimensions to ensure adequate housing which include Security of tenure, availability of services, materials, facilities, and infrastructure, Affordability, Habitability, Accessibility, Location, and Cultural adequacy. In the case of living in informal settlements, one of these parameters always gets compromised in one way or another. Therefore, creating a housing stock that can fulfil all the parameters is the need of the hour. Several human rights, such as the right to work, health, social security, vote, privacy, and education, might be conditioned on having suitable housing. As a result, focusing on the housing sector has the potential to enhance communities' overall "quality of living" and "well-being" by tackling poverty reduction, inclusiveness, safety, economic growth and prosperity, sustainability, climate mitigation, and adaptation. According to the approach suggested by the industry experts, the Affordable Housing and Slum Upgrading should be based on major three principles.

Sectoral and Institutional Integration: Institutional integration, in which urban municipal governments collaborate and coordinate efforts in the implementation of spatial convergence plans and strategies, can have a transformative influence. For efficient and effective use of the technical and financial resources given by different hierarchies of institutions, strengthening vertical links across local, subnational, and national levels is critical.

Holistic Planning and Governance: A holistic approach to planning and governance entails a complete response that includes diagnosis, policy, legislation, planning, design, governance, funding, implementation, and monitoring throughout the comprehensive housing development and implementation process.

Networking and Collaboration: Participatory planning improves accountability, transparency, and information distribution by facilitating joint design, planning, execution, and feedback from diverse stakeholders and interest groups. Collaboration across government levels, the private sector, civil society, and other stakeholders is the new standard, and it must be formalised through a governance structure in order to provide complete programmes.

Institutional Mechanism

One of the most significant conditions for developing sustainable and affordable housing stocks is collaboration between diverse agencies. Integrated strategies, followed by solid and responsive policy, regulatory, and institutional frameworks, inclusive and affordable housing, climate-smart and sustainable techniques, a continuum framework and fit-for-purpose approach, and finally, diversified partnerships from a variety of institutions, are the way to go. PMAY (U) has engaged several stakeholders and industry experts with this goal and is striving to change from a dwelling unit approach to a housing neighbourhood approach. To increase the supply of sustainable housing in the country, initiatives such as building affordable housing complexes using global technologies that can speed up the process, research on thermal comfort in affordable housing, and deepening the capacities towards Green and Resilient Affordable Housing by establishing are being pursued.

Moving Beyond PMAY-U

We recognize the fact that a large proportion of urban migrants in all categories may already have a house or own a land in their respective place of domicile. They may not be interested in ownership of a house in urban areas, rather would look for safer affordable rental accommodation to save on expenses. As per Census 2011, about 4.5 million migrated to the different parts of the country for employment opportunities. Provision of rental housing options closer to the place of work has potential to improve their productivity. Therefore, promoting rental housing is necessary for inclusive urban development. Thus, our focus is also towards promoting rental housing. We initiated to put in place the ecosystem of rental housing by implementing Affordable Rental Housing Complexes (ARHCs) in

2020. In future, we would work towards enhancing and strengthening the rental housing market in the country.

We are aware of the fact that housing demand is dynamic in nature and will keep on increasing in proportion to the population growth, there has to be a sustained supply of affordable housing units. To ensure this supply, the Ministry is formulating strategies to create a sustained supply of EWS housing in collaboration with Private Sector, where a certain portion of land of any large-scale residential development is being necessarily dedicated to building EWS housing. Availability of land has been one of the restricting factors in ensuring adequate supply of affordable housing. Several State Governments have been successful in provisioning land for affordable housing through mechanisms of Town Planning (TP) Schemes. The Ministry envisages to replicate these good practices. Further, through its flagship Mission, MoHUA aims to optimise the use of land already under development to its full potential by encouraging private participation, Local Area Planning (LAP), regulating FSI/FAR, land-use flexibility and other spatial strategies.

While the pressure of development on urban India is growing constantly, so is the commitment of the Government to ensure technology driven low carbon, sustainable and disaster resilient urban development. In the context of PMAY-U, construction of 12.2 million houses is an opportunity for us to revolutionise the construction sector, Light House Projects thus became harbinger of technology based housing construction in the country. Through implementation of Light House Projects (LHPs) the country is witnessing a revolution in the construction technology sector of New India.

We recognise that availability of formal sector finance remains a challenge for urban poor. This mainly arises because of the lack of proper documentation availability and credit score assessment. Thus, there is need to work with the banks and financial institutions to formulate strategies for assessing the income of the beneficiaries. Soon, small ticket loans for lower income groups would become a mainstream market product.

Conclusion

The Mission and its associated programmes have endeavoured to pave the road for the country's self-sustaining affordable housing industry. However, some issues in the affordable housing sector persist, such as an insufficient supply of land in urban areas, a lack of diverse tenure options, slums, and informal settlements, limited financing options for EWS/LIG beneficiaries, a low yield in the rental housing sector, a lack of neighbourhood amenities, livelihood options, and so on. It is important to address each of the challenges as this will lead to the formation of a sustainable housing ecosystem. Since housing has direct and indirect impacts on the lifestyles of the people inclusive and participatory approaches, enhanced focus on the design of the dwelling units and use of green technologies in the building sector are the future of housing in India. A home brings new rays of hope in the lives of the beneficiaries. The task of providing 12.2 million homes is huge. However, we are working together to make that happen.

The last seven years have proved that the collective efforts of people involved in the framework has had a positive impact on the economy when it comes to the housing sector's development. The role of other flagships Missions have been crucial too. What began as a mere dream has finally taken a fruitful shape. However, it is not a one-time process. The dedicated efforts of the Government and the Ministry, under the guidance of Hon'ble Prime Minister, has made us stand where we are today. The journey of Pradhan Mantri Awas Yojana- Urban is an inspiring tale to tell our generations to come. As I write the chapter, the Mission has been extended till 31st December 2024 for completing the construction of already sanctioned 12.2 million houses till 31st march 2022.

About the Contributors

Narendra Modi is the Prime Minister of India.

M. Venkaiah Naidu was the 13th Vice President of India. He was the Minister of Urban Development, Housing and Urban Poverty Alleviation from 2014-2017.

Hardeep S Puri is the Union Minister for Housing and Urban Affairs & Petroleum & Natural Gas.

Manoj Joshi is the Secretary, Ministry of Housing and Urban Affairs. He is a 1989 batch IAS officer.

Durga Shanker Mishra is currently the Chief Secretary to the Government of Uttar Pradesh. He has served as Secretary, Ministry of Housing and Urban Affairs from 2017-2021. He is a 1984 batch IAS officer.

Amitabh Kant is the G-20 Sherpa of India. He was the second CEO of NITI Aayog, a policy think tank of the Government of India. He is a 1980 batch IAS officer.

Amrit Abhijat is currently a Principal Secretary to the Government of Uttar Pradesh. He has served as the Joint Secretary and Mission Director (PMAY-U), Ministry of Housing and Urban Affairs from 2015-2021. He is a 1995 batch IAS officer.

Kuldip Narayan is the Joint Secretary and Mission Director (PMAY-U), Ministry of Housing and Urban Affairs. He is a 2005 batch IAS officer.

Dr Neeta Verma had served as the Director General of National Informatics Centre, Ministry of Electronics, and Information Technology till May 2022.

Vishnu Chandra has served as the Deputy Director General & Head of Group (NIC-IPR Division) National Informatics Centre, Ministry of Electronics, and Information Technology till May 2022 .

Pradeep Kumar Gupta is the Sr. Technical Director (Scientist-F) & Head of Group (NIC-IPR Division) National Informatics Centre, Ministry of Electronics, and Information Technology

M Ezhil Arasu is the Senior Technical Director of National Informatics Centre, Ministry of Electronics, and Information Technology

Suvasish Das is a 2005 batch Indian Forest Services officer. He is serving as Director in the HFA Mission Directorate at the Ministry of Housing and Urban Affairs.

Pooja Gupta is a consultant at HFA Mission directorate in the Ministry of Housing and Urban Affairs.

Dr K Venugopala Rao is the Group Director of Urban Studies and Geo-informatics cell at National Remote Sensing Centre (NRSC) which is one of the primary centres of Indian Space Research Organisation (ISRO).

M Arulraj is the I/c Group Head, Bhuvan Geospatial and Web Services Group of National Remote Sensing Centre (NRSC).

A Lesslie is Scientist (F) in Geo-informatics Division, RSA, National Remote Sensing Centre (NRSC).

Dr M V Ravikumar is serving as Dy. Director, Management Systems Area, National Remote Sensing Centre (NRSC).

Darshini Mahadevia is a Professor at Ahmedabad University and former Director of Centre for Urban Equity, CEPT University

Dr Bimal Patel is a renowned architect, urban designer and academician. He is the current president and Acting Director of CEPT University in Ahmedabad.

Dr Sejal Patel is Professor & Chair, Master of Urban Housing, Faculty of Planning, Head, International Office, CEPT University, Ahmedabad.

Renana Jhabvala is the President, SEWA Bharat. She has been awarded Padma Shri for her glorious career of more than 35 years in the social work sector.

Anukriti Pathak is a consultant at HFA Mission directorate in the Ministry of Housing and Urban Affairs.

Shruti Shiksha is a consultant at HFA Mission directorate in the Ministry of Housing and Urban Affairs.

Dr Shikha Jain is an architect and historian. She is the Director of Development and Research Organisation for Nature, Arts and Heritage (DRONAH).

Sanjeev Sanyal is a member of the Economic Advisory Council to the Prime Minister of India. He has served as the Principal Economic Advisor to the Government of India till February 2022.

Gurvinder Kaur is a 2014 batch Indian Economical Services officer. She is serving as Deputy Director in the Department of Economic Affairs at Ministry of Finance, Government of India.

Hitesh Vaidya is the Director of the National Institute of Urban Affairs (NIUA).

Sarika Chakravarty works as a Senior Sector Coordinator for the 2041 Master Plan for Delhi at the National Institute of Urban Affairs (NIUA).

Dr Partha Mukhopadhyay is the senior fellow at Centre for Policy Research. He was a founding member of the Infrastructure Development Finance Company.

Dr Julia King is a design practitioner and a Research Fellow at the LSE Cities. She is trained as an Architect.

Ricky Burdett is the Director of LSE Cities and a Professor of Urban Studies at LSE. He is a co-director of LSE's Urban Age project and teaches in the Executive MSc in Cities and other courses.

Pritika Hingorani is the Director of the IDFC Institute in Mumbai, as well as a Research Fellow. She supervises the Institute's urban programmes in addition to her administrative responsibilities.

Shilpa Rao manages IDFC Institute's state government connections as the Head of State Engagements. She has worked in low-income housing for over a decade.
Dhaval Monani works at IDFC Institute as a Resident Fellow. He is also the founder and President of the Future of Living Institute, a think tank that works on housing solutions with governments, multilaterals, and investors.

Khatibullah Sheikh is a consultant at HFA Mission directorate in the Ministry of Housing and Urban Affairs.

Dr O P Agarwal is the CEO, WRI-India

Rejeet Mathews is the Program Director, Urban Development at WRI India

Prof Anil Sawhney is the Infrastructure Sector Director for Royal Institution of Chartered Surveyors (RICS)

Dr Shailesh Kumar Agrawal is the current Executive Director of Building Materials & Technology Promotion Council (BMTPC), where he works on emerging housing technologies at the grass-roots level.

Raj Kumar Gautam is a 2001 batch ISS officer. He is serving as Director in the HFA Mission Directorate at the Ministry of Housing and Urban Affairs.

Manish Kumar is a consultant at HFA Mission directorate in the Ministry of Housing and Urban Affairs.

Sunita Narain is the Director General of Centre for Science and Environment (CSE), New Delhi.

Anumita Roy Chowdhury is working as Executive Director of Research and Advocacy cell with CSE, New Delhi

Rajneesh Sareen is the Program Director for the CSE Delhi's Sustainable Habitat Program.

Prof PSN Rao is the Director of SPA New Delhi, the Chairman of the Delhi Urban Arts Commission, and a member of the Ujjain Smart City Limited Board of Directors.

Prof N R Bhanumurthy is the Vice Chancellor of Dr B R Ambedkar School of Economics, Bengaluru.

Deepak Parekh spearheads India's premier housing finance company HDFC Ltd.

Renu Sud Karnad is the current Managing Director of HDFC Ltd.

Kamran Rizvi is Additional Secretary and CMD HUDCO, Ministry of Housing and Urban Affairs. He is a 1991 batch IAS officer.

M Nagaraj is the current Director (Corporate Planning) at Housing and Urban Development Corporation Limited (HUDCO).

Dinesh Kumar Khara is the Chairman of State Bank of India group.
Dr Niranjan Hiranandani is the Managing Director and Co-Founder of Hiranandani Group. He is also Vice Chairman, NAREDCO

Jaxay Shah is the founder and M.D of Savvy Infrastructure Pvt. Ltd. He was the ex-President of CREDAI

Anand Mahindra is the Executive Chairman of the Mahindra & Mahindra Ltd.

Yogi Adityanath is the Chief Minister of Uttar Pradesh.

Shivraj Singh Chouhan is the Chief Minister of Madhya Pradesh.

Manik Saha is the Chief Minister of Tripura.

Y S Jagan Mohan Reddy is the Chief Minister of Andhra Pradesh.

M K Stalin is the Chief Minister of Tamil Nadu.

Pinarayi Vijayan is the Chief Minister of Kerala.

Bhupendrabhai Patel is the Chief Minister of Gujarat.

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CPWD Works Manual 2019

Global Housing Technology Challenge– India Concept Note

Abbreviations

AARP : American Association of Retired Persons

AHF : Affordable Housing Fund

AHFCs : Affordable Housing Finance Companies

AHP : Affordable Housing in Partnership

AI : Artificial intelligence

AIP : Annual Implementation Plan

AMC : Amdavad Municipal Corporation

AMRUT : Atal Mission for Rejuvenation and Urban Transformation

API : Application Programming Interface

APSHCL : Andhra Pradesh State Housing Corporation Limited

APTIDCO : Andhra Pradesh Township and infrastructure Development Corporation

ARHCs : Affordable Rental Housing Complexes

ARP : Address Resolution Protocol

ASHA - India : Affordable Sustainable Housing Accelerators- India

AUEGS : Ayyankali Urban Employment Guarantee Scheme

BCE : Before the Common Era / Before the Current Era

BEE : Bureau of Energy Efficiency

BIM : Building Information Modeling

BLC : Beneficiary-Led Construction

BLE : Beneficiary-Led Enhancement

BMTPC : Building Materials and Technology Promotion Council

BNI : Bare Necessities Index

BRTS : Bus Rapid Transit System

BSE : Bombay Stock Exchange

BSUP : Basic Services to Urban Poor

CAG : Comptroller and Auditor General

CAGR : Compound Annual Growth Rate

CCC : Command Communication Centre

CDP : City Development Plan

CE : Common Era / Current Era

CIBIL : Credit Information Bureau (India) Limited

CII : Confederation of Indian Industry

CLAP : CLSS Awas Portal

CLSS : Credit Linked Subsidy Scheme

CLTC : City Level Technical Cell

CNAs : Central Nodal Agencies

COVID-19 : Coronavirus Disease of 2019

CPWD : Central Public Works Department

CREDAI : Confederation of Real Estate Developers Associations of India

CRGFTLIH : Credit Risk Guarantee Fund Trust for Low-Income Housing

CSE : Centre for Science and Environment

CSIR-NEIST : Council of Scientific and Industrial Research - North East Institute of Science and Technology

CSMC : Central Sanctioning and Monitoring Committee

CSO : Civil Society Organisations

CSR : Corporate Social Responsibility

CSV : Comma Separated Value

CTI-2019 : Construction Technology India - 2019

DAY-NULM : Deendayal Antyodaya Yojana-National Urban Livelihoods Mission

DBT : Direct Benefit Transfer

DCR : Development Control Regulation

DDDM : Data-Driven Decision Making

DFA : Design for Assembly

DFM : Design for Manufacture

DFMA : Design for Manufacturing and Assembly

DOT : Department of Transportation

DPR : Detailed Project Report

DU : Dwelling Unit

DUDA : District Urban Development Agency

EBR : Extra Budgetary Resource

ECB : European Central Bank

ECBC-R : Energy Conservation Building Code for Residential Buildings

EGNOS : European Geostationary Navigation Overlay Service

EIA : Environmental Impact Assessment

EIUS : Environmental Improvement of Urban Slums

EMI : Equated Monthly Installment

EPS : Expanded PolyStyrene

ESG : Environmental, Social and Governance

EWS : Economically Weaker Section

FAR : Floor area ratio

FDI : Foreign Direct Investment

FSI : Floor Space Index

FY21 : Financial Year 2021

FYP : Five-Year Plans

GAGAN : GPS Aided Geo Augmented Navigation

GDP : Gross Domestic Product

Geo-AI : Geospatial artificial intelligence

GGBFS : Ground Granulated Blast Furnace Slag

GHAR : Green Habitat Accomplished Rating

GHTC -India : Global Housing Technology Challenge - India

GIS : Geographic Information System

GoI : Government of India

GoTN : Government of Tamil Nadu

GPRS : General Packet Radio Service

GPS : Global Positioning System

GST : Goods and Services Tax

HDFC : Housing Development Finance Corporation

HFA : Housing for All

HFAPoA : Housing for All Plan of Action

HFC : Housing Finance Company

HFI : Housing Financial Institution

HIG : High Income Group

HPEC : High Powered Expert Committee

HRIDAY : Heritage City Development and Augmentation Yojana

HUA : Housing and Urban Affairs

HUD : Housing and Urban Development

HUDCO : Housing and Urban Development Corporation

IAY : Indira Awas Yojana

ICAP : India Cooling Action Plan

ICT : Information and Communication Technologies

IDFC : Infrastructure Development Finance Company

IEC : Information Education Communication

IESS : India Energy Security Scenarios

IGBC : Indian Green Building Council

IHHL : Individual Household Latrine

IHSDP : Integrated Housing and Slum Development Programme

IIT : Indian Institutes of Technology

IKM : Information Kerala Mission

IoT : Internet of Things

IPR : Intellectual Property Rights

IRNSS : Indian Regional Navigation Satellite System

ISHUP : Interest Subsidy for Housing loan for Urban Poor

ISRO : Indian Space Research Organisation

ISSR : In-Situ Slum Redevelopment

IT : Information Technology

ITR : Income Tax Return

JnNNURM : Jawaharlal Nehru National Urban Renewal Mission

JS&MD : Joint Secretary & Mission Director

KIP : Kampung Improvement Plan

KLEMS : Capital (K), labour (L), energy (E), materials (M) and service (S)

KURDFC : Kerala Urban and Rural Development Finance Corporation

LAP : Local Area based Plans

LED : Light-Emitting Diode

LGSF : Light Gauge Steel Framed System

LHP : Light House Projects

LIFE : Livelihood Inclusion and Financial Empowerment

LIG : Low Income Group

LISS-IV : Linear Imaging Self-Scanning Sensor-IV

LPG : Liquefied Petroleum Gas

LSGIs : Local Self Government Institutions

MA&UD : Municipal Administration and Urban Development

MCMV : Minha Casa Minha Vida

MGNREGS : Mahatma Gandhi National Rural Employment Guarantee Scheme

MHT : Mahila Housing SEWA Trust

MIG : Middle Income Group

MIS : Management Information Systems

MIT : Massachusetts Institute of Technology

MLA : Member of the Legislative Assembly

MLC : Member of Legislative Council

MoEFCC : Ministry of Environment, Forests and Climate Change

MoHUA : Ministry of Housing and Urban Affairs

MP : Madhya Pradesh

MSAS : Multi-functional Satellite Augmentation System

MTA : Model Tenancy Act

NAREDCO : National Real Estate Development Council

NAVARITIH : New, Affordable, Validated, Research Innovation Technologies for Indian Housing

NAVIC : NAVigation with Indian Constellation

NBC : National Building Code

NBFC : Non-Banking Financial Company

NBO : National Building Organization

NDA : National Democratic Alliance

NER : North Eastern Region

NGO : Non-Governmental Organisation

NHB : National Housing Bank

NHG : Neighbourhood Groups

NHP : National Housing Policy

NIC : National Informatics Centre

NIC-VC : National Informatics Centre - Video Conferencing

NIPFP : National Institute of Public Finance and Policy

NITI : National Institution for Transforming India

NPV : Net Present Value

NRSC : National Remote Sensing Centre

NSDP : National Slum Development Program

NSE : National Stock Exchange

NSO : National Statistical Office

NSSO : National Sample Survey Office

NUHF : National Urban Housing Fund

NUHHP : National Urban Housing and Habitat Policy

NURHP : National Urban Rental Housing Policy-2015 (Draft)

OBC : Other Backward Classes

OBPS : Online Building Permission System

OECD : Organization for Economic Cooperation and Development

PAT : Perform, Achieve and Trade

PFMS : Public Financial Management System

PHP : Hypertext Preprocessor

PIR : Price To Income Ratio

PLIs : Primary Lending Institutions

PMAY (U) - MIS : Pradhan Mantri Awas Yojna (Urban) Management Information System

PMAY-U : Pradhan Mantri Awas Yojna - Urban

PMC : Project Management Consultancy

PMU : Programme Management Unit

PMUY : Pradhan Mantri Ujjwala Yojana

POI : Proof of Identity

PPP : Public-Private Partnerships

PR : Public Relations

PRAGATI : Pro-Active Governance and Timely Implementation

PREVI : Proyecto Experimental de Vivienda

PSC : Partnership for Sustainable Communities

PSL : Priority Sector Lending

PSU : Public Sector Undertaking

PVC : Polyvinyl Chloride

Q-o-Q : Quarter on Quarter

R&R : Rehabilitation and Resettlement

RAY : Rajiv Awas Yojana

RBI : Reserve Bank of India

RCA : Rent Control Act

RCC : Reinforced Cement Concrete

RD : Rural Development

RDBMS : Relational DataBase Management Systems

RERA : Real Estate (Regulation and Development) Act, 2016

RFP : Request for Proposal

RWA : Residents Welfare Association

SAPREP : Streamlining Approval Procedures for Real Estate Projects

SARFAESI : Securitisation and Reconstruction of Financial Assets and Enforcement of Securities Interest Act

SBAS : Satellite Based Augmentation System

SBI : State Bank of India

SBM-U : Swachh Bharat Mission - Urban

SC : Scheduled Castes

SCM : Smart City Mission

SDGs : Sustainable Development Goals

SECC : Socio-Economic Caste Census

SEEP : Super-Efficient Equipment Programme

SEWA : Self Employed Women's Association

SGR : SEWA Grih Rin

SLNA : State Level Nodal Agency

SLSMC : State Level Sanctioning and Monitoring Committee

SLTC : State Level Technical Cell

SNP : Slum Networking Programme

SOP : Standard Operating Procedure

SoR : Schedule of Rates

SPA : School of Planning and Architecture

SRA : Slum Rehabilitation Authority

SRC : Slum Rehabilitation Committee

SRS : Slum Redevelopment Scheme

ST : Scheduled Tribes

SUNREF : Sustainable Use of Natural Resources and Energy Finance

TCPO : Town and Country Planning Organization

TDR : Transferable Development Rights

TEC : Technical Evaluation Committee

TG-12 : Technical Group Report - 12

TIG : Technology Innovation Grant

TNCDBR : Tamil Nadu Combined Development Building Rules

TNHB : Tamil Nadu Housing Board

TNSCB : Tamil Nadu Slum Clearance Board

TOD : Transit Oriented Development

TPIMA : Third Party Inspection Monitoring Agency

TPS : Town Planning Schemes

TSM : Technology Sub-Mission

UCD : Urban Community Development

UDA : Urban Development Authority

UIDAI : Unique Identification Authority of India

UJALA : Unnat Jyoti by Affordable LEDs for All

ULBs : Urban Local Bodies

ULCRA : Urban Land Ceiling and Regulation Act

UMANG : Unified Mobile Application for New-age Governance

UN : United Nations

UN-Habitat : United Nations Human Settlements Programme

UNDESA : United Nations Department of Economic and Social Affairs

USD : United States Dollar

UT : Union Territory

VAMBAY : Valmiki Ambedkar Awas Yojana

VGF : Viability Gap Funding

WAAS : Wide Area Augmentation System

WMS : Warehouse Management System

WRI : World Resources Institute

WZCC : West Zone Cultural Centre

YoY : Year-on-Year

Hindi Terms

Chaubara : It is a fully shaded place or rooms with Osari (a partly shade place) on one side, and either an open, or partly shaded place (Otala), on the other side.

Pucca House : A pucca house is one, which has walls and roof made of the following material. Wall material: Burnt bricks, stones (packed with lime or cement), cement concrete, timber, ekra etc

Tibara : It is a partly shaded place surrounded on one side by the open place (courtyard) and on the other side by the fully shaded place Choubara/ Khadki.

Kutcha House : The walls and/or roof of which are made of material such as un- burnt bricks, bamboos, mud, grass, reeds, thatch, loosely packed stones, etc. are treated as kutcha house.

Agâra : Sanskrit technical term denoting a “residence”.

barriadas : Squatter settlements often on land occupied without titles and legal recourse

otla : Semi- private zone

Kapda : Clothing

Roti : Food

Makaan : House/Shelter

UGADI : Ugadi or Yugadi, also known as Samvatsarādi is the New Year's Day for the states of Andhra Pradesh, Telangana, and Karnataka in India.

Swachhagrahis : Swachhagrahis are the foot soldiers of the SBM (G) and the motivators for bringing about behaviour change with respect to key sanitation practices in rural areas.

"Satyagrahis : Satyagrahis are the people who follows the principles of Satyagrah(insistence on Truth, and dependence on the force inherent in Truth)"

SabkaSaath, Sabka Vikas : Collective Efforts, Inclusive Growth

Abadi Land : According to The Madhya Pradesh Land Revenue Code, 1959; 'Abadi' means the area reserved from time to time in a village in a non-urban area for the residence of the inhabitants thereof or for purposes ancillary thereto, and any other local equivalent of this expression such as "village site" or "gaonsthan" shall also be construed accordingly.

Haritha Bhavanam : Green Home

Puranas : One of a class of Hindu sacred writings chiefly from a.d. 300 to a.d. 750 comprising popular myths and legends and other traditional lore

Upanishads : The Upanishads are the philosophical-religious texts of Hinduism which develop and explain the fundamental tenets of the religion.

Vastushastra : Vastu Shastra is a Sanskrit term that translates to the “science of architecture.” It incorporates many architectural design ideas, such as space, arrangement, layout and measurements.

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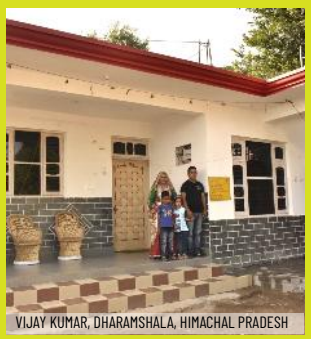
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Rs. 1200.00
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www.ikbooks.com