MaS-SHIP
Mainstreaming Sustainable Social Housing in India Project

Resident perceptions of living conditions in a social housing development located in the Composite climate (Delhi, Jaipur & Dehradun)

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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 field surveys of nearly 420 households in three social housing developments (*Bawana housing, Delhi; Kiron Ki Dhani, Jaipur and Bhagat Singh colony, Dehradun)*, located in the composite climatic zone of India.

Key findings

1. Indoor environment was perceived to be just bearable

The composite climate is characterised by high temperatures in summer (32 to 43°C) and low external temperatures in winter (4 to 10°C). The findings revealed that the dwellings in all the three locations were unable to provide comfortable indoor environment during both summer and winter. Except Jaipur, where majority of the households perceived indoor temperature to be satisfactory during winter; in Delhi and Dehradun, majority of the residents perceived indoor temperature and air quality in their dwellings to be (just) *bearable* during summer and winter. In all the three cities, as compared to the winter period, nearly thrice the number of households found indoor temperature to be unsatisfactory in summer. Majority of the residents in Delhi and Jaipur perceived indoor air quality to be (just) bearable during summer and winter, while in Dehradun indoor air was perceived to be still during summer (Table 1).

Table 1: Residents' overall experience of the indoor environmental conditions during summer and winter, in Composite climatic zone

Climatic zone	Case study location	Summer				Winter			
		Unsatisfactory	Bearable	Satisfactory	Total responses	Unsatisfactory	Bearable	Satisfactory	Total responses
Composite	**Delhi**	49	**81**	18	148	16	**100**	30	146
	Jaipur	40	**71**	39	150	12	**67**	**71**	150
	Dehradun	43	**68**	9	120	15	**68**	37	120

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. Residents resorted to warm clothing and often lit fire in open space or on street outside their house during winter, to adapt to the cold weather. The perception of

indoor temperature was found to be a key factor in influencing the residents' overall experience of the indoor environment, indicating the need to design the building envelope to keep the heat out in summer and prevent heat loss during winter, so that comfortable indoor environment is maintained at no or low cost.

2. Quality of construction was found to be poor

The dwellings were mainly constructed using RCC frame structure and burnt clay brick or solid concrete blocks or flyash bricks as walling material. Though these materials may have proven to be environment friendly and cost effective, the poor quality of materials and workmanship was evident in the presence of dampness across all the three developments. The number of households reporting the presence of dampness was found to be highest in Dehradun (80%), followed by Delhi (58%) and Jaipur (33%) (Figure 1). In Dehradun, dampness could be seen on the ceiling and external walls, whereas in Delhi and Jaipur occurrence of dampness could be seen on the toilet and kitchen walls. The residents attributed it to poor quality of plumbing that led to leaking of pipes, confounded by poor quality of workmanship and building materials not being water resistant.

Figure 1: Presence of dampness in households, as per location

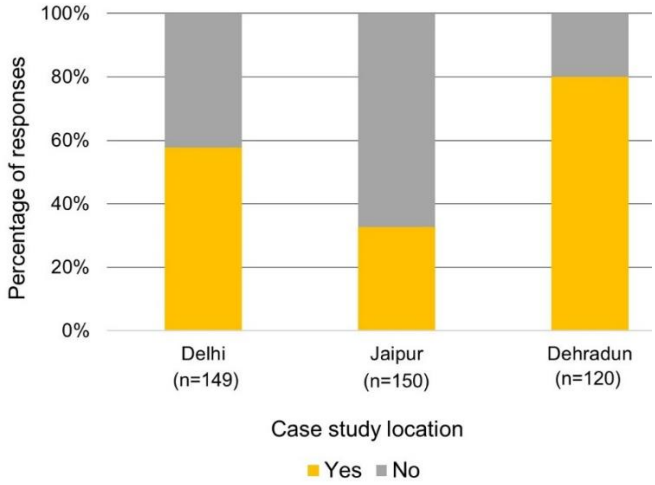

Figure 2: Garbage and water logging on the streets of case study development in Jaipur

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.

3. Residents were dissatisfied with the lack of nail-ability of the walls

The residents across the three locations were found to be dissatisfied with the building materials used in the construction of these dwellings. Majority of residents 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.

4. Poor maintenance and upkeep was widespread across the developments

The lack of an institutional mechanism for the maintenance and upkeep of the development was a common sight across the three surveyed social housing developments. The improper planning of drainage and sewage disposal system resulted in the accumulation of sewage water along the streets, leading to hygiene and health issues for the residents (Figure 2). In the social housing development in Delhi, unoccupied dwellings had become dumping yards.

5. Distance from the city centre impacted the ease of access to basic amenities

The surveyed social housing developments in Delhi, Jaipur and Dehradun, where located at approximately 30km, 19km and 1km from the city center respectively, which influenced the residents' level of satisfaction with the location of the development. In Dehradun, the residents reported having an easy access to their places of work and other basic day-to-day amenities, whereas the surveyed householders in Delhi and Jaipur expressed concern regarding the availability of job opportunities at a convenient distance from the development. In Jaipur particularly, the residents seemed to be largely unsatisfied with the isolated location and the unavailability of proper public transportation system to access basic facilities such as hospitals and market place. The residents reported walking for about one to two kilometres to access the nearest public transport. The nearest hospital was located at a distance of around five to six kilometres from the development, and an absence of proper public transportation system made it even more difficult for them to access these facilities.

6. 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, availability of job opportunities at convenient vicinity and convenient accessibility to basic amenities 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.

One planet build with care

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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).

Contacts

OXFORD BROOKES UNIVERSITY

Prof. Rajat Gupta (Project lead) rgupta@brookes.ac.uk

teri

Sanjay Seth
sanjay.seth@teri.res.in

Development Alternatives

Zeenat Niazi
zniazi@devalt.org

UN HABITAT FOR A BETTER URBAN FUTURE

Jesus Salcedo
jesus.salcedo@un.org