

# Affordable Housing: Reality or Myth

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## Abstract

**Objectives:** The concept of affordable housing is new in India and still not clearly defined. There are so many myths prevailing about this concept, so there is need to define this concept in Indian context. At present the scope of affordable housing is limited to only construction cost of housing but there is need to investigate the affordability in its operation cost as well maintenance cost. **Methods/Analysis:** The concept of affordability is defined in the context of initial cost of house, its operation cost and maintenance cost as well its location from the work place of owners. The various myths prevailing in the name of affordable housing among various stake holders have also been discussed. It has also been discussed to reduce the cost of housing through various parameters such as design approach, construction management and appropriate building materials and technology. **Findings:** The affordable housing is not only targeting to poor people but it also includes the middle income group having income up to 10 lacs per annum. It has been also found out that affordable housing is not similar to low cost housing, the difference lies in its approach. The major focus of low cost housing is to reduce the cost by use of low end technology and low cost materials even with compromise in facilities while affordable housing is not limited to this concept, it can afford to use high end technology and high tech materials too. The construction cost of affordable housing could be reduced through compact planning, sharing of the common facilities among various housing, sharing of the services and structure between the units of the same housing, sustainable building materials, appropriate technology and construction management. The operation cost of housing could be reduced through design process such as orientation of blocks and units, building envelope design, landscaping, road and parking etc. **Applications:** The role of architectural design process is most important in reducing the operational cost of affordable housing along with construction cost to certain extent.

**Keywords:** Appropriate Technology, Construction Management, Design Approach, Low Cost, Operation Cost

## 1. Introduction

The population of India has grown manifold in recent years, 3.4 times from 1951 to 2011 and the urban population has grown up even much faster rate i.e. 6 times from 62.4 million in 1951 to 377.1 millions in 2011. In recent years, the overall population of country has increased 17.64% while urban population increased by 31.8%. The figures are clearly indicating rapid urbanization in India. Due to rapid urbanization of country, every city needs extra housing stocks to fulfill the needs of its citizen. The central government as

well state governments has done its efforts to provide the housing to all under its various schemes such as "Housing and Habitat Policy", National Urban Housing and Habitat Policy (NUHHP) and Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Interest Subsidy Scheme for Urban Poor (ISHUP). These schemes have been implemented but were not sufficient to cater the needs of people. The Government of India has decided to launch new scheme "National Urban Rental Housing Policy". This scheme the government is trying to provide housing to all through rental housing instead of ownership of housing<sup>1</sup>.

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The above efforts of government has are not so significant as compared to the need of housing for all. The governments have limited resources and dependency on government for housing to all may be not realistic solution. There is need to work out the public private partnerships, the support of NGO's etc. for fulfilling the present. The government should play a role of regulator rather than provider. The price escalation of housing in past decade was due speculation by investors and it has resultant into very harmful for end users<sup>2</sup>.

The government can play role in regulating the price of housing which are in range of affordable housing and it can also play role by giving intensive to builders in terms of more FAR, low land price for affordable housing. The government and financial institutes has major role to pay for providing finances to the owners of the affordable housing at lower interest rate and easy processing.

The other stake holders such as builders, architects, engineers, project manager, material manufactures have also their specific role to play in achieving the objectives of affordable housing.

The scope of paper is limited to only the contribution of architects in making housing affordable to all.

## 2. The Concept of Affordable Housing

There are very definitions given by various experts to define the affordable housing but still its definition is not very clear. The concept of affordability becomes so popular in India as well all over world that people have started the ventures in this area already even without caring of clarity of the concept. The builders have started the exploration of the concept already and in future also seeing the business opportunity in this particular segment.

As per various definitions available, one of the definition states that affordability is directly related to the paying capacity of owners and in India around 40% gross income spent on housing could be considered as affordable. The fluctuation in the interest rate might lead to serious problem for owner. So the possibility of varied interest rates should also be seen while allocating the 40% gross income so that owner should not face problem in future<sup>2</sup>.

There are three categories included in affordable housing i.e. EWS, LIG, MIG and their income criteria's and size of dwelling are also defined in Table1.

**Table 1.** Income and size of affordable housing

	Income	Size of dwelling units	Affordability
EWS	< 1.5 lakhs per annum	Up to 300 sqft area	EMI to monthly income : 30% to 40%
LIG	INR 1.5 lakhs to 3.00 lakhs per annum	300 -600 sqft	House price to annual income ration: less than 5 :1
MIG	INR 3.00 lakhs to 10 lakhs	600 – 1200 sqft	(Task force headed by Deepak Parekh)

Source: KPMG

The location of affordable housing is also very important role to play because the people in affordable housing also needs jobs to earn their livelihood, so the efforts should be made that affordable housings sites should not exceed beyond 20 km of the major workplaces of city and also the sites should be well connected to the major public transportation. The affordable housing should also be supported by other Infrastructure needs of people like school, hospitals, sanitation etc<sup>3</sup>.

The concept of affordability normally restricted to the cost of house at the time of possession to owner. If the housing is not designed properly the operation cost in terms of energy consumption, maintenance etc. may become very high and the owner might not be able to afford these after possession of house. The affordability concept should able to address this issue too<sup>4</sup>.

## 3. Myth of Affordable Housing

There are so many myths prevailing in society about the affordable housing due to lack of proper knowledge.

The first myth is that affordable housing is for low income group people, as discussed earlier that it includes the people:

Who are having annual income up to 10 lakhs.

The second myth is that affordable housing is low cost housing; the low cost housing is done by using low cost techniques and low cost materials while the affordable housing has no such restriction.

The third myth is that affordable housing will be free to low income group people by government. The earlier scheme by Government was having such provision to large extent for low income group people but at present the affordable housing concept has widened to middle

income group people too. Recent scheme launched by government indicates that Government will only provide the housing on rental scheme and will not give the house free of cost.

## 4. Affordable Housing through Design Approach

The design of housing is very important in deciding the cost effectiveness of housing. There are many parameters of design such as orientation, building configuration and building envelop design, circulation areas, sharing of facilities etc. may not have direct impact on the cost effectiveness but certainly going to have indirect effect to the cost effectiveness. As discussed earlier that operational cost is also important in deciding the affordability of housing so there is need to analyze the housing for life cycle assessment i.e. pre construction, construction stage and post construction stage. The following design factors are responsible to indirectly the cost effectiveness to housing.

### 4.1 Orientation of Blocks and Units

The energy consumption of building is directly related to its orientation. The energy consumption may not be directly related to cost of house but surely it will have major contribution in operation cost of building. As discussed earlier that operation cost should be taken care in case of affordable housing, so orientation is playing major role in operation cost of building and indirectly affecting the affordability to the user. The housing design always composed of different blocks and it is not possible to orient all blocks in the same direction due to other factors such as site, building byelaws etc. The units will face different direction of orientation and all units' energy consumption will be different. The effort of architect should be to place blocks in such a way to orient max units in best direction. It can save initial cost of housing as well operation cost. To reduce the energy consumption, the shading devices, insulation on walls etc. are required and if max units are facing in best orientation then this cost can be reduced automatically, so best orientation can save cost too.

The units facing NW-SE direction (which considered as best orientation in composite climate like Delhi) will be having lesser cost in its shading device, insulation of

wall etc. as compared to units facing the orientation E-W direction ( worst direction)5.

### 4.2 Compactness in Planning

The compactness could be achieved by various means such as going for vertical instead of horizontal, choosing shape of building which are compact e.g. cube. The compactness has so many advantages. The first advantage of compactness is that surface area exposed to outside be less, so in composite climate like Delhi it is easy to reduce the energy consumption. The second advantage of compact planning is that the circulation areas could be reduced and better connectivity could be achieved. The compactness will also result in more open space for landscaping or different activities on the ground.

Through compact planning it is possible to reduce the energy consumption thus reducing the operation cost and through reducing the circulation area, super built area of unit could be reduce thus directly reducing the cost of building.

### 4.3 Building Envelope Design

The building envelope design is very important to reduce the energy consumption within building and hence reduction in operation cost of building. The building envelope design consist of fenestration size, location of fenestration, shading of fenestration, fenestration materials, different insulating materials for walls, roofing etc. The building envelope should be designed by the help of simulation model and an appropriate building design envelope will save energy consumption of buildings and thus saving the operation cost of building. The building envelop through simulation model can reduce the initial cost of building too due to accuracy in working out all building envelope features.

### 4.4 Structure and Services

Structure and services are major component in cost of housing. The structural grid in housing design is not easy due to different sizes of different activities in unit and also the grid for parking in basement differ to the grid for housing units. The structural grid should be design not only to fulfill the functional requirements of housing but also should take care of economical factors.

The planning should be done in such a fashion so that service ducts should be minimized by sharing the

service ducts for various toilets, kitchen etc. of the same unit or with other units. This will reduce the initial cost of housing as well maintenance cost too in its operation.

#### 4.5 Roads and Parking

The area of roads should be minimized as per site planning principles. The roads for fire tender should not be made of bitumen or concrete but should be dealt with gravel or green grass to reduce the cost of housing project and this will also help in achieving sustainability. Sometimes the same peripheral road of housing for vehicular access could act as fire tender road to reduce the cost of housing.

The parking area should also be design in such a fashion that only part of moving wheel should be made of bitumen or concrete and the rest part can be dealt simple gravel or green to reduce the cost<sup>5</sup>.

#### 4.6 Landscaping

The landscaping is very important in housing project due to its environmental value but it can also contribute to saving the energy consumption within building. The landscape elements create evaporation which helps to create microclimate condition and these also create shades as well shadow on the ground surface as well on buildings to reduce the energy consumption.

The affordable housing normally considered very dense and spaces for landscaping are hardly left in these type of housing ultimately sacrificing the quality of living of the occupants<sup>5</sup>.

### 5. Common Areas/Shared Facilities

The common facilities such as school area, community hall should be shared among the other such housing complexes so that to reduce the cost of these component unnecessary. The utilization of these areas may be worked out by timing for different users e.g. school can work on two shifts and the same school space could be used for community facility in evening.

The common wall concept should be implemented while designing such housing to avoid unnecessary cost in creating two walls.

### 6. Affordable Housing through Construction Management

The construction management is another tool to save the cost of housing. Construction management involves utilization of resources such as materials, labor and tools of construction to its fullest through proper planning of activities on site before execution and also the actual construction on site. Affordable housing does not mean poor quality of construction at low cost. The project management also ensures the quality of material, skilled labor, also good tools for construction to achieve good quality of construction.

The most important aspect of the project management is that it saves time of construction of project. This has dual benefits, the first one is that more no. of such housing projects could be possible in a given period and the second one is that it saves cost of the project because most of the projects are financed from financial institutes, saving in time means saving in interest rate of the financed project.

### 7. Affordable Housing by using Appropriate Technologies and Building Materials

The concept of affordable housing and low cost housing differs to large extent in using building materials and technologies. Low cost housing normally low storey building which does not requires high end technology as well materials while the affordable housing have no such restriction and bound to happen multistoried. Few construction materials and technologies used in affordable housing are given below only to showcase the benefits of such material in saving cost as well other benefits<sup>6</sup>.

#### 7.1 GFRG (Glass Fiber Reinforced Gypsum) Building Designs

Glass fiber reinforced Gypsum panels are used for walls as well in roofing; these panels are normally 124 mm thick as compared to conventional bricks of 230 mm thus saving a lot of built-up area. The construction of panels on site is very fast thus saving in time of the project and ultimately

saving in the cost of project. The material is light weight as compared to bricks so it reduces the structural loading thus reducing the cost of project. The GRGG panel installation is shown in Figure 1. The finished of such panel is so good that even do not need nay plaster. The cost of panel is Rs. 1000/- per sq. m .



Figure 1. GFRG panel installation.

## 7.2 Panel Building System using Steel Mesh

### 7.2.1 Polystyrene Core and Chipping Concrete

Panel building system is used in load bearing walls and can be used in seismic prone area due to strength and light weightness. These panels are also having thermal insulation properties. The panel building system is shown in Figure 2. The panel consists of foam polystyrene plate in middle and on the both side steel mesh is added for protection. The chipped concreted is filled later in these steel mesh. These are lightweight, durable and having insulation properties, so these panels could act as saving energy consumpt as well reducing the structural cost of building<sup>7</sup>.



Figure 2. Panel building system installation

## 6.3 Pre-stressed Precast Prefab Technology using Hollow Core Slab, Beams, Columns, Solid Walls, Stairs, etc.

These panels are used in multistoried projects and these panels are pre-stressed, precast in the factory itself. These panels have whole assembly of beams, columns, solid walls, slabs etc. and assembled on site as shown in Figure 3. These slabs used in this system are hollow core floor slab, rectangular beams or inverted T-beams are used. The speed of construction using this type of technology is very fast and the all elements are made in factory so quality of material could be ensured<sup>7</sup>.



Figure 3. Precast, pre-stressed and prefab installation.

## 8. Conclusion

The concept of affordable housing differs from low cost housing in its approach; the affordable housing is slight wide area and covering the middle income group people too. In affordable housing the main criteria is the cost effectiveness for various types of users such as Economically Weaker Section (EWS), low income and middle income group.

The cost of house at the time of possession is not only criteria but the operation cost is also important, so the holistic view is important for affordable housing. The affordable housing should also meet the requirement of sustainability also to large extent. The affordable housing should not only have the cost effectiveness and sustainability but should also have unique built environment for quality of living to its user. The concept of affordable housing is new to India but its future looks very bright due to many factors such as it is addressing to the middle class people, it is also addressing to cost effectiveness without compromising the quality of living.

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