MaS-SHIP

Mainstreaming Sustainable Social Housing in India Project

Brief 1: Strategies to mainstream sustainable social housing | January 2019

SUMMARY

This brief discusses the rationale for mainstreaming sustainable social housing followed by an explanation of key barriers to adopting more sustainable materials and construction practices. Examples include lack of awareness amongst developers and poorly skilled construction workers. While policies, rules, and codes have contributed to sustainability in social housing, barriers remain including in shortfalls at the local level to effectively monitor and enforce sustainability requirements, data gaps, and poorly structured incentives. These factors also hamper the development of the green materials supply chain. Resident experiences also show the inadequacy of housing. Policies to address these issues are proposed.

1. DEFINING SOCIAL HOUSING IN INDIA

Social housing provision typically involves some form of demand or supply side public subsidies, targeted at low income groups (Herda et al., 2017). To the extent that the term applies to India, it involves government support, for example, in the form of discounted loans to prospective low-income homeowners through programmes such as the Pradhan Mantri Awas Yojana (PMAY). However, policy frameworks, regulatory relaxations, and incentives also enable the private sector to supply low income housing. As such, social housing provision in India involves the public and private sector. These arrangements have reduced the urban housing shortage from 18.78 million in 2011 (MoHUPA, 2012) to between 10 to 12 million units today (FSG, 2018)[1]. However, as the country urbanises, projected to encounter 416 million new urban dwellers by 2050, the pressure to deliver in a timely, and cost-effective way, is increasing.

2. RATIONALE FOR MAINSTREAMING SUSTAINABLE SOCIAL HOUSING

It is important to mainstream sustainable social housing for three reasons. First, the majority of the shortage is concentrated amongst Low Income Groups (LIGs) and Economically Weaker Sections (EWSs). This has meant that households are faced with inadequate living conditions such as overcrowded dwellings. Such factors are negatively associated with measures of well-being such as health and chronic poverty. Rapid housing construction may perpetuate these conditions if resident needs, such as comfort, are not factored into housing planning and design.

Second, the construction industry will play a crucial role in housing delivery. The sector's output value is expected to grow at a compound annual growth rate (CAGR) of 4.16% between 2017 and 2021, compared to 3.95% between 2012 and 2016 (GlobalData, 2017). However, prioritisation of cost effectiveness may involve adopting more mechanized, and less labour-intensive housing solutions, potentially neglecting the job creation potential of the sector.

Third, construction is associated with environmental risks. For example, increase in demand for raw materials arising from construction can worsen land and riparian degradation. Increased building construction is also associated with a rise in energy consumption at an annual rate of 9% compared to the overall national growth rate of 4.3% (UN-Habitat, 2015). Continued energy consumption in an inefficient manner risks increasing greenhouse gas emissions.

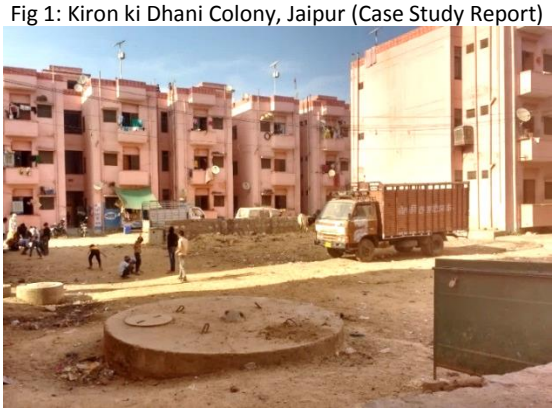
These competing risks and opportunities necessistate the development of strategies to decouple the potential socio-economic benefits of social housing development from its negative environmental impacts.

3. MaS-SHIP INSIGHTS

MaS-SHIP addressed the need to mainstream sustainable social housing in two ways. First, it created a framework to measure the performance of 17 established and emerging building materials and technologies[2], against four criteria, including resource efficiency, operational performance, user experience, and economic impact. Second, it studied the construction and policy ecosystem to identify barriers and opportunities in adopting sustainable materials and technologies and related design and construction practices.

The results of Autoclave Aerated Concrete (AAC) Blocks is indicative. This option stood out as being resource efficient and scored well in terms of operational performance. With respect to economic impact, the material is cost effective, allows for quick construction, and has some potential for creating jobs for semi-skilled workers. In fact, AAC blocks have demonstrated some success in the market. However, they are generally limited to high-rise buildings, atypical of the three-story units that are characteristic of most social housing projects. Part of the reason for its limited adoption is because of its poor performance in user experience, reflected in developers' limited familiarity with the material.

Fig 1: Kiron ki Dhani Colony, Jaipur (Case Study Report)



3.1. Developers: Awareness, Capital, and Informality

Social housing developers prioritise cost effectiveness and profits when making project decisions, including with design choices and material selection. They have limited awareness and interest in adopting sustainable alternatives, particularly with more expensive, mechanized options. They are also small or mid-sized - constructing projects less than 100 units – with limited access to working capital. For cost effective, sustainable options, such as AAC blocks, a perception remains that they are more expensive. Many developers also rely on informal networks to make material selection and design choices. These factors explain the continued use of cheaper, masonry-based and less resource efficient options such as English Bond Brick Work.

3.2. Labour: Skills and Informality

Construction workers also primarily operate in informal settings. The most accessible tend to be unskilled.

Fig 2: Laggere Housing Colony, Bangalore (Case Study Report)

Low skills requirements for masonry based, less resource efficient materials, such as English-Bond Brickwork, explains its persistent use. A significant portion of such workers also get trained on site by the practitioners and/or mason. This ad-hoc approach, with limited monitoring mechanisms can negatively affect the quality of construction.

3.3. Policies, Codes, and Rules

National housing and urban policy frameworks have evolved in India to better account for socio-economic and environmental factors in housing. However, a more comprehensive framework that integrates factors, such as resource efficiency into housing policy, is not developed.

Building codes and model building bye laws also advance sustainability. For example, the Bureau of Energy Efficiency (BEE) developed an Energy Conservation Building Code (ECBC) for commercial buildings, setting minimum energy efficiency standards for Building Envelope, Lighting, Heating Ventilation and Air Conditioning (HVAC) Systems, Electrical Systems, and Solar Hot Water Heating. A similar code for residential buildings is also being developed. The National Building Code, drafted by the Bureau of Indian Standards (BIS), recently added a chapter on "Approaches to Sustainability," proposing strategies to merge resource and energy efficiency in buildings. However, the efficacy and cost implications of these interventions for social housing have not been systematically addressed. Similarly, Model Building Bye Laws, drafted by the Ministry of Housing and Urban Affairs (MoHUA), provides for sustainable material use in construction, and promotes implementation of mandatory use and incentives. However, no specific arrangements are suggested for states to implement in social housing.

Rules, such as Fly Ash Notifications, issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC) has restricted topsoil extraction from brick manufacturing, and encouraged using Fly Ash Bricks. MaS-SHIP found that these rules have resulted in widespread adoption of the material. The Central Public Works Department (CPWD) also lists

efficient materials for public buildings in its Schedule of Rates. However, these procurement guidelines are not necessarily replicated by state housing boards that are responsible for implementing social housing projects.

Fig 3: Jakkampudi Colony, Vijayawada (Case study report)

3.4. Implementation Constraints

Fiscal constraints inhibit local governments from enforcing rules for sustainable construction. For example, in spite of adopting Fly Ash Bricks, the composition of its use, and by extension, construction quality – monitored by local governments – was below standard. Lack of adequate information sources also inhibits such bodies from crafting plans and bylaws to effectively advance sustainable housing.

The approval process can also be time consuming and costly for developers. As such proposals by agencies such as BIS and state measures have been taken to create single window clearance mechanisms to expedite the process. However, there is limited evidence of whether sustainability criteria are incorporated as part of the expedited review processes.

3.5. Weak Incentives

National *ratings tools*, such as Green Rating for Integrated Habitat Assessment (GRIHA), and Indian Green Building Council's (IGBC) tool, score buildings against many sustainability criteria. For example, IGBC factors in efficient use of components such as water and materials, from construction to its use. The ratings can be used by developers for promotional purposes. However, these tools have limited uptake because they are voluntary. To increase adoption, some states have relaxed Floor Area Ratios (FARs) in exchange for incorporating GRIHA standards. However, these arrangements do not consider the negative effects of resource extraction when building density is increased.

3.6. Barriers to the Green Technologies Supply Chain

A World Bank (2011) study found that instituting greener measures in India adds 10% to the average cost of construction. However, this was attributed to increased transportation, labour, and incremental costs associated with enhanced energy efficiency standards. No similar studies exist for building technologies in India. Such data gaps preclude a rigorous cost-benefit analysis to inform policies such as linking fiscal incentives with mandatory conditions for adopting sustainable options, both of which are critical to strengthening the supply chain. For example, MaS-SHIP found challenges in procuring information on attributes such as the job creation potential of new technologies. Lack of disclosure mandates for manufacturers and developers, and limited efforts to aggregate data largely explain such gaps.

These gaps also hamper broader market development efforts, such as promoting new options to build awareness, allocating resources for scaling up promising green technology firms, and cost-effectively securing the manpower to utilize more complex technologies. For example, the Building Materials and Technology Promotion Council (BMTPC), studies and promotes innovative technologies. As part of PMAY, it is also responsible for the Technology Sub-mission to support such endeavours. However, no systemic measures are in place to promote new options against broader criteria such as resource efficiency and economic impact.

3.7. Resident Experiences

MaS-SHIP also surveyed social housing residents to gauge their experiences. Many raised grievances about factors such as discomfort because of inadequate ventilation, and their homes being located away from employment opportunities. This indicates negligence amongst practitioners and policymakers in incorporating resident needs into planning and design to ensure adequate housing.

Residents also influence demand for less sustainable materials. They preferred less resource and operationally inefficient materials, such as English-bond brickwork, because such an option affords them greater flexibility to make in house adjustments such as nailing wall-hangings.

4. POLICY MEASURES TO MAINSTREAM SUSTAINABLE SOCIAL HOUSING

MaS-SHIP insights imply that deft interventions are needed to strengthen the supply chain and improve construction practices to mainstream sustainable social housing.

4.1. Develop an overarching sustainable housing policy framework that integrates resource and energy efficiency considerations with socio-economic parameters in urban contexts. The framework can build off existing policies with an implementation strategy and monitoring provisions to ensure efficacy.

4.2. Develop a data collection strategy to fill missing information on factors such as job creation potential for new technologies, based on interventions such as

4.2.1. *Instituting mandatory disclosures*

4.2.2. *Funding primary data collection efforts*

4.2.3. *Funding more modelling exercises*

4.2.4. *Developing a centralized, open source database for constant updating*

4.3. Develop a decision support system with sustainability criteria by leveraging the enhanced policy framework and data collection strategy. The system should function as the reference point for other public and private agencies to formulate and refine regulations, incentives, educational, and investment decisions in sustainable housing design and construction.

4.4. Incorporate sustainability requirements in state procurement guidelines as conditions for developers to win social housing contracts. Standards and specifications need to be developed for architects and engineers to adopt and for public officials to use for compliance checks.

4.5. Provide supply side subsidies and tax breaks to incentivize private financing and construction of sustainable social housing. All incentives should be structured against metrics that promote resource and energy efficiency with due consideration for socio-economic factors. Some strategies include:

4.5.1. Short term subsidies for working capital and discounts on land for small developers, contingent on meeting sustainability criteria that decouples resource use from development

4.5.2. Awards, incentives, and subsidies for manufacturers advancing sustainable materials and technologies

4.6. **Study the costs of instituting mandatory sustainability codes for mid-size social housing units** and calculate rebates to developers and homeowners to offset potential costs incurred by new standards.

4.7. Develop models to scale up small and mid-size, manufacturers of resource efficient building materials and technologies and focus on creating links with developers and providing the requisite labour.

4.8. Incorporate sustainability criteria into new streamlined approval processes. A check-list should be publicized for applicants to prepare.

4.9. Secure resources to improve local government capacity by developing collaborations between state and central governments, educational institutions and other relevant agencies for technical support. Training programmes and educational materials on sustainability should be systematically developed and made available to local governments. Strategies to sustainably finance capacity building should also be incorporated, along with advocacy for receiving consistent state support.

4.10. Develop awareness programmes for developers with a focus on sensitizing such actors to potential convergences between cost and efficiency considerations with environmental benefits. Identify key materials and design practices that achieve such goals and link them to its potential benefit for their prospective customers – the homeowner.

4.11. Develop training modules for developers, masons and unskilled construction workers to adopt better construction practices with a focus on ensuring basic design factors are implemented for resident comfort

4.12. Engage residents in design and planning through

4.12.1. *Awareness programmes to sensitize residents to the value of sustainability and influence them to demand sustainable options from housing providers*

4.12.2. *Studying resident needs in order to apply design changes to enhance comfort, and potentially allocate additional resources to empower residents in more sustainably managing their homes*

4.12.3. *Collaborating during the planning and design phase of housing to secure long term buy-in and ensure resident satisfaction*

Note: The references used in this document can be found here

One planet build with care

MaS-SHIP

Mainstreaming Sustainable Social Housing Project in India (MaS-SHIP) is a two-year initiative developed to promote sustainability in terms of environment performance, affordability and social inclusion in social housing, funded by United Nations Environment Programme (UNEP) 10 Year Framework of Programme on Sustainable Consumption and Production (10YFP).

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[1] A 2018 report by FSG chose this range based on estimates of 10 million according to the Ministry of Housing and Urban Affairs (MoHUA) and 12 million according to a National Housing Bank (NHB) workshop

[2] "Materials and Technologies" are used throughout this brief to reflect the terminology applied by the Indian government