

October 2018

Summary

The construction of 12 million social housing units under the Government of India's *Housing for All* by 2022 scheme, presents an opportunity to inform the design, performance and specification of these units, from the experiences of residents inhabiting such developments. As part of the MaS-SHIP project, field study was conducted in five social housing developments across three climatic zones of India. The purpose of the questionnaire survey-based study was to gather subjective feedback from residents about their perception of the overall living conditions related to indoor environmental conditions in their homes, familiarity with the building materials, maintenance, upkeep and access to day-to-day amenities around the development. This document describes the learnings from one of the field surveys of 152 households in a social housing development (Jakkampudi colony), located in the warm-humid climate of Vijayawada (Andhra Pradesh).

Key findings

1. Indoor environment was perceived to be just bearable

Majority of the residents perceived indoor temperature and air quality in their dwellings to be (just) bearable during summer and winter. As compared to the summer period, double the number of households found indoor temperature to be satisfactory in winter, while nearly half the number of households perceived indoor air quality to be stuffy in winter. Although this is likely to be due to the relatively moderate conditions (Avg. temperature-max.= 25 to 30°C, min. = 20 to 25°C, Avg. RH = 75%) in the winter period of Vijayawada, the findings imply the inability of the building envelope to provide comfortable indoor environment (in absence of air-conditioning) in the summer season (Avg. temperature-max.= 30 to 35°C, min. = 25 to 30°C, Avg. RH= 90%) (Figure 1).

Figure 1: Perceived indoor temperature

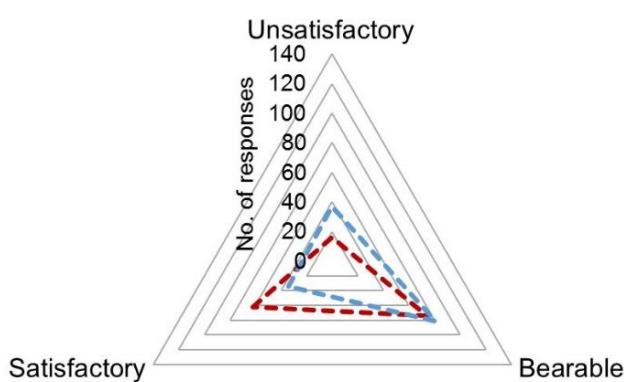


Figure 2: Window opening onto the staircase



2. Daylighting was affected by window location though air movement inside was adequate

Windows are intended to provide adequate daylight and ventilation for maintaining a good indoor environment. However, in the case study development, windows were found to be inappropriately located and designed. Though each dwelling unit had been provided with adequate number of windows and ventilators, the majority of these either opened into the central corridor or the common staircase, making them unusable due to privacy issues (Figure 2). This led to poor levels of daylighting in the dwellings, resulting in electrical lights left on in most of the dwellings during the day.

Interestingly despite the inappropriate window locations, residents felt that dwellings were well-ventilated in both summer and winter periods. Natural ventilation using openable windows along with ceiling fans and evaporative coolers formed the suite of adaptive measures adopted by the residents for achieving indoor comfort during the summer period. The use of air-conditioning was not found to be prevalent, possibly due to the high energy costs associated with its use. Indoor air movement was found to be a key factor in influencing the residents' overall experience of the indoor environment, indicating the need to incorporate strategies for cross ventilation and passive cooling in social housing design, so that comfortable indoor environment was maintained at no or low cost.

3. Quality of construction was found to be poor

Just after eight to nine years of occupancy, nearly half of the surveyed households reported occurrence of dampness on the toilet and kitchen walls and attributed it to the poor quality of plumbing that led to leaking of pipes, confounded by building materials not being water resistant (Figure 3). Although Building Byelaws require a minimum quality of construction, appropriate site checks need to be put in place by developers and urban local bodies to ensure that construction quality is not compromised. Well-constructed dwellings will tend to be more durable and have lower maintenance costs that are vital for social housing developments, inhabited by Economically Weaker Sections (EWS) or Lower Income Groups (LIG) groups. Good quality of construction and workmanship would also enhance residents' health and safety (in case of natural disasters) and liveability of these developments.

Figure 3: Perceived causes of dampness inside the dwelling

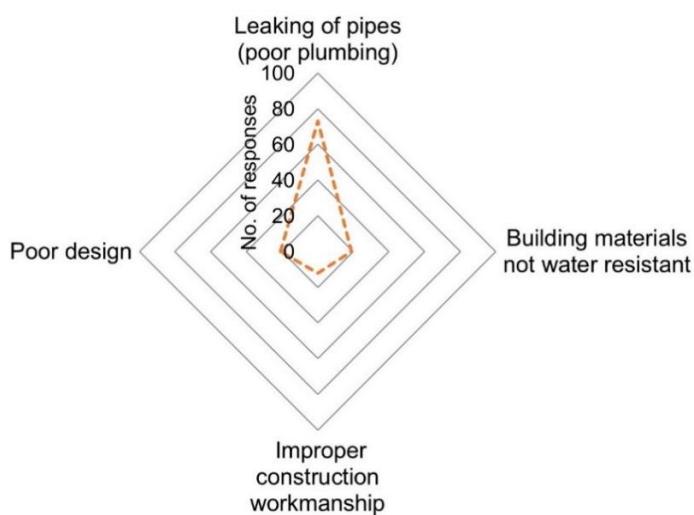


Figure 4: Sewage water accumulated on plot adjacent to the development



4. Residents were satisfied with the building materials overall but dissatisfied with the lack of nail-ability of the walls

Despite the poor quality of construction, majority of residents were satisfied with the building materials (RCC frame structure & Flyash brick walls) overall. Nevertheless, about a third of the households surveyed expressed dissatisfaction with the lack of 'nail-ability' of the walls and the difficulty in adding or changing electrical points. This reveals the significance of designing social

housing units that can be adaptable by offering residents the ability to make changes in their own housing units.

5. Poor maintenance and upkeep was widespread across the development

Despite having a Residents Welfare Association (RWA) in place, maintenance and cleanliness of the streets and surroundings were poor. The improper planning of drainage and sewage disposal system in the development resulted in the accumulation of sewage water and garbage in the barren land around the colony, leading to hygiene and health issues for the residents (Figure 4). It is evident that simply having an institutional system such as RWA is not enough to keep a clean and healthy environment. Design for maintenance must be incorporated at the planning stage of a social housing project, through provision of appropriate infrastructural and institutional arrangements, to ensure sustainable disposal of different forms of waste that are generated in the development.

6. Access to basic amenities was good but the commute to work was inconvenient

Jakkampudi colony is located approximately 11 km away from the city centre. The development has easy access to schools, hospitals and market places, but the location was not conveniently located for commuting to work though access to public transport was good. Majority of the residents used public transport to travel to work, although some residents had their own vehicle for commuting.

7. Conclusion

This study has revealed for the first time, resident perception and experiences of inhabiting a sustainable social housing development. The findings reveal that the quality of indoor environment, quality of the interiors, ability to make changes, the maintenance and up-keep of the surroundings and availability of job opportunities at convenient vicinity are important factors in determining the level of 'satisfaction' of the residents. These factors must be taken into consideration in the planning, design, specification and performance of social housing developments, so that they are truly sustainable and liveable for the residents.

 <p>One planet build with care</p> <p>MaS-SHIP</p> <p>Mainstreaming Sustainable Social Housing Project in India (MaS-SHIP) is a two-year research developed to promote sustainability in terms of environment performance, affordability and social inclusion as an integral part of social housing. Funded by United Nations Environment Programme (UNEP) 10 Year Framework of Programme on Sustainable Consumption and Production (10YFP).</p>	<p>Contacts</p> <p> OXFORD BROOKES UNIVERSITY Prof. Rajat Gupta (Project lead) rgupta@brookes.ac.uk</p> <p> Development Alternatives Zeenat Niazi zniazi@devalt.org</p> <p> teri Sanjay Seth sanjay.seth@teri.res.in</p> <p> UN HABITAT FOR A BETTER URBAN FUTURE Jesus Salcedo jesus.salcedo@un.org</p>
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