CONSTRUCTION PROCESS IN SELF-HELP HOUSING
- A study on piecemeal construction in urban housing in Bangladesh (Part 4) -

Md. KAMRUZZAMAN* and Nobuyuki OGURA**

The bulk of urban housing units in Dhaka city are being built with piecemeal construction process and supplied for rent by small-scale private landlords. This paper draws on longitudinal studies and examines the process of housing construction among this category of producers using case study of a typical middle income settlement in Dhaka city. The study revealed the predominant role of small building firms in the construction process and landlords deploy them for maintaining operational flexibility and cost saving. Invasion of manufactured building materials and utilization of modern equipments are traced in contemporary self-help construction. Due to public and private initiatives, landlords are gradually trained in construction skills; promote self-help construction, and making notable contribution to the settlement’s consolidation process and housing supply.

**Keywords:** Building Materials, Construction Management, Small-scale Building Firm

1. INTRODUCTION AND OBJECTIVE OF THE STUDY

Construction by self-help has long been recognized to be the main path for middle and lower-middle income households in developing cities to become house owners. Despite the substantial constraints often posed by high cost of land, building materials and public policy, small-scale private production system continues to supply the majority of housing to the urban dwellers in cities in developing countries. Given the discernible trends in much of the developing world, there are indications that the bulk of urban housing into the 21st century in the developing world will continue to be produced by the private sector (Okpala, 1992). While some of these dwellings are built for owner-occupation, many are built for rent. There are overwhelming evidences that the bulk of housing units in the rental sector, and thus in the urban areas as a whole, is supplied by the small-scale private builders and landlords. This is due to the known reluctance of the corporate private sectors to embark on this form of housing development on large-scale or for low-income tenants. They seek higher profit margins than are available in this sector and more attuned to swift recovery of invested capital. Despite the known significance of small-scale private production of rental housing, there has been no detail study attempt to identify their operational process as a guide to policy.

This paper starts by acknowledging the role of small-scale private builders, owner-builders and landlords*1 as they are providing accommodation to the vast influx of tenants in Dhaka city, given the obvious inability of the public sector to produce sufficient dwellings to meet their shelter need. Despite this recent focus on rental housing, research into the organization of the housing production process by small-scale builders, who themselves are landlords, is very limited.

One part of the research on ‘piecemeal housing’*2 is therefore focused on the activities of small-scale private housing producers, in order to understand how they are able to produce large number of dwelling units for rent. It has been widely accepted that most of the self-help builders manage the construction projects rather than build with their own hands (Aina, 1989; Ofori, 1989). In order to put the present issue in perspective, this paper intends to highlight some aspects of the housing construction in self-help piecemeal process in a typical residential area of Dhaka to represent the overall picture of the city.

The aim of this paper is to link the two spheres of construction and management by examining the process of housing production and the role of various actors that prompt the households to take direct participation in the shelter production process. The main focus is to uncover the relationship between the housing consolidation and landlord household’s involvement in mobilizing resources, principal actors and all input components of housing construction and the factual difficulties during the execution of the housing projects. The study also attempts to answer how the self-help builders attain construction skills as they have different professional backgrounds and lack of construction skills. How far the self-help construction holds its role in the settlement’s consolidation process?

In order to examine these issues, this paper draws on the typical example of an intermediate sized residential neighborhood in Dhaka city, Bangladesh. The
paper is described into five sections. Following this introduction, the methodology of the study is outlined. The factors directly contributing to the operation of self-help building activities are then analyzed focusing on small-scale building firms and their characteristic features. Afterwards, a combination of ethnographic observation and longitudinal fieldwork of the study area is illustrated in light of self-help construction and supply of building components. Factors influencing the housing investment and different promotional activities are delineated that encourage self-help construction. Finally, the nature and type of housing consolidation process in self-help settlement are discussed followed by some concluding statements.

2. RESEARCH DESIGN AND METHODOLOGY

A survey of activities of small construction firms in the self-help settlements was undertaken to attain information on their way of operation and constraints they face. Of the four parts of the Rupnagar Residential Area (RRA)\(^3\), the middle two parts of RRA enjoy advantages due to affordability grounds. Therefore, these two areas have been experiencing rapid physical growth, largely by the small-scale private sector. They were chosen for this survey on this aspect. The study interacted with 20 small-scale private building firms working during the field survey in two selected settlements. A detailed questionnaire was then administered to the selected firms to reveal the pattern of constraints and to establish operational modalities. The respondents were preferably the heads of the firms.

It has already been established that small-scale private landlords in the middle-income settlements are not homogenous (Kamruzzaman and Ogura, 2009.6). A distinction can be made between those who own rental properties built by engaging small building contractors and those who build their own rental properties (contractor-landlords). Although the first group was the majority, their knowledge of the process of housing production in the settlements is limited, only to the investment side. Because the focus of the survey was on key features of the entire process of small-scale housing production in the settlements, this partial knowledge was considered inadequate. The contractor-landlords, on the other hand, presented a unique group which combined knowledge of both the investment and the construction aspects of housing production. Although fewer in number than the first group, they were eminently in a better position to give an all-round perspective on the process and problems of housing production by small-scale private firms. They became the focus of the present study for this reason.

Longitudinal studies\(^4\), which entail return visits to the same study site, can be particularly illuminating as they enable the researcher to trace the experiences of particular house and its physical changes over a period of time. The insights that can be gained from longitudinal studies of the housing conditions have been aptly illustrated by Schlyter (1991). Qualitative and quantitative data are frequently complementary and both data types were used to examine the main question addressed by this paper. Quantitative data were collected through questionnaire survey whereas qualitative data were gathered through a combination of longitudinal observation\(^5\) and ethnographic fieldwork.

The data were collected in three different phases; December 2006, January 2008 and 2009. Fieldwork was carried out in four parts of RRA, totaling about 1,089 housing plots (Table 1), and examines the harmonization of construction process and consolidation of the housing plots. The housing consolidation stages were readily evident and many households were pleased to show the improvements they have made to their home. The collection of data on house consolidation, therefore, is not particularly difficult, especially with longitudinal data, which avoids the problems associated with relying on householders’ recollections of the past. Obtaining data on construction management activities, however, is much more problematic and much depends on how questions are phrased.

<table>
<thead>
<tr>
<th>Location within RRA</th>
<th>Plot Size (sq. m)</th>
<th>Number of Plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1 area</td>
<td>335</td>
<td>203</td>
</tr>
<tr>
<td>Part 2 area</td>
<td>234</td>
<td>201</td>
</tr>
<tr>
<td>Part 3 area</td>
<td>167</td>
<td>326</td>
</tr>
<tr>
<td>Part 4 area</td>
<td>117</td>
<td>359</td>
</tr>
</tbody>
</table>

3. BUILDING PROCESS AND THE SMALL-SCALE CONSTRUCTION FIRMS

All self-help builders in the middle and lower-middle income categories face financial constraints to bear the construction cost. The favored practice amongst the builders is to embark on piecemeal development of residential property: buying land, gradual procurement of building materials, and engagement of a contractor for a phased construction program (such as starting from foundation to plinth level, construction of superstructure, roofing, installation of fittings, finishing, etc.), at times with time-lags of months or even years between phases, and with different contractors engaged for different phases (in the case of owner-builders who are not building contractors). This staged approach fits their savings mobilization profile.

It is already identified that the existence of a continuum, from capitalist landlords at one end to petty landlords at the other, in the organization and process of urban housing construction in the context of Bangladesh (Kamruzzaman and Ogura, 2009.6). It has also been established that in the case of low-income housing, the latter form of organization characterizes the construction process. In addition, there is evidence that small building firms almost inevitably work in the informal sector, since this mode of operation removes them from conventional regulations, taxation and accountability (Tipple, 1994). Their informal and anonymous nature give them some advantages, particularly with respect to reduced overheads, nevertheless remove them from the possibility for assistance from government or formal agencies, such as banks and investment companies. However, self-help builders employ small building firms and largely depend on them for their housing construction projects. Here, two distinct actors intimately operate: landlord as investor and contractor as builder. It is recognized that the distribution of responsibilities between the landlord and the contractor (in situations where they are different persons) for the provision of the various inputs in the process of housing production depends on the nature of the contract. In turnkey contracts, ‘package deals’ or management contracting,
the contractor is responsible for assembling all the components required to complete a building. But, no traces of such an arrangement were found from the study area. Piecemeal approach to residential property development is widely practiced due to inadequate finance, to build the entire building at once. That is why turnkey process can not operate in this production process. There is a strict definition of roles and responsibilities between the landlord and the contractor in the process of housing production.

In the context of Dhaka city, small contractors or small-scale construction firms may be defined as those who can complete construction of 5,000 sq. ft (468 sq. m) of floor area per annum, build between one and nine housing units in a year, employ two or more permanent staffs, and invariably owned by a sole proprietor who spent most of his time in the actual supervision of construction work. A predominance of such small-size indigenous firms who produce the bulk of new dwellings in the semi-formal and informal sectors has been widely found in the study area. Though the value of total annual housing construction by small firms has certainly increased several folds due to inflationary trends over the years, the type of firms with which this analysis is concerned share the other characteristics established in the definition. Now we will examine the behavior of the firms as landlords and as contractors. As contractors, all the firms interviewed operate as sole proprietors without formally registered business names. The firms, as contractors, build an average of two flats per year. This performance is consistent with the parameter used in the definition. However, the criterion of output per year is restricted by the time-lag (running into years in some cases) which existed between the commencement and completion of the projects. The number of flats each firm had built depends on how long it had been established. Table 2 gives a breakdown of firms in the survey by age. The predominance of firms with more than twelve years of age can be established from Table 2. The classification of firms based on the number of permanent employees on their payroll in the present study is an improvement on the yardstick employed in the definition of small firms in Bangladesh (Table 3). In order to highlight certain organizational details, a distinction is made between micro and small firms. Micro-enterprises include one-man firm or firms where the only other permanent employee is the proprietor’s spouse or close relative who performs all the administrative functions. Such firms (a fifth of the total; see Table 3) often operate from the residence of the sole proprietor. Small-scale firms also keep a number of skilled workers who may or may not be permanent staffs. About 40 percent of the interviewee firms have 6 to 10 skilled workers; of them some are permanent employees (Table 4).

<table>
<thead>
<tr>
<th>Table 2 Small-scale House Building Firms by Age</th>
<th>Table 3 Small-scale House Building Firms by Number of Permanent Employees</th>
<th>Table 4 Small-scale House Building Firms by Number of Skilled Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of Firms (in years)</strong></td>
<td><strong>Number of Sample</strong></td>
<td><strong>Percentage</strong></td>
</tr>
<tr>
<td>&lt; 6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 to &lt; 8</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>8 to &lt; 10</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>10 to &lt; 12</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>12+</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>No. of Permanent Employees</strong></td>
<td><strong>Number of Sample</strong></td>
<td><strong>Percentage</strong></td>
</tr>
<tr>
<td>&lt; 2</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>2 to &lt; 4</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>4 to &lt; 6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>6 to &lt; 10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10+</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>No. of Skilled Employees</strong></td>
<td><strong>Number of Sample</strong></td>
<td><strong>Percentage</strong></td>
</tr>
<tr>
<td>&lt; 2</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>2 to &lt; 4</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>4 to &lt; 6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>6 to &lt; 10</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>10+</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

This arrangement keeps administrative and other overhead costs to a minimum and offers a measure of operational flexibility to the firm. Such flexibility includes the possibility for adjusting staff emoluments according to a firm’s fortunes and even to not pay such emoluments or any other overhead costs when there are no jobs. The small firms (with more than two permanent employees) are less flexible than the micro-firms, because they incur higher overhead costs. Most such firms operate from rented accommodation exclusively used as an operational base for business activities. This is in addition to a larger number of permanent staff. However, not much difference exists between the small and micro-firms in terms of their respective capabilities to execute jobs. This is because of the often total reliance on casual labor for job execution. Opinions volunteered by most respondents showed that most proprietors strove to keep their permanent staff numbers as low as possible, so as to benefit from the perceived advantages of the micro-firms. This strategy for surviving a period without construction projects, however, also prevented growth of the firms. Now we shall return to landlord’s mode of operation in housing construction and the supply factors in the production process.

4. **SUPPLY OF BUILDING COMPONENTS**

The basic inputs to a construction process are identified as land, finance, building materials, labor, infrastructure, plant and machinery. In a well-managed process, these inputs must be harnessed, synchronized and monitored to ensure that adequate quantities, of the proper item, to the correct quality, arrive in the specified place at the required time (Ikejiofor, 1997). The landlord is responsible for land and building materials acquisition and for providing the building design. A steady flow of finance is important to both the landlord and the contractor in the course of executing the project, while the provision of labor, plant and machinery is the exclusive prerogative of the contractor. Under the following subheadings, we examine these issues and the findings of the present study, starting with building materials.

4.1 Building Materials

The consensus among landlords and building firms interviewed was that building materials were readily available but very expensive. For example, Kamruzzaman and Ogura (2009, 2) discussed that price of major building materials has gone up by more than twice during the last ten years. Building material
traders usually had stock on a continual basis, a wide range of assorted building materials. The booming construction industry in the study area sustained the building materials trade. However, materials were considered to be very costly and, in particular, to be rapidly increasing in price at unpredictable rates. The latter concerned small entrepreneurs, as it adversely affected them in their roles both as landlords and contractors. As landlord, it frustrated their efforts to do project planning with any degree of confidence. The result was that most entrepreneurs who embarked on house building could not be sure whether the funds they had in hand would be enough to complete the project. This dampened the enthusiasm of potential investors, thereby adversely affecting the volume of housing to take-off. As contractors, on the other hand, the inability of a client to supply sufficient materials to the site as and when required often disorganized work programs and led to breaks in the construction process, suspension, or even abandonment of a project. Temporary halts to the work generally extend the contract period, raise firm’s overhead expenses and reduce profits. Two examples suffice to illustrate the unpredictable trends of rising building materials cost. In December 2006, one thousand pieces of bricks were sold at 3, 500 Taka in the open market. By December 2007, the same number of bricks was sold for 6,000 Taka. Also, the price of standard mild steel reinforcement bars jumped from 63,000 Taka per ton in January 2008, to 70,000 taka per ton by May of the same year. These examples confirm that the inflation in the building materials causes severe instability in construction market of Bangladesh. Despite the higher prices, most self-help builders are becoming increasingly in favor of modern construction materials. The last decade has recorded a relatively much use of mosaic floor tiles while a couple of decades before them cement finished floors were dominant. Today, it is common to decorate rooms with floor tiles. Contemporary materials gradually invade the self-help construction.

4.2 Labors

All the firms interviewed had, in theory, a simple process for recruiting permanent staff: advertisement of a vacant position, writing of application by the prospective employee, interview of the prospective employee in which skills were tested and/or credentials examined and, if successful, assumption of work. But in practice, many of the procedures enumerated above were not strictly followed, especially when prospective employees were relatives of the sole proprietor. The salary of this category of staff depended on a lot of factors; principal among them is the level of generosity of the proprietor and financial wealth of the firm. The majority of cases in the sample (Table 3), however, were small-scale firms with about ten permanent employees. The situation was somewhat different in the case of the employees of building trades. Respondents unanimously agreed that, whereas it was easy to find and recruit unskilled workmen and laborers from the labor supply which is plenty in the settlements, skilled artisans in the specialized building trades (such as carpentry, masonry, electrical and plumbing works, etc.) were expensive and more difficult to get. The survey revealed that the wage of a skilled employee is more than two and half times that of unskilled employee. More than half of the interviewee projects, especially where a building project had little or no complexity, unskilled workmen were engaged to reduce labor costs. Another factor that influenced the quality of labor was the type of skills possessed by the proprietor. It was apparent that proprietors who were trained building artisans were less inclined to employ experienced hands, because they felt that they could manage to direct the construction process.

All the firms engaged workmen (whether skilled or not) on a casual basis, to be laid off once the project they are engaged in is completed, suspended or abandoned. The ease of access to cheap labor in the settlements encouraged the practice of maintaining only small numbers of permanent employees. Payment to casual employees for on-going jobs was usually on a daily basis, in which case a firm maintained a schedule of day work rates specifying the man-hours put in by each worker. The practice of using casual workers in the execution of building contracts has the advantage of enabling a firm to survive periods of job drought by limiting the number of persons on its permanent payroll, as observed during the survey.

4.3 Construction Equipments

The contractor or the small firms acquire modern construction equipments during the construction in order to accelerate the construction speed. Most often contractors manage construction equipments through rentals. In general, the longer the construction time, the higher the rent. Basically some other people are professionally engaged in supplying construction equipments. These people have close observation in the whole settlement and if they watch any new project, they start motivating the landlord or contractor to hire equipments from them. They supply timber for shuttering, bamboo, concrete mixer, vibrator, generator, water pump etc. Within the study area, numbers of contractors were found to engage in supplying construction equipments to the self-help builders. For example, mobile crane is widely used to cast RC roofs. But temporary bamboo ladder was used to move building materials to the roof tops while casting the RC roofs for two decades before. These ratify invasion of modern construction equipments in self-help construction.

4.4 Infrastructure

About 80 percent of all interviewee households agreed that they need to bear partial or whole cost of infrastructure to their un-serviced land in order to make them completely habitable (i.e. extending access roads, pipe-borne water and electricity to their un-serviced plots). Of them, majority of the small-scale investors have infrastructure provision as a separate phase of a building program. Poor residential infrastructure and services such as roads or streets, drains, waste collection and disposal, piped water supply and sewage disposal constitute a problem in promoting housing construction in the study area. While some of these facilities are provided by the authority, others are to be developed by the builders with help of the community or neighbors and sometimes household alone. For example, major roads were developed in 1998 along with electricity, water and drainage facilities in the study area. But sewerage pipes were set after five years by the authority. Meanwhile, some self-help builders jointly dig pipe lines and connect to the main disposal pipe. Likewise, gas and telephone lines were installed by the builders themselves. Waste collection system is not yet completely developed. Some builders collectively appoint people who regularly perform waste collection tasks.
In the next section, we shall examine the factors that motivate the landlords investing in rental housing as well as inspiring environments that encourage the landlords to take direct part in executing the construction projects.

5. FACTORS INFLUENCING INVESTMENT IN HOUSING AND SELF-HELP CONSTRUCTION

The desire of most urban residents in Bangladesh is to own their first house in their respective villages of origin as a result of cultural factors, insufficient income, and restricted access to homeownership in the city. Renting thus becomes the popular tenure choice for most urban residents in Bangladesh. Multifamily apartments, rented by the low-income tenants, have already been identified as constituting the majority of all rental units in the city. The major reasons given for the preferred house type and target consumers include convenience, minimum repair and maintenance, good returns on investment and high incremental value. Survey results clearly show a desire among the respondents to be owners of landed property in order to attain social and financial security. In the absence of any reliable and affordable social insurance scheme, the possession of real property, put out on rent, satisfies this social security need.

5.1 Motivation to Invest in Rental Housing

The attractions to rental properties also include potential use of the house by the landlord for a long period, the accumulation of wealth and the possibility of passing the property to the inheritor. Added to these are the perpetual returns from the investment in the form of rents from tenants. Opinions volunteered by most respondents indicate, however, that the biggest attraction of investing in real property ownership for the landlords is the hedge it provides against the ravages of inflation on liquid capital. For these landlords, the availability of rental income introduces some stability and permanence into the capital base of their economic pursuits and provides something to fall back in times of difficulty or when one retires from ‘active’ business. This makes it a compelling necessity that overrides all other inhibiting factors and constitutes the driving force behind small-scale private housing investment in the settlements. The number of such landlords who want to invest in rental housing gives the small producers a preeminent position in the supply side of the settlements’ housing market. They are thus making contributions to the settlements’ housing stock, the size of which the public sector cannot match, at a rate beyond the public sector’s capabilities, which are reasonably good value for money, and which are better tailored to the needs of consumers.

5.2 Construction Related Publication to Promote Self-Help Construction

In case of Dhaka city; small-scale builders (they may be owner-builders or landlords) are the mass and active housing producers. Thus, the building material manufacturing companies (i.e. cement, tiles, steel, paint etc) often attempt to draw the attention of the self-help builders by publishing technical books, brochures, posters and billboards in the native language. It helps greatly to the huge self-help builders as they understood well about the technical matters when it is written in native language. The study formulated questions to the builders how they gain construction skills. Many landlords showed popular books in ‘Bangla’ about developing construction skills. One such book is titled ‘Amar Nirmane Ami (literal meaning ‘self-construction of my building’) published by a cement manufacturing company. This popular book helps the owner-builders to involve in construction and encourage enormously. Again, it has been observed during the survey that most of the self-help builders belong to various professions and only a handful of them are engineers or possess construction skills. The vast owner-builders have no previous construction experience. They attain some skills from the books; hire friends, neighbors or relatives during construction, those who have construction knowledge and the builders construct incrementally. They keep on construction and acquire construction skills gradually during the phased construction. In this process, the owner-builders simultaneously remain in construction; learn skills with some technical mistakes. But at the later stage, they attain sufficient construction skills to run individual construction projects.

5.3 Training Programs to Accelerate Self-Help Construction

The main responsibility of Housing and Building Research Institute (HBRI) is to develop low-cost housing and techniques to accelerate housing production. It also organizes training programs for the self-help builders to spread construction skills among the self-help builders. The survey came across capitalist landlord, a graduate in commerce, who claimed to have built three buildings with extensive self-involvement. He said that he acquired construction skills from a training program organized by HBRI. Besides, manufacturing companies also frequently organize training programs to promote construction through self-help builders. These training programs not only include the self-help builders but also masons, carpenters, plumbers, painters and other workers engaged in different building trades. All these activities cumulatively promote the self-help working environment to a great extent.

6. HOUSING CONSOLIDATION BY SELF-HELP CONSTRUCTION

Most households start by building a shack of temporary materials. In RRA, the walls of temporary houses are usually built with split bamboo which is sometimes covered with plastic sheets to keep out the rain, with a roof of corrugated iron sheet or second-hand clay tiles. Timber poles clad in boards and recycled metal sheets
and other found materials are also used for the temporary houses (Photo 1). All the temporary houses are providing rental accommodation for the low-income tenants. The aim of all households providing the temporary structures is to consolidate their dwelling. Later, households build semi-permanent houses on their plot which utilizes the land effectively as well as generate ample rent (Photo 2, bottom). Almost all self-help builders’ aim to have a brick build permanent house or apartment with RC roof and contemporary finish and fittings (Photo 2, top).

There are many possible routes from typically small, temporary, one-room, un-serviced dwellings to large, permanent, multi-room, fully serviced dwellings. Many houses are slowly, but steadily, consolidated in an incremental way with rooms gradually being added and facilities upgraded as income allows. Other houses remain static with the semi-permanent dwellings receiving little more than basic maintenance. Some houses remain at one stage for long periods but when the opportunity arrives, that are consolidated quickly and effectively. A small minority of households are able to finance the construction of a completed dwelling over a short period. The various stages of house consolidation can be characterized as follows: temporary, semi-permanent, developing, and completing.”

Because of the continuous and incremental nature of most constructions, it is rare to find dwellings which are regarded by their owners as completed houses.

This section will try to examine the interrelationship between the operation of self-help construction activities and consolidation of the houses. A great majority of self-help builders have little surplus incomes and investment for construction is difficult. Possible alternative strategies for raising money to finance the construction are renting out the dwelling units and manage sizable informal loans. The importance of renting as a housing strategy has been widely recognized (Gilbert, 1987; Rakodi, 1995). There is thus a clear relationship between the level of consolidation of the settlement and the frequency of renting rooms. Table 5 is an empirical estimation of the output of the interviewed building firms in the study area. It is remarkable to notice from Table 5 that 70 percent of the interviewee firms have completed about 8,000 to 10,000 sq. ft construction in last one year. It is assumed that almost 70 percent of this new construction is for rental use. As well, Table 6 denotes the level of housing consolidation in the whole settlement. Longitudinal field work in three consecutive years traced the changes in housing types and the development scale. Field survey in 2006 in the study area revealed the total housing stock, type and number of rental units. The consecutive survey in 2009 traced the physical changes. It reveals from Table 6 that on average 2 percent of housing structures of the study area are consolidated in three years.

<table>
<thead>
<tr>
<th>Stage of Consolidation</th>
<th>Part – 1 Area</th>
<th>Part – 2 Area</th>
<th>Part – 3 Area</th>
<th>Part – 4 Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>12%</td>
<td>11%</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>2009</td>
<td>8%</td>
<td>7%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>2006</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>2007</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>2008</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>2009</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
</tr>
</tbody>
</table>

It was demarcated through repeated observation on the same study area that 90 percent of the households in the self-help settlements like RRA are able to consolidate their homes through time. As the houses become more consolidated there is potentially more rental income that can be further invested in construction. All the process of finance, construction and generating rent are not static rather always in change. As Tables 6 shows, the average housing development scale has raised in all four settlements in RRA. In Table 6, it can be seen how over a three year period the average level of consolidation has increased in all settlements. Table 6 clearly shows that houses in part-3 area changes quite rapidly from the developing to the completing stages.

7. CONCLUSION

This paper draws on empirical work carried out between 2006 and 2009 in Rupnagar Residential Area, a peripheral semi-informal settlement in Dhaka. The research was based on extensive field work, interaction with self-help builders and contractors to identify the main issues in shaping the housing construction process in urban housing arena. The first issue is the identification of the direct operators who directly facilitate and conduct the housing production. The second issue is the housing supply components. It includes labor, building materials, infrastructure and construction equipments. The third issue is the role of public and private initiatives to promote the production and level of consolidation through self-help construction.

The builders have demonstrated that they are able to construct their own houses and accelerate housing production without government or professional assistance. The role of small-scale building firms is indispensable in conducting the construction. The micro and small firms are indivisible part of the self-help construction process. These firms run with minimum cost with operational flexibility and construct average of 9,000 sq. ft (836 sq. m) floor area per year. Building materials are expensive but available. Widespread utilization of modern building materials and construction equipments are also evident. A number of public and private promotional activities are observed to accelerate self-help construction in the study area. This resulted into quick consolidation of the settlements, which offers rational rental accommodation for the vast tenants of the city. Finally, the study site indicates that the owner builders, together with the small-scale firms, obtained impressive shelter supply performance within the prevailing difficulties.
Notes

1) Dhaka’s housing market is dominated by the informal sector. Small-scale building construction firms, owner-builders and landlords are playing vital role in supplying shelter under the informal sector. Although all of them are producing shelter for the urban dwellers, their individual roles are not adequately treated in the developing world’s housing literature. This paper intends to clarify the individual role of different providers. For example, small firms only remain in construction side. On the other hand, some owner-builders deploy small firms for construction and some others construct own-self. Again, owner-builders not always create shelter for rental purpose. Apart from the owner-builders, landlord households purposely create shelter for rental use. Thus the shelter supply strategy and method are different from one another. Hence, this paper recognizes these three distinct key players and discusses their role separately.


3) Map of the whole study area had been provided in the first part of this series paper. See Kamruzzaman and Ogura (2009, 2).

4) Longitudinal studies are often used to study the development trends of a settlement over a long period of time. It involves repeated observations of same items over a certain periods of time. Longitudinal studies allow researchers to distinguish short from long-term phenomena, such as housing stock. For further reading, please see Tang and Wong (2008).

5) Longitudinal observations are repeated observations, excluding time-invariant unobserved individual differences and observing the temporal order of events at the individual scale.

6) Degree of legality may be the main criterion to define informal and semi-formal builders. Studies in Dhaka often use informal builders to denote both illegal and service deficient housing providers. As well, semi-formal sectors are those who build queasy-legal housing with inadequate services. Land title, legal tenure, building by-laws and services are the individual subset of ‘degree of legality’ upon which settlements may be classified as formal, semi-formal and informal.

7) Skilled employees are those who posses particular expertise in building trade. For example, ‘master masons’ are skilled employees in small construction firms.

8) Financial management is discussed in the third part of this paper. Land supply issues are discussed in the first part of this paper. Thus these two issues are omitted in this section.

9) In the past, people used to mix concrete manually; daily labors were engaged to break stones to make stone chips and use bamboo-ladder to cast concrete in elevated location. Now a day, all these construction process and equipments are entirely replaced by modern construction equipments. For example; mechanical concrete mixer is used for producing concrete mix, stone crasher is used to make stone chips, and mobile cranes are used for casting roofs. All these are the examples of modern construction equipments.

10) Temporary: non-permanent materials and form (Photo 1); Semi-permanent: includes some permanent construction combined with temporary (Photo 2, bottom); Developing: a dwelling mainly in permanent but under construction (Photo 2, top); Completing: an apartment that has already completed at least two dwelling units, out of which one is for renting.

11) Floor tiles, concrete hollow blocks and ceramic bricks are the examples of modern construction materials. In the past, people used to make ordinary cement finish for the floors and ordinary bricks for the walls, which may not be treated as modern building materials. Bamboo and thatching materials are the examples of temporary building materials. Please see Kamruzzaman and Ogura (2009, 2) for further reading.

References


和文要約

ダッカ市内における都市住居は小規模個人家主により次第建設計画形式で建設された賃貸住宅が多くを占めている。本研究は市内の典型的中低層住宅地区における事例を対象として、これらの住宅建て替えに下する工事管理に着目し、建設過程での施工運営の融通性及びコスト削減における小規模施工会社とその施主である家主の果たす主な役割の特色について述べている。また、ここでは現在の助建設に用いられる工業化生産材料や建設機材の導入にも触れ、家主が次第に建設技術を修得して自給自足住宅を推進する事により住宅の完成と住宅供給に大きく寄与している状況も明らかにした。

（2006年6月10日原稿提出，2008年10月26日採用決定）