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# Spatial and Social Adaptations: A Post-occupancy Evaluation of Multi-storey Social Housing in Dhaka[1]

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**Abstract:** This paper investigates how low-income households adapt spatially and socially in multi-storey (walk-up six-storied) social housing in Dhaka, by looking at the allocation, organization and use of spaces, and household members' extent and ways of socialization. Evidence is presented from a broader research on socio-spatial adaptation for living and livelihood in multi-storey social housing in Dhaka. Post-occupancy evaluation, through structured questionnaire, informal interview and observation, helps understand the building performance in responding to the needs of the low-income dwellers. Low-income households' access to the surveyed two housing projects at the old and new Dhaka implies a change in the location and mode of dwelling, from single to multi-storey housing, requiring households' spatial and social adaptations. The findings indicate that households generally adapt 'actively' to the dwelling environment to suit their spatial and social needs. This paper concludes by calling a fit between physical and social environment in designing and maintaining functional contexts for the low-income households in Dhaka where human activities and interactions can be appropriately accommodated and developed.

**Keywords**: adaptation; post-occupancy evaluation; social housing; low-income households; Dhaka.

## 1. Introduction

Access to housing of the lower-income households, especially the urban poor, has been a critical issue in Dhaka, Bangladesh, like most other large cities in developing countries. While this access to shelter issue persists in critical proportion, design and use of domestic spaces in urban housing in Bangladesh have changed in the last few decades due to demographic, social and economic forces active in the broader urban context. Rising costs and scarcity of land have also contributed significantly to changes in design and use of domestic spaces. This change in design and use of housing has two major implications for the urban poor households. First, construction of 'social housing' has become a specific public response to give slum/squatter settlement dwellers access to shelter. Second, a dwelling type in the multi-family and multi-storey social housing has evolved for the lower-income group; this type is different from the traditional concept of organization and use of space, especially, in terms of private-public and front-back notions.

A multi-storey approach to social housing—a new setting—creates a context for the low-income dweller's adaptations in at least two possible situations. They are: First, target slum/squatter settlement dwellers would have to adapt to a new dwelling if a given housing scheme fails to reflect their prior life-style and dwelling situations. Second, in the possible event of target dweller's involuntary exit from and/or lack of access to these housing, non-target low-income households will move in eventually and would have to adapt to a dwelling not designed for their life-style and dwelling situations. In the context of these two probable situations, this paper investigates how low-income households adapt spatially and socially in multi-storey (walk-up six-storied) social housing in Dhaka, Bangladesh, by looking at the allocation, organization and use of spaces, and household members' extent and ways of socialization. A key intention of this investigation is to suggest how this knowledge can be used for future design of housing for the urban poor households.

This investigation is important because studies have shown that social structure, life style, and cultural practices relate to a given group's 'habitation'—a place of abode and its physical environment (Rapoport, 1969; Oliver, 1987; Lawrence, 1987; Chandhoke, 1980). 'Habitation pattern' of any community indicates its practice or custom with regard to the pattern of its abode. A locational change in their habitation—dwelling premise—necessitates subsequent adaptation for living and livelihoods, for example, in the new context of planned resettlement projects. Household adaptation, due to locational change in habitation, would have at least two dimensions: 'spatial' and 'social'. Spatial adaptation refers to the initiatives taken by the members of a household for use and reorganization of dwelling space

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by means of adjustment or alteration in the physical environment. Social adaptation, on the other hand, takes place in the physical environment for social interaction.

## 2. Methodology

A theoretical framework based on a set of five dependent variables explains household adaptation mechanism; they are: household's position in the labour market, life-cycle, life-style, condition of present dwelling, and condition of previous dwelling. The first three variables are termed as 'household factors'. 'Post-occupancy evaluation' (Preiser et al, 1988; Zimring and Reizenstein, 1980; Rabinowitz, 1979) has been used as a method to investigate the building performance in responding to the needs of the low-income households in their adaptations in the two multi-storey social housing schemes in Dhaka, located at Badda and Islambagh (Ghafur, 2005). Housing in the former case consists of two six storied buildings with 48 dwelling units. The latter case, called Ershad Colony, consists of four six storied buildings with 192 dwelling units.

This research employed a multi-method fieldwork to gather relevant data from all dwelling units of these cases. It carried out a questionnaire survey, in addition to informal interview and observations, in these two social housing schemes in March 2001. The researcher, i.e. the author, had himself participated in the questionnaire survey along with thoroughly briefed one Research Assistant and three Field Assistants. The author, however, conducted himself all the informal interviews. Completed responses obtained from survey in Badda and Ershard Colony housing projects are 46 and 169 respectively; either absence of household members during the survey or their non-cooperation had resulted in not getting responses from the rest of the dwelling units. Housewives were the main respondents. It used a combination of both qualitative and quantitative analysis. Quantitative analysis is limited within frequencies and simple cross-tabulation. Analysis included collection/preparation and analysis of measured drawings (of houses) to use them as a basis for further analysis. Qualitative evaluation of different space uses and performed activities came from informal observation and photographs.

**Table 01:** Indicators and Attributes of Adaptation

| Concept | Indicators | Attributes |
|---|---|---|
| Spatial Adaptation | Existing space use<br>Change in space use<br>Security and Privacy | Locational grouping<br>Circulation<br>Proximity |
| Social Adaptation | Social use of space Socialization with Neighbours<br>Linkages with village relatives<br>Leisure activities | Social Interaction<br>Privacy<br>Territoriality |

Source: Ghafur (2005)

## 3. Multi-storey Social Housing in Dhaka

Bangladesh National Report to the Habitat II (GOB, 1996) identifies 'social housing' as a specific category of public housing that involves social costs i.e. some form of subsidy either in its land development, construction or rent. Social housing, thus defined, provided housing for 1.16 per cent of all households in Dhaka (GOB, 1996, p.68); later this report noted that social housing in Dhaka had increased from 1.12 per cent in 1993 to 12 per cent in 1998 (UDD, 2000). Neither this broad definition of social housing nor any of its subsequent estimation of constructed housing units gives reference to low-income households. Another study reports low-income household's limited access to government housing: 5.4% and 5.9% of all urban poor in Dhaka and in all urban areas are tenant in government houses (Islam et al, 1997, p.200).

Recent public sector interventions in urban low-income housing have shown diversity in the delivery mechanism by constructing multi-storey flats in addition to the development of new settlements and upgradation of service-deficient settlements (HSD, 2000). In terms of height, housing in Dhaka can be classified into the following categories: low-rise (1-2 stories), walk-up medium-rise (3-6 stories), and high-rise (8 stories and above). The middle walk-up category

denotes 'multi-storey' in this research. The government of Bangladesh (GOB) has an agenda of enabling 'social housing', i.e. provision of shelters with state subsidy either for rental or hire-purchase scheme for the poorer section of society. Since the early 1980s, GOB has been pursuing the idea of multi-storey housing for lower income groups, e.g. the Class III and IV government employees and displaced squatter settlement dwellers. The lower income groups represent the urban poor and households whose monthly expenditure equals or just below the income poverty level.

Recent estimates identify high-density multi-family housing developments as the only feasible alternatives in Dhaka, Bangladesh, to give the urban poor households access to shelter. The discrepancy between urban land and house price, and incomes of below median income groups sets this option (Hoek-Smith, 2000, pp.114-117). Ranking of priorities of what the urban poor households in Dhaka want include increase in income, access to shelter and services, recreation etc. (Islam et al, 1997, p.247). Experiences from private developers built apartments for high- and middle-income households suggest that multi-storey housing projects could provide some of these needs more efficiently than dwellings in single-storey high-density settlements. The government of Bangladesh has taken initiatives to construct multi-storey housing for the urban poor. In an initiative by the Ministry of Land, 9000 and 6000 flats are now under construction in Bhashan Tek by a private sector developer for the slum dwellers and Class III and Class IV government employees; this type of housing will be first of its kind of significant scale.

## 4. Surveyed Multi-storied Social Housing

In 29th May 1984, the Ministry of Housing and Public Works decided to construct a housing project to stop development of public health threatening environment. Low-income people with a monthly income below Tk. 1000 would be the beneficiaries of this project by paying a rent of Tk. 250 per month. Initial project target was to construct 32 apartments, each with 24 dwelling units and 405 sq.ft (with half stair) per unit, in 10 acres of land. HSD was given the task of implementing this project with two specific objectives: First, to apply cost-saving structure; second, to provide housing at a subsidized rent for the welfare of low-income people, and transfer the ownership to its occupants after 60 years (cited in HEC, 2000, p.2). In its first and last phase, only 2 apartments with a total of 48 dwelling units were constructed in 1984 in Badda near Gulshan, Dhaka.

The only other known example of social housing was constructed at the personal directives of the then President H. M. Ershad to rehabilitate squatters. In old Dhaka, Dhaka City Corporation (DCC) had built four six-storied apartments with 192 dwelling units at Islambagh during the late 1980s; people popularly call this project as 'Ershad Colony'. The squatters were reportedly let live in some of the two-room dwelling units with kitchen and toilet before they were eventually evicted in 1993/94. No further details were obtained from the DCC on this issue. Despite stated objectives, none of the mentioned social housing projects are now inhabited by the targeted beneficiaries. Class III, IV government employees, and Class IV employees of the Dhaka City Corporation are now the respective occupants of the former and latter case.

The government had designed the dwelling units, allocated different domestic spaces, allegedly for the urban poor households in Badda and Ershad Colony under the following assumptions: First, poor urban nuclear family will use the dwelling units; the number of poor urban household members living in the dwelling unit will remain unchanged at any given point in time. Second, poor urban household's formal living and sleeping take place in different rooms, under modern practice of living. Third, poor urban households use living and sleeping spaces in the dwelling unit in association with modern furniture and fixtures while practice traditional way of cooking. Fourth, poor urban households separate their place of living from place of working.

## 5. Forms of Household Adaptations

Household adaptation in this paper denotes a form of response to housing stress, and is indicated by a difference between household's 'residential situation picture' and 'aspiration picture'. The former refers to the significance attached to the residential situation not only in present terms but also by the situation in youth and previous residential situation. The latter aspiration picture refers to "the picture of the situation which one regards as most suitable for one's present household situation". The aspiration picture is related to (aspects of) dwelling that households consider realizable within the supply of dwellings in the housing market. Household attempts to make the residential situation picture and the aspiration picture as congruent as possible in order to avoid stress. There are two possible household responses to avoid this stress: passive and active adaptation. The first response—passive adaptation—is household's decision to move to a new location or stay in the existing house with its inconveniences; household adjusts its aspiration picture. The second response—active adaptation—relates to household's making adaptation while staying in the new or earlier dwellings; household's residential situation picture is adjusted. Construction of multi-storey housing projects and their subsequent occupation by the squatter dwellers and non-beneficiary low-income households had

created contexts for adaptation with reference to the household and residential factors. These two groups of households' adaptation responses are further explained with reference to the following five forms of adaptation (Priemus, 1986). Observations on household adaptation are summarized below.

**5.1 Move:** Two separate but linked events i.e. move in by the low-income households and move out by the urban poor, had taken place in this form. In the former case, despite slum-dwellers'/homeless peoples' living with aspiration picture—housing satisfaction—in Ershad Colony they were forcefully displaced to make room for the DCC allotted low-income households. This involuntary displacement had put them under greater housing stress. In the latter case, the existing low-income dwellers were under housing stress in their previous dwellings. Despite housing stress, they were financially not capacity to make a move to a better dwelling closer to their aspiration picture. So they had to live without fulfilling their aspiration pictures. When access to dwellings through allotment became available, either due to patronage or personal network, existing low-income households moved in.

**5.2 Conversion:** This is active adaptation. Here household members adapt the environment to suit their needs. For example, low-income households made structural conversions by adding a partition wall to make an extra room for either self-use or renting for income generation. Turning the adjacent corridor an extension of the dwelling inside has compensated households' shortage of indoor spaces for social interaction.

**5.3 Change of Use**: This is also active adaptation. Households in Ershad Colony converted their kitchen into an extra bed due to shortage of space. Households are involved in different income generation activities inside their dwellings.

**5.4 Loyalty:** This is passive adaptation. Here dwelling households adapt themselves to the environment. A section of the non-beneficiary dwellers have continued staying despite absence of services, crowding, sense of security and dilapidated structural conditions. In Ershad Colony, they also had to seal off the corridor-facing windows with paper to ensure privacy inside dwelling.

**5.5 Protest:** This is a form of non-adaptation.

## 6. Profiles of Household Adaptation

Low-income households, after they move in, face spatial and social changes in their present dwelling circumstances in relation to their previous ones. These changes have taken place respectively, first, in the availability of types and extent of domestic spaces and services for household use; second, in the creation of a new context for intra- and inter-household socialization. The next two sections explain how households have responded spatially and socially to adapt to their present residential situation.

### 6.1 Spatial Adaptations

Households' spatial adaptation for living and livelihood take place in conversion, change and loyalty of use. The manifestations of households' spatial adaptation are explained next in the following three inter-linked areas.

#### 6.1.1 Existing domestic space use

The total dwelling unit area in the Badda and Ershad Colony multi-storey social housing project are 301 sq.ft and 232 sq.ft respectively, excluding circulation space. Designed spaces for services are basic and similar in them; these spaces are toilet, kitchen, and a small multipurpose space in between meant to serve as dining or circular space. The areas where both these projects differ are the type and allocation of spaces for sleeping and living. In Badda, the given large room (220 sq. ft. approx.) has an option of its sub-division into two equal rooms, invariably for living and sleeping. The designed two equal-sized rooms (74 sq. ft each) accommodate living and sleeping activities in Ershad Colony.

**Table 02:** Percentage Distribution of Domestic Spaces

| Types of Spaces | Badda | | Ershad Colony | |
|---|---|---|---|---|
| Total Carpet area | 301 sft. | 100 % | 232 sft. | 100% |
| Sleeping/living | 204 | 67.8 | 153 | 66 |
| Dining | 36.5 | 12.2 | 30.5 | 13.2 |
| Kitchen | 30 | 10.0 | 22 | 9.6 |
| Toilet | 30 | 10.0 | 26 | 11.2 |

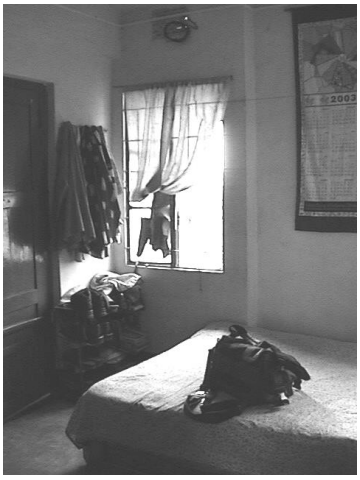
Source: 2001 survey

To examine the uses of different function-specific spaces (or rooms), observation of the presence (or absence) of furniture has been taken as a preliminary indication of the respective dwellers' way of using these rooms or spaces. Observations on households' domestic space use, in relation to a given space's corresponding furniture, are organized by describing their use pattern and explaining their implications for spatial adaptation.

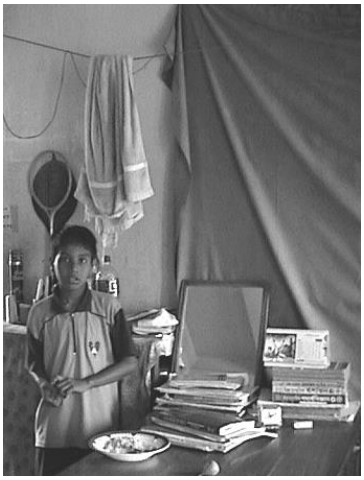
Entry to a dwelling unit first leads one to public space that is explicit in the form of a room in Ershad Colony and implicit in Badda with the possible sub-division of the room. The most common furniture used for formal sitting is 'sofa set' whose presence is few and far between (13.5 %); most of the surveyed households do not show their preference of using sofa sets in a living room to socialize with guests, in addition to their own informal living. Meanwhile alternative furniture like a 'bed' has been observed used for sitting. After public, private is the next layer with functions like sleeping, dining and cooking, toilets etc. A very high 98 % households use beds of different qualities for sleeping in addition to their occasional use for sitting. Households' wider use of bed indicates its essential need. An average household size of 5.34 demands more space if not rooms for sleeping with due provision of privacy. Out of this necessity, all dwelling units in Badda have converted their large room into two separate rooms, with bed(s) at least in one room. Some have placed both beds and sofa set (or chairs) in the second room, therefore, giving that room a dual purpose for sleeping and living.

Bengali word 'almeera'—denoting cupboard, clothing cabinet, cabinet or sideboard—is another essential domestic furniture usually placed in bed room with additional purpose of safe keeping of valuables. Although available data shows that 60% of all households own at least one almeera it varies noticeably among Badda (71.7 %) and Ershad Colony (56.8 %). This difference, in part, is as an indication of lower socio-economic status of the dwellers in the latter case. Space allocation for dining in both cases, despite its labeling in the original plan of Badda, has been barely adequate. As a result, observed very low percentage of dining tables (20 %) in the two sites suggest two issues: first, using dining table as part of eating has not yet become a regular part of their domestic habits as they have preferred to retain their rural dining habits, i.e. eating being seated in floors. Secondly, even if households are willing to eat in the dining table they cannot afford placing it in the scanty designated space or in other room due to space shortage in place of higher priorities. In most cases, the observed dining table has also been used as a study table. Household's informal dining practice is related with their traditional ways of cooking.

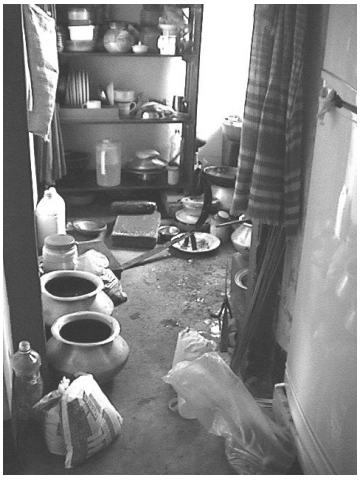
A Bengali house uses 'meat safe'—a kitchen cabinet—to store cooked food and different uncooked items and ingredients. Its type, size, and frequency of use are indication of household's kitchen use and cooking practice. Meat safe ensures hygiene and protects its items from insects and mice. Presence of meat safe among a little more than half of all households (52.1 %) suggests an inadequate and unhygienic kitchen and cooking process and also the low affordability of the people.



Living room has bed that is also used for sitting during day time



A small table is used for dining and study in the bed room; a curtain separate spaces and gives privacy.



Extensive use of the floor in the kitchen food preparation and cooking in the traditional way

Source: Survey 2001

**Figure 01:** Domestic Space Use in Badda Multi-storey Social Housing Project

Front living room displaying different household items

Multiple use of the front living room, used for food preparation

Meat safe in kitchen, a kerosene stove is in the background

Source: Survey 2001

**Figure 02:** Domestic Space Use in Ershad Colony Multi-storey Social Housing Project

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half of all households (52.1 %) suggests an inadequate and unhygienic kitchen and cooking process and also the low affordability of the people.

### 6.1.2 Change in use and space

The concerned authority had allotted designed dwelling units to households with different income levels. Households with different social composition and needs have adapted differently by initiating changes in use and space in the following ways.

- **Rent:** There are few instances of renting to non-allotted people in the surveyed households. Although the rate of rent in the two sites is 7.6 percent (16 cases), the rates in each site are wide apart; the rate of rent in Badda and Ershad Colony are 19.6 % (9 cases) and 7.6 % (7 cases) respectively. A separate room and part of a room are rented in 10 and 6 cases respectively, within a total 16 cases. Tenants share available services with the host household.
- **Income Generation:** To supplement household income, low-income households have also been engaged in different income generation activities based on their dwelling space. There are only 10 observed cases of home-based income generation (4.7 %) in the surveyed multistoried social housing. The rates of this practice are 4.3 % (2 cases) and 4.7 % (8 cases) in Badda and Ershad Colony. Observed types of activities are teaching, tailoring, business, and cooking. These activities are performed inside a room (6 cases), in a separate room (3 cases), and in verandah (1 case). Five cases have reported to earn less than or equal to Tk. 1000 and the rest above this figure.
- **Physical Change:** Households made physical changes in their dwelling for either renting, economic activities or to make up space constraints. All 46 households in Badda have made physical changes in their dwellings by sub-dividing the room into two separate rooms of equal sizes. These physical changes are permanent in nature: brick wall and temporary partition make the sub-division in 31 and 14 cases respectively. In Ershad Colony, only 2 households made physical change mainly because the dwelling unit has been designed with two separate rooms. Households in Ershad Colony, however, had initiated innovative adaptive changes within their dwelling; these new changes are either conversion of kitchen into a small bed space or makeshift overhead storage space.

Space above toilet is used to store household items

Overhead storage facility in between kitchen and toilet

Kitchen has been converted into a bed room

Source: Survey 2001

**Figure 03:** New uses in Ershad Colony

### 6.1.3 Security and Privacy

Emerged senses of security and privacy are the results of the spatial disposition of different spaces in relation to the public-private realm as well as households' socially constructed sense of privacy. Dwellers' sense of security is manifested by their installing security gate; dwellers' perceived sense of privacy, however, requires careful observation. Perimeters of the Badda and Ershad Colony sites have been porous—open to outsider's intrusion—from security point

of view. There were no security guards and gates at each stair in both these sites. When asked, four in every five households in Badda and Ershad Colony have reported to open their main entrance door only when required. However, the rest have shown a habit of keeping their main entrance door open throughout the day until late night. This habit fluctuates noticeably between the two sites: the rates for Badda and Ershad Colony are 8.7 % and 21.4 %. Observation and informal discussion suggest that long intra-dwelling unit interaction, community's collective surveillance that arise from these interactions, and most importantly, the use of corridor as public space for children contributed to keep their door open at different buildings and levels of Ershad Colony.

Measures for privacy is spatially manifested and are attained at different levels: first, privacy within the enclosure for domestic functions like sleeping and dining etc.; second, privacy within the social grouping for washing, and socialization with neighbours; third, privacy within the community. At the dwelling unit level, household brings the notion of 'front-back' for separation between the public and private spaces. People living in Ershad Colony manoeuvre and improvise their window panels of the corridor facing two rooms without exceptions for privacy and protection against petty thefts. The glass panels are either painted or pasted with papers from inside to block outsider's intrusive gaze from the corridor or simply replaced with G.I. sheet, especially in the case of the bedroom. A door close to the entrance door connecting the two rooms is closed permanently for privacy of the bedroom.

### 6.2 Social Adaptations

Households' social adaptation has mainly taken place for living, and not for their livelihood. The two site contexts and the presence (or absence) of corridor have set different spatial contexts for household 'socialization', irrespective of the dwelling unit design. Socialization refers to the person-to-person contact for different formal and informal purposes, ranging from non-committal to deeply involved activities. Socialization of women and children—the dominant users during most of the day—attains more analytical focus. An initial identification of the socially significant space(s) sets a basis for subsequent understanding of the ways in which women and children use these space(s) for socialization. The following discussion helps explain the extent in which design at the building level, in particular, arrangement of dwelling units in each floor plays its role in dwellers' social adaptation.

#### 6.2.1 Socially Significant Spaces

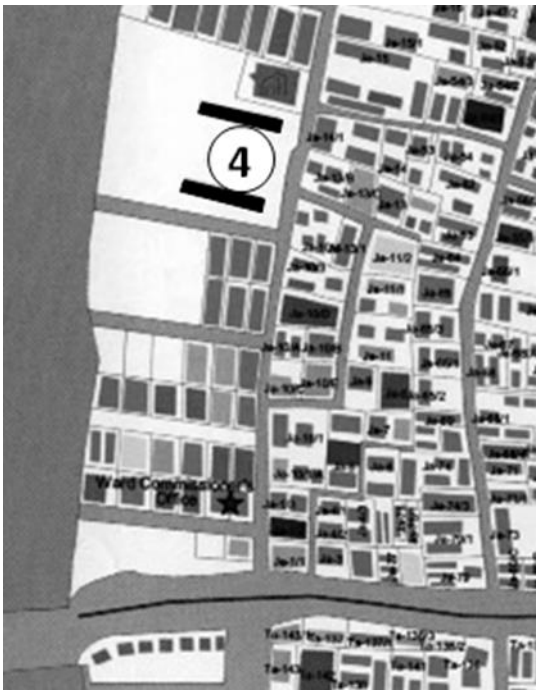
Urban low-income households perform different formal and informal activities. These activities have social significance, requiring appropriate space. Households living in unplanned settlements use a hierarchy of spaces, starting from home, for these activities. When spaces within dwelling unit become inadequate, their access to public (or even semi-public) spaces within/beyond housing becomes crucial. Their access to outdoor spaces compensates inadequate spaces inside dwelling. Performing informal activities outside dwelling unit has always been vital for social interactions and establishing networks, especially, for women and children. While living in ground floor, household members' access to spaces immediately outside a given dwelling unit—however small—was possible. But living in a multi-storey social housing presents a different phenomenon. A hierarchy of spaces of social significance, in a private-public continuum, as observed in the two sites is noted in Table 2. The performed formal and informal activities in these spaces are explained next.

**Table 03:** Hierarchy of Spaces in Socialization

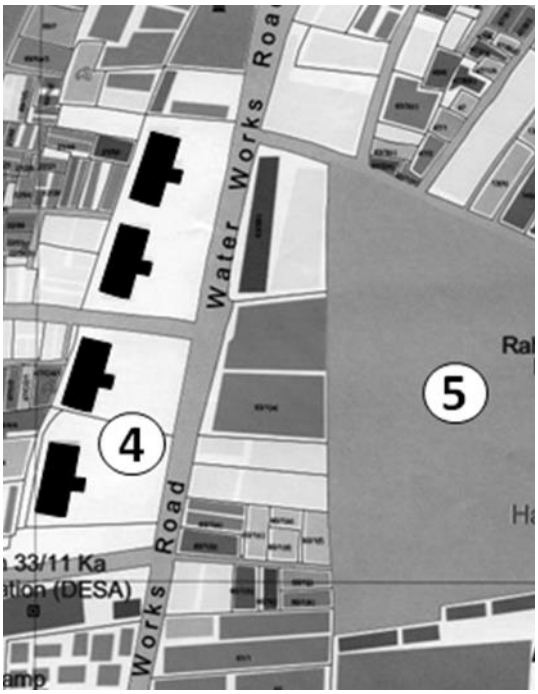
| Levels in Hierarchy | Spaces in Hierarchy | Nature |
|---|---|---|
| First | rooms within dwelling unit | private |
| Second | corridor | semi-private |
| Third | stair verandah and roof (only in Ershad Colony) | semi-private |
| Fourth | forecourt | semi-public |
| Fifth | urban play field (adjacent to Ershad Colony) | public |

Source: Survey 2001

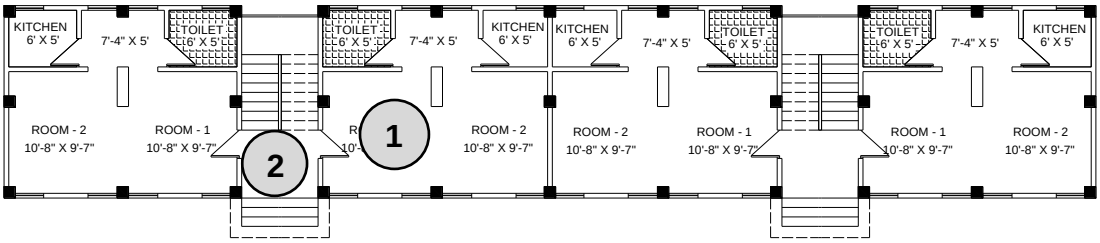
Social activities like birthday party, milad (a social gathering for religious purpose), wedding ceremony become formal because they are organized in advance and people are invited to participate. Nearly four out of every five respondents have reported to perform their formal social activities inside house, presumably due to the private nature of that activity.



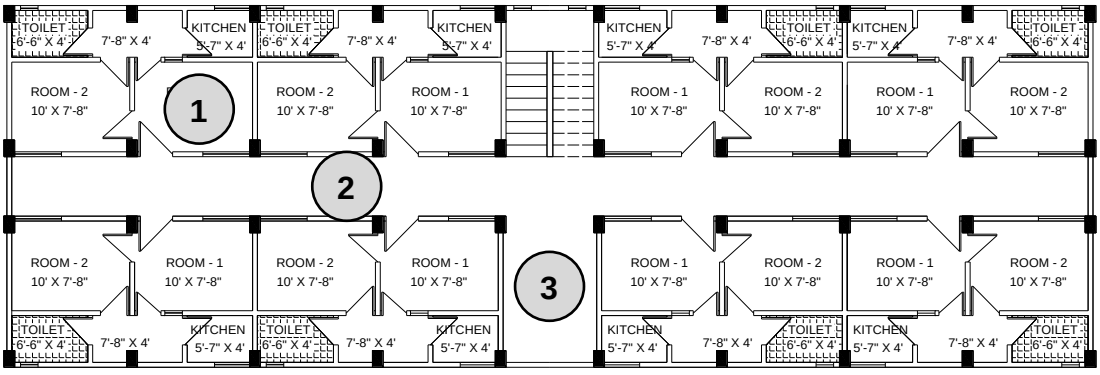

Badda Social Housing




Ershad Colony Social Housingh




Typical Floor Plan: Badda




Typical Floor Plan: Ershad Colony

Source: Ghafur 2005

**Figure 04:** Hierarchy of Socially Significant Spaces: Badda and Ershad Colony Multi-storey Social Housing Projects

For absence of any public spaces within the building, the next notable spaces mentioned by the households in Badda are the ground floor and clubhouse, situated within the housing premise. Options outside dwelling unit include outdoor, stair veranda, roof, ground floor, and clubhouse; the roof at Badda, however, is inaccessible. These formal activities are performed outside dwelling when the scale of that particular activity becomes large and public in nature. The presence of corridor and adjoining stair veranda in Ershad Colony creates possibilities for meaningful contacts among residents, among women and young children in particular, in a given floor and this in turn generates activities and interactions. The subsequent outcomes of these contacts are both socialization and domestic works. Significance of the presence of corridor and stair veranda is felt when compared with Badda where households are deprived from their access to the semi-private spaces as outlined in the spatial hierarchy – corridor, stair veranda and roof. Due to their absence, spontaneous informal contacts hardly generate in Badda.

### 6.2.3 Socialization with Neighbours

A majority 76.8% respondents judge their social life with neighbours in the new multi-storey social housing as better in comparison to their previous house. What then are the factors present in multi-storey social housing creating a setting for socialization? This question is probed with reference to an opinion that 'homogeneity', i.e. common problems and socio-economic background among a given group of households, influences neighbouring households' meaningful social interactions (Fastinger, 1972; Jehl, 1987). Households have shown socio-economic homogeneity among themselves. First, occupation of 93.9 % of all household heads are in government service; Class Four government employee (66.5%) is the single largest category, in addition to a few higher-level officers. Class Four employees constitute 76.1 % (36 nos.) and 63.9 % (106 nos.) of all household heads in Badda and Ershad Colony respectively. Other indicators showing similarities among households include:

- Household nature: 95.8% households eat from a single or common source of income;
- Low income: 57.5 % households have average monthly income equal to or less than Tk. 3000 during the period of survey;
- Food-clothing expenditure: 79.6 % households spent 60% or more of their monthly income on food-clothing;
- Life cycle: 62.7 % household heads are in the 'middle-age' stage of their life-cycle.

The surveyed households' average period of staying in Badda and Ershad Colony are 21.5 and 14.2 years. Are these years long enough to develop a meaningful social relationship with one's neighbours? This paper first inquires into the frequency of, participants in and reasons for meeting neighbours. Discussions of these issues would tell more about individual responses and trends than 'group life' they have developed over the years. Probing these questions with specific reference to women is important. For women, a large number of whom are homemakers and spent their time indoors, the issue of social interaction as part of their social adaptation is very important. In a society that imposes spatial restrictions (of purdah) on women, it is also important to know the nature and extent of women's mobility for socialization. To understand the role women plays within the households, this research asked questions for their opinion on the decision-making role they play in the resource allocation on different household needs. Male household heads—husbands—gave decisions in 48.8 percent cases while wives gave decisions in only 13.2 percent; the figure for decisions given by both husband and wife is 37.3 percent. Although issues related to social adaptation, especially for women, are quite complex, tangible responses on the issue of socialization, at a general level, are sought. Issues examined are frequency of, participants in, and reasons for meeting with neighbours.

All households meet their neighbours, either situated beside their dwelling unit, in the same floor, or in other floors of the same building: 87.7 percent respondent meet 'daily' and the remaining 12.3 percent 'sometimes'. The variations in responses between the two sites are not statistically significant. No responses of 'never' meeting their neighbours imply the fact that possibilities for person-to-person social contacts among all have always existed in both sites. Therefore, we can see that possibilities for primary contacts for socialization among members of the households has been in practice as an outcome of living all these years. When asked who are the participants in these meetings, it is reported that 'all'—everyone meeting everyone irrespective of age and sex—as the highest category (49.5 %) besides the next highest 'women-women' (43.4 %). Interestingly, categories like 'men-men' (5.2 %) and 'women-men' (1.9 %) are very few in percentage. However, a comparative examination of these instances between Badda and Ershad Colony suggests the following observations:

- Women meet women more in Ershad Colony (47%) than Badda (30.4%) implies the fact that women have been prone to stay more inside house in the latter case; the main reason for this higher contacts among women, in

Ershad Colony, is the presence of different types of (semi-private) space outside dwelling unit for socialization, especially the corridor and stair verandah.

- Women's coming out of home and meeting other women in Ershad Colony is more (47%); its equal instance with 'all', implying both men and women, (47%) indicates a gender balance in social interactions.
- In both cases of Ershad Colony and Badda, socialization does not always take place with immediate neighbours, i.e. adjacent dwelling units.

The survey questionnaire included a list of probable options to catalogue household members' reason for meeting their neighbours. Neighbours meet each other for a variety of reasons that include: formality, discuss daily household affairs, to seek help/advise during crisis. The highest reason is 'all' (62.7 %)—a combination of these three reasons. The next highest as well as statistically significant reason is 'formality'; neighbours meet each other out of social courtesy, which is equivalent to exchanging 'salam' (i.e. similar to the western context of saying hello). At closer scrutiny, the response of formality suggests two aspects of residing households. First, socio-economic differences or status exist among an apparently homogenous community. Second, there are small households where only the male members meet with their neighbours while females stay inside.

Responses on location of women's traveling for socialization give us more insight into the dynamics of their social adaptation. Questionnaire included location options, in a hierarchy of spatial settings, to record their responses; the location options are: adjacent house, a house in the same floor, a house in the same building, a house in other building, outside housing site, and all. There are very few reported cases of going outside housing area and all. All responses suggest highest movement within a given building. Taken together these observations, it indicates the development of a community—in the social sense of the term—comprising a given group of households first within a building and then the site. From a different perspective, it also suggests that women's mobility is restricted predominantly within the multi-storey building and then within the site.

Socialization in multi-storey housing in relation to its different levels is discussed now. Both projects are six-storied high. In Ershad Colony, the number of dwellings within a building—served by a stair—is 48 with 8 units per floor; this figure for Badda is 12 with only 2 units on both sides of the stair. Households living in fourth and fifth floors have shown a tendency to socialize more within their respective floor of living. On the other hand, households living in second and third floors interact least with their respective floor of living. They avail the opportunities for socializing households living top or bottom two floors. However, for dwellers of all floors, the covered distance is limited within the building. Occupational status, indicated by income and presence of furniture, does not show any pattern for households' preference for floors. Households of different income level are evenly distributed in all six floors to suggest an absence of any given income group's concentration in a particular floor. Households are satisfied with their respective level of dwelling level.

## 7. Evaluation of Building Performances for Adaptation

This section evaluates the building performance to comment on the effectiveness of design in dwellers' spatial and social adaptations. This evaluation is carried out by comparing the 'performance criteria' and 'performance measures'. For this evaluation, two performance elements are taken into consideration in varying degree of investigation; they are: functional and behavioural. This research did not carry out an in-depth evaluation of the technical elements other than the attribute of security. It is worth repeating the limitation of this evaluation of building performance. Evaluation is not users' own evaluation of their residential environment through a structured format within the framework of Environment-Behaviour studies. Evaluation is qualitative and descriptive based on observation and questionnaire survey, and not in scale. The utility of this (limited) evaluation lies in providing a basis for future in-depth analysis of how users' perception and cognition of the dwelling environment influences their behaviour in using domestic space and socialization.

The surveyed two housing projects—Ershad Colony and Badda—are different in the way in which dwelling units are organized. Aspects of design, in these two projects, that worked well in favour of dwellers' active adaptation are: self-contained dwelling unit found in both projects; grouping of eight dwelling units around a corridor in Ershad colony; the 'front-back' notion is arranged in both dwelling units in two layers that has later been re-defined to suit the needs of the users. Physical environment is the setting where scopes for socialization are created and practiced. Hierarchy of spaces in Ershad Colony, i.e. corridor, stair veranda, fore court (and roof) worked well for creating a hierarchy of social

activities. These activities are organized with reference to age and sex. Presence of large number of dwelling units creates possibility for women's mobility within the building and site.

**Table 04:** Framework for Evaluation of Building Performance for Housing Adaptation

| Performance Elements and Attributes | Performance Criteria | Performance Measures |
|---|---|---|
| **Functional** | | |
| Locational Grouping of space and dwelling units | Self-contained dwelling unit and function-specific use of space as per design assumptions | Deviation in use of domestic space from design assumption that led to dwellers' adaptation |
| Circulation | Stair and corridor used only for circulation. | Social uses of circulation space. |
| Front-Back | Presence and use as per design. | Alterations for flexible presence in time |
| **Behavioural** | | |
| Socialization | Inter- and intra-household social interaction | Group life and social interactions among homogenous households |
| Privacy | No user-initiated alteration | Presence of user-initiated alteration to ensure privacy |
| Territoriality | Defined territory, and correspond-ing mobility and use | Defined territory, and correspond-ing mobility and use |

Source: Ghafur, 2005

Behavioural elements that emerged in this study as significant for social adaptation are socialization, privacy, and territoriality; these elements are aspects of user satisfaction and wellbeing. Presence of group life and homogeneity among dwellers are pre-conditions for socialization. On the other hand, physical environment is the setting where scopes for socializations are created and practiced. Specific elements of these setting are corridor, stair veranda and fore court. These elements are arranged in a hierarchy, and create a more conducive setting for socialization and group life in Ershad Colony than in Badda. This observation supports Gehl's (1987) claim that the hierarchy of social grouping is reflected by a physical definition and disposition of these spaces, especially in Ershad colony, and are in close conformity with the dweller's social definition and use of space. Given the extent of interaction, the social consequences of arranging eight dwelling units around a corridor, on a face-to-face situation, is a positive design aspect. Dwelling low-income households have shown a propensity to make a fit between the physical environment and behaviour.

Dwellers closing of corridor-facing windows refers to the presence of user initiated adjustments to ensure privacy of the adjoining rooms. Design location of window offer flexibility, an option for opening to bring light and air inside or closing to ensure privacy. Dwellings in Badda are devoid of these options in favour of rigid privacy control at the dwelling level, but at the cost of social interaction. A demand for rigid application of privacy at the inter-household level has been reduced significantly in Ershad Colony due to the extent of socialization observed in the corridor.

### 7.1 Implications on Design Assumptions

While low-income households in Dhaka are offered domestic spaces in the multi-family and multi-storey context they do not use spaces in the ways and extent in which they had been intended. Consequently, a gap between the assumptions that guided the dwelling unit design and their actual use persists. This gap has been a major source of housing stress for the low-income households, leading to their spatial and social adaptation. Major observations that make the design assumptions invalid, and therefore, led toward dwellers' spatial adaptation are organized in terms of 'user' and 'use'.

- User: Dwelling units are not always lived by the assumed urban poor or even low-income nuclear families. There are many reasons for this. First, impossibility of housing mobility of the grown-up children, especially after sons get married, meant that they live with their parents. Moreover, retired father (or old parents) prefers to live with their children instead of living independently. As a result, over crowding and congestion (due to excess furniture)

become inevitable, subsequently triggering dwelling households' coping initiatives through spatial adaptation. Living with relative comfort, without cramped situation, is not preferred in favour of over-crowding. Low-income households are most likely to continue living not as a nuclear family but sharing their dwelling space with dependants. They have seen provision of shelter as the key purpose of dwelling unit.

- Use: Traditional living practice and performances are adapted within modern dwelling. Even though it had been expected that the availability and quantity of furniture would be an indication of the respective household's socio-economic status, furniture's placement and use have been adjusted to their traditional way of life than the other way round. This observation comes in contradiction with the assumed dichotomy of formal living-sleeping spaces. In defiance of the design assumption, in addition, low-income households retain their pre-existing sense of security and privacy, but adapted them in the new context of multi-storey and multi-family dwelling.

## 8. Conclusions

Social and spatial adaptations are inter-related; one usually acts to influence the other. Households' passive and active adaptations are the cumulative outcome, to a large extent, of these spatial and social adaptations. The findings of this research have shown that urban house planning and design do not necessarily determine urban house use if design assumptions are set apart from the prospective users' socio-economic status and life style. Post-occupancy evaluation of the two surveyed multi-storey social housing has shown the significance of a fit between physical and social environment. This research has reiterated the significance of an objective for consideration in social housing: designing and maintaining functional contexts where human relationships can be more appropriately accommodated and developed. Negation of this objective, in particular, is most likely to cause housing stress, manifested in either household's active or passive adaptation. Given the changing (and different) household factors, and their previous residential situation, household's spatial and social adaptation would take place any way. However, design assumptions if based on user's social structure and cultural practices and priorities then designed dwelling units, and their grouping, are most likely to make a supportive setting for positive adaptation.

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