

# An Overview of Affordable Housing in Bangladesh

Md. Akhter Hossain Sarker Rubaiyet Hafiza Hasan Shahriyer\*  
Housing and Building Research Institute (HBRI), Dhaka-1216, Bangladesh

## Abstract

A secured household is the base of a contented life and decent housing for all is the foundation of a good society. The current supreme challenge for the modern civilization is to confirm affordable housing for. Providing housing for all is the substantial issue for ensuring sustainable urban and rural development. Bangladesh is most densely populated country in the world. Within its 147,570km<sup>2</sup> of area, in both rural and urban areas, unplanned housing is apparently creating extra pressure and making an adverse impact on the affordability of safe accommodation. This paper scrutinizes the existing housing affordability of the people comprising all-income group of the country. This paper will highlight some techniques and measures coming out from extensive research and study towards ensuring affordable and sustainable accommodation.

**Keywords:** Sustainability, affordable, housing, ferro-cement, low cost.

**DOI:** 10.7176/CER/11-11-02

**Publication date:** December 31<sup>st</sup> 2019

## 1. Introduction

The Constitution of Bangladesh recognizes Housing as one of the three basic primary needs of man and women, is as important as food and clothing and Bangladesh National Housing policy, 1993 accepted the fact. Housing provides shelter, safety and a sense of belonging to the owner. An adequate shelter must have security of tenure, protection from elements of nature, utility services such as safe drinking water, sanitation and other essential services; it needs to be affordable and accessible. At present, housing is considered to be central to survival and human dignity that are universally accepted. Housing status is often a major indicator for economic and social base for development status of the individual and family (Haque, 2007). However, housing affordability is a major policy concern all over the world, especially in developing countries. Bangladesh, one of the developing countries with rapid growth, has been suffering from acute housing affordability for a long time (Sarkar, 2014).

In 2011, the Bangladesh Bureau of Statistics conducted a national census in Bangladesh, which provided a provisional estimate of the total population of the country as 142,319,000 (Statistics, 2011). However, the population of the country has increased in a rapid growth. Within its 147,570 km<sup>2</sup> of area, with the current population of Bangladesh, which is 164,670,000 (United Nations, 2017) establishment of housing facilities for whole has been severely hampered. The High quality of living, availability of jobs, attract the rural population to the urban sides of the country. Dhaka, the capital and primate city of Bangladesh, with a density of 8,229 people per square kilometer within a total area of 1,463 square kilometers (Bangladesh Bureau of Statistics, 2015) is one of the fast growing mega-cities in the world. The city receives an estimated 300,000 to 400,000 new migrants, mostly rural people annually (Mohit, 2012). There is an incredible pressure of influx of people in Dhaka city.

Present movement of urban migration is driven by rural poverty, river erosion and natural calamities forcing them to migrate to Dhaka city in search of better livelihoods. The existing infrastructure facilities developed in Dhaka megacity cannot cope with the minimum living requirements of this poor working class floating population (Shams, Mahruf, Shohel, & Ahsan, 2014). These poor migrants live in the worst possible situation in terms of housing and security of their lives. Urban development in this country has been based on subsidized allocation of land for upper and middle class use. Access even to minimal protection has been high-priced for most of the poor. The poor migrants who usually find job in the low-paid informal sector do not have enough income to pay for the housing in the formal sector (Nawaz, 2004).

On the other hand, with the increase in demand of housing the cost of construction materials have gone out of the reach of the low and middle income group of individuals. Housing problems has been identified by the Government of Bangladesh (GOB) as one of the important hurdles in improving the housing conditions for middle and lower income households (Loton, 2004). The government is conscious of this crisis and its magnitude. They intend to create a favorable and conducive environment in the country to provide impetus to this sector. The Government's endeavor is to make housing accessible to all citizens of Bangladesh through various measures, incentives, motivation, planning and management. Special housing schemes will be undertaken, both in the public and private sectors, for the low-income groups, the disadvantaged, the destitute and the shelter less poor.

Present movement of urban migration is driven by rural poverty, river erosion and natural calamities forcing them to migrate to Dhaka city in search of better livelihoods. The existing infrastructure facilities developed in Dhaka megacity cannot cope with the minimum living requirements of this poor working class floating population (Shams et al., 2014). These poor migrants live in the worst possible situation in terms of housing and security of their lives. Urban development in this country has been based on subsidized allocation of land for

upper and middle class use. Access even to minimal protection has been high-priced for most of the poor. The poor migrants who usually find job in the low-paid informal sector do not have enough income to pay for the housing in the formal sector (Nawaz, 2004).

On the other hand, with the increase in demand of housing the cost of construction materials have gone out of the reach of the low and middle income group. Housing problems has been identified by the Government of Bangladesh (GOB) as one of the important hurdles in improving the housing conditions for middle and lower income households (Loton, 2004). The government is conscious of this crisis and its magnitude. They intend to create a favorable and conducive environment in the country to provide impetus to this sector. The Government's endeavor is to make housing accessible to all citizens of Bangladesh through various measures, incentives, motivation, planning and management. Special housing schemes will be undertaken, both in the public and private sectors, for the low-income groups, the disadvantaged, the destitute and the shelter less poor (National Housing Policy, 1993).

## 2. Present Housing Conditions in Bangladesh

An adequate shelter should have minimum security of tenure, protection from elements of nature, utility services such as safe drinking water, sanitation and other essential services; it needs to be affordable and accessible. Regrettably a large section of Bangladesh population has no access to adequate housing (Nawaz, 2004). The accommodation situation in Bangladesh has never been satisfactory. According to Bangladesh Grihayon Poristhiti (1991), there are some triggering factors which have influences on the Housing Condition:

- Population growth, mainly growth of under privilege people
- Natural calamity
- Required land for housing
- Infrastructure for housing
- Financial support
- Required available housing materials
- Housing technology, technical personals and skilled labor
- Housing management and institutional support, and participation of citizen
- Policies and Law of Housing

The majority of dwelling units are temporary, unsafe and overcrowded. The ancillary physical, social and economic facilities and services essential for the development of healthy and harmonious community life are highly inadequate both in the urban and rural areas (Jamil & Ahmad, 2006). Over two million people in the capital city of Dhaka either live in slums or are without any proper shelter. City migration is mainly due to better service opportunities particularly in the ready-made garments sector and educational opportunities. While most people migrate for economic reasons, more than 26% leave for the cities because of natural disasters, river erosion and recurrent flooding. Accommodation scarcity in 1991 was estimated to be about 3.10 million units which now have surpass the 5 million units mark predicted for the year 2000. This country will have to build at least 300,000 housing units a year to keep up with the population surge. Survey done by Ministry of Housing on the housing needs revealed that some six million accommodation units have to be built in Bangladesh to meet the deficit. The survey suggested that the government undertake a massive housing program (Nawaz, 2004). The problems of housing of Dhaka city as well as in other metropolitan areas of Bangladesh are very acute. Dhaka city requires between 55,000 to 83,000 accommodation units each year, whereas all public and private efforts together can only produce 25,000 housing units a year. The percentage of people living in slums in the urban area of the country is 6.33% percent. Among them 43.60 percent floating population lives in Dhaka (Bangladesh Bureau of Statistics, 2015). A similar situation prevails in other cities of Bangladesh. The household stock of the metropolitans and municipalities are about 5.0 million and the deficit is around 8.5 million (Haque, 2007). Two major constraints for the housing development in Dhaka's are: scarcity of land and high construction cost. The rise in construction cost with the building height is prominent where construction is labor intensive. The inclusion of the costs of developed land, render such housing solutions inaccessible even for HHs well above the median income (Shams et al., 2014). A commonly accepted guideline for housing affordability is a housing cost that does not exceed 30% of a household's gross income. When the monthly carrying costs of a home exceeds 30% – 35% of household income, then the housing is considered unaffordable for that household. On the other hand, the classifications of income group people in Bangladesh are mainly three types such as higher, middle and lower income group. The income groups of Bangladesh are defined from the perspective of monthly income as follow: low-income, \$156.28 or less, lower middle-income TK \$156.29–296.00, middle- middle income \$296.01–592.01, upper middle-income \$592.02–1184.04 and high-income \$1184.05 or more. In Bangladesh, 50% of the people are middle income group people (Statistics, 2011). High land prices have excluded the poor from ownership of land and housing. These prices make it impossible for the poor to purchase land in the open market within the city area (Shams et al., 2014).

### **3. Existing Housing policy ensuring affordability**

In this circumstance, the Government of Bangladesh has taken several initiatives to improve the housing condition of the country. With the promise to provide accommodation for all, National Housing Policy 2016 has been published. The Government has adopted a program titled "one house and one farm". In addition to solving accommodation issue this program aims to address the issue of food security and employment. Despite enormous constraints and challenges, Bangladesh has made remarkable strides in a host of areas including food production, safety net programs, rural infrastructure, credit provision, primary education, child immunization, family planning, sanitation, drinking water provision etc. (Ministry of Housing and Public Works, September 2016). The Government of Bangladesh considers housing as an inseparable part of human settlement, cultural and economic advancement. The government took the initiative to prepare Housing Policy of Bangladesh in the light of the recommendations and guidelines declared in the First Human Settlement Summit, Vancouver Canada, 1976; Second Human Settlement Summit 1996, Istanbul, Turkey and recommendations from series of seminars organized during World Habitat Day since its inception in 1986 by United Nation.

In the United Nations Conference on Environment and Development (UNCED), also known as the Rio de Janeiro Earth Summit, 1992, United Nation strongly appealed to governments across the globe to implement the recommendations and declarations related to development of human settlements. In the context of guidelines and planning objectives mentioned above, the "National Housing Policy 1993" was approved in the Ministerial Meeting on 27th September, 1993. The "National Housing Policy 1993" was revised and updated in 1999. "National Housing Policy 2016" has been prepared with the view to address the increase of population, decrease of per capita land, deterioration of environment and prevailing global context. In this respect, "National Housing Policy 1993" has been changed, elaborated, modified, and revised to make it more pertinent and contextual.

House is not only a shelter, it has a multi-dimensional significance, it provides contentment and security to people, and it is an infrastructural component which demonstrates the social status of people. It has certain market value. This concerned policy is an indicator of socio-economic stability of the country. This policy is equitably applicable to all urban and rural areas of the country and the government is gradually adopting the supporting role in housing development under the purview of this policy.

Government will assess circumstantial consequences during the execution of housing development measures and will play a dynamic role to overcome the related procedural constraints. In this context, the role of individuals and groups are as decision makers and developers, whereas the government as provider of general guidelines, supports and opportunities.

### **4. Housing and Building Research Institute (HBRI) Working With Housing Policy and Housing Affordability**

Housing and Building Research Institute (HBRI), which is the only national research institute to conduct researches on low cost reasonable building material in terms of decreasing the cost of construction in Bangladesh. Honorable Prime Minister provided some instructions to Housing and Building Research Institute (HBRI). During her visit on 28th December 2014 at Ministry of Housing and Public Works, she instructed the followings

- Take mass initiative to disseminate the building materials developed by HBRI.
- Initiate proper planning to use the products developed by HBRI in appropriate places.
- Introduce Ferro-cement technology in shelter projects and rural housing projects.
- Take initiative to develop hollow block using river dredged soil.
- Take initiative to develop eco-friendly block using clay soil from river dredging

Housing and Building Research Institute focuses on bringing innovation including alternatives to traditional bricks with a target of achieving zero use of agricultural top soil for brick production, and standardization of construction materials through research. Special emphasis are given for extension services to disseminate newly developed technologies and building materials which will be agriculture and environment friendly, disaster resilient and affordable. It has updated the Bangladesh National Building Code (BNBC) and on a pilot basis steps will be taken for construction of 75 low cost multistoried residential building at different villages during the 7th 5 year plan period. Among the targets of SDG's, the 11th goal is, by 2020, substantially increase number of cities and human settlement, adopting and implementing integrating policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for disaster risk reduction 2015 to 2030. In response to the aforesaid target, HBRI undertake initiatives to develop alternative Building Materials aiming to reduce the use of agricultural top soil. HBRI took the projects to fulfill SDG's target that also should be satisfied affordable home requirements. Now, HBRI has been developing some alternative building materials that coincide with the aforesaid projects, taking into consideration affordability, fire-resistive properties and earthquake resiliency. Most of these materials replace the use of traditional bricks which consume agricultural top soil.

#### 4.1 Adaptation of Affordable and Sustainable building Materials and Construction techniques

The customary building construction trend in Bangladesh usually focuses on the use of burnt clay bricks for the infill and RCC frame structures which are heavy. In a broader perspective, they prove to be economically unfeasible. It has become a topic of concern to utilize more lightweight materials in any construction, to make the process more cost efficient by reducing the load of the structure.

On the other hand, development and construction of lightweight pre-fabricated blocks and structural elements is a popular trend now a day in construction industry all over the world. In this regard, Housing and Building Research Institute is working towards inventing more cost effective construction techniques such as sand cement hollow block, compressed stabilized sand block, thermal block, coconut coir board and ferrocement technology (FC sandwich panel wall, pocket footing, sand cement pavement block, cast in-situ pile, cast in-situ column, cast in-situ beam, precast floor, cast-in-situ tiles, precast folded plate, louver, door frame, pile, hollow column, high and low benches, outdoor sitting, dustbin and flower pot)

##### 4.1.1 Interlocking: Compressed Stabilized Earth Block (CSEB)

To establish the interlocking CSEB bricks in wall construction, HBRI has taken initiatives to complete a one storied building within an area of about 30m<sup>2</sup>. The successful implication of interlocking bricks can be proved to be an exceptional substitute to burnt clay bricks and can be easily made by using local available materials (Figure 1)



Figure 1: Model house with interlocking blocks

##### 4.1.2 Ferrocement Technology

A five story model house is built using alternative building materials innovated by HBRI. Not a single burnt brick is used in this building. The model house has been designed with a RCC structure with fixed service zones, leaving the inner room arrangements on the user's choice. Ground floor has been kept free for multipurpose activities. Slabs, walls, doors & window frames, staircase and louvers are designed with Ferro cement technology.

Complete ferro-cement technology is used in the slab of the building instead of conventional RCC slab. The use of FC channel reduces the weight of the slab. Moreover, the process also abates overall construction cost about 30%-35% as well. On the other hand the technology is labor intensive which may create job opportunities and can contribute to reduce unemployment problem of our country. Ferro-cement 3D panel along with sandwich technologies are used in the walls

as well (Figure 2)



Figure 2: 5-Storey Rural House

##### 4.1.3 Ferrocement Sandwich Panel

A pilot project has been conducted on application of Ferro-cement Sandwich in community kitchen and toilet (Figure 3).



Figure 3: Display Centre (left) and Community Kitchen with Toilet by using FC Sandwich Panel (right)

#### 4.1.4 Thermal Block

Similar technology is used in the HBRI display center (Figure 3). In the partition wall, ferro-cement sandwich panel and 3D panel are used but thermal block is used in the outer wall, Ferro-cement Folded plate is used in the roof of the building. This display center is a two storied building.

#### 4.2. Other Affordable Materials Used by Housing and Building Research Institute



Figure 4: Community Toilet and Toilet (left) and Training Centre (right)

##### 4.2.1 3D Panel

Unlike concrete block, the 3D panel provides the insulation and reinforcement strength to concrete which makes it acceptable for residential or commercial construction (3D Panel). Another community kitchen and toilet has been built in the HBRI premise with 3D Panel (Figure 4)

Special Feature of 3D Panel

- Total thickness of the concrete (water:cement:sand=0.45:1:3) on interior and exterior faces = 25mm
- Sylhet Sand having F.M 2.2- 2.6 is used as fine aggregate.
- Woven wire mesh has been used.
- Thickness of expanded polystyrene sheet (density-15kg/m<sup>3</sup>)= 56.25mm
- Total finishing thickness= 100mm

The monolithic structure of 3D panel enables it to withstand earthquakes, hurricanes and typhoons. Construction and characteristics of 3D Panel is similar to Ferro-cement sandwich panel. Relatively thick mesh is used here so that it can be used as load bearing wall. In this type, mortar layer is thicker and that is why it can also be used as roof slab.

##### 4.2.1 Cellular Lightweight Concrete (CLC)

Different trainings and workshops, organized by HBRI, is held in training center (Figure 4). It is a two storied building having floor are 744m<sup>2</sup>. Special Features of Training Centre are as follows:

Technology uses

- Foundation –RCC
- Beam & Column –RCC
- Floor & Roof – Ferro-cement Channel
- Ground Floor – Soil-Cement Stabilized
- Wall – CLC Block, sandwich Panel and Thermal block
- Floor Tiles –Ferro-cement
- Plinth Area – 375sqm.

#### 5. Conclusion

Bangladesh has recently been upgraded from low income country (LIC) to lower-middle income country (LMIC) as per the World Bank's classification in 2014. Per capita income of Bangladesh finally rose to US\$1,316 in the last fiscal year, up from provisional estimate of \$1,314. According to the World Bank criteria, Bangladesh will be recognized as a middle-income nation if it achieves at least an average per capita income of \$1,045 for three consecutive years. Per capita income was \$1,190 in FY14 and \$1,154 in FY13. With high population growth the challenge of housing affordability is not new. Affordable housing means when monthly housing cost is in between 30% of total monthly earnings. Present housing system exceeds this limit for the people willing to build or rent a house for them. High construction price as well as high rate of building materials exacerbates the situation. However, the conventional brick production process damages the agricultural land, emits greenhouse gases as well as threatens the food security of the country. To keep up the pace with the modern propensity development of lightweight, cost effective as well as enduring materials for future construction has turned out to

be a requirement for the construction system of Bangladesh. In this circumstances, Housing and Building Research Institute, the only government research institute, is working for the development of alternative, cost effective, environment friendly and disaster resilient building materials and construction techniques. HBRI promotes the motto of moving towards alternative materials and construction techniques, which can promote more sustainable and affordable housing.

### References

- Bangladesh Bureau of Statistics, M. o. P. (2015). Census of Slum Areas and Floating Population 2014: Bangladesh Bureau of Statistics (BBS) Dhaka, Bangladesh.
- Haque, M. (2007). Shelter Design and Development–Bangladesh Perspective: In search of Sustainable Shelter for the Urban Poor. *Dhaka: MH&PW.(surfing from internet)*.
- Jamil, G. M. H., & Ahmad, M. (2006). Housing for low income people in Bangladesh: Problems and prospects. *The Cost and Management*, 34(5), 25-33.
- Loton, S. H. (2004). Low-Income Communities: Facing the problems of adequate housing in Bangladesh agenda: Emerging issues. *Center for Urban and Community studies, university of Toronto, Ontario*.
- Ministry of Housing and Public Works, G. o. t. P. s. R. o. B. (September 2016). Bangladesh Country Report HABITAT III.
- Mohit, M. A. (2012). Bastee settlements of Dhaka City, Bangladesh: a review of policy approaches and challenges ahead. *Procedia-Social and Behavioral Sciences*, 36, 611-622.
- Nawaz, R. (2004). *Right to shelter: Bangladesh*. Paper presented at the International Conference–Adequate & Affordable Housing for All, Toronto.
- Sarkar, M. (2014). Urban Housing Sector in Bangladesh: A Law and Policy Review in the Context of Affordable Housing for the Low- and Middle-Income Households in Dhaka. .
- Shams, S., Mahruf, M., Shohel, C., & Ahsan, A. (2014). Housing problems for middle and low income people in Bangladesh: Challenges of Dhaka Megacity. *Environment and Urbanization Asia*, 5(1), 175-184.
- Statistics, B. B. o. (2011). Bangladesh population and housing census 2011: Author Dhaka.
- United Nations, D. o. E. a. S., Population Division. (2017). World Population Prospects: The 2017 Revision, Key Findings and Advance Tables”.