

AFFORDABLE HOUSING – A Review

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Abstract- *The need for achieving sustainability in social housing has been widely acknowledged in the literature and society in general. Housing problems occur both in rich and poor communities across the planet. There is an enormous shortage of housing in India, mainly due to the fact that the urban population is increasing at a fast pace. Nearly 28% of Indians live in cities and urban areas, which is double compared to the rate of urbanization back in 1947. Given the magnitude of the present housing shortage which we are facing and economical barriers of both state and central government, it is clear that efforts of public sector will not be capable to cope up with the requirement. At present there is plenty of cost-effective technology which can be used for construction of affordable houses at large scales. But due to lack of their technical knowledge, they are still not in use. In future with the increase of their technical aspect, these technologies can be used for mass construction of affordable housing projects in India for the poor and needy.*

Keywords- affordable, sustainable, housing, estimating, costing.

I. INTRODUCTION

In India, housing industry is one of the very best fastest growing sectors. A large population base, progress income level and rapid urbanization leads to growth in this sector. In the Federal structure of the Indian polity, the matters pertaining to the housing and urban development have been assigned by the Constitution of India to the State Governments. Unless, the Union government is responsible for formulation and implementation of social housing schemes. Our section on housing highlights various initiatives and schemes implemented by government for rural, urban and EWS residential housing.

The need for achieving sustainability in social housing has been widely acknowledged in the literature and society in general. The term sustainable social housing (SSH) refers to the ability to adequately meet the housing needs of every household “without compromising the ability to provide for those of the future generations” (Parkin, 2000). In the UK, the sustainable development (SD) agenda is being promoted in the social housing sector by the government housing agencies

– housing authorities and registered social landlords (RSLs) or housing associations (HAs) (Carter and Fortune, 2003). Sustainable social housing provision (SSHP) is, therefore, characterised by First is “goals of increasing the gross density of development at affordable costs (compactness), second is provision for a broad cross-section of people in each precincts and increasing transportation options (diversity), Third is ,mixing residential areas with the commercial and civic, even business areas that serve them (completeness) and the fourth in some cases, allowing for land-use-change over time (flexibility) (Girling, 2010).

Broadly, if we see, the house is not only a place for living, but it also determines our habits and living patterns, it affects our choices for access to education, health related facilities, job opportunities and many other things that are indicators of one’s well being. Providing housing and improving its standard on a large scale, has now become a stumbling block for the government. Affordability is a relative concept as it could mean different things to different people. A “one size fits all” approach will not do justice to define affordability, especially in a country like ours, which is large and diversified. But before framing a policy on affordable housing we need to define it first, what may be affordable for one person might not be for the other person.

II. LITERATURE REVIEW

Ugochukwu and Chioma M. (2015) studied the national housing needs of Nigeria and author also shares the fact that by using locally produced building materials and intermediate technology can help us to reduce the construction cost up to 60%. In Nigeria building material account for more than half of the total housing expenditure which can be overcome by locally available material for construction. Author also talks about the compressed earth blocks (CEBs) a technology which has become very popular in Nigeria in recent times. After proper treatment CEBs gain enough high compressive strength so that they can be used for up to three floor construction. Depending on the situation these blocks can be left unplastered, covered with plaster or can be coated with watered earth. In comparison to contemporary urban houses, houses build using CEBs give a feeling of a cooler interior and the inside temperature is lower compared to many houses build

using concrete blocks. By adoption of above discussed recommendations, housing problem can be successfully tackled successfully.

Shuid (2015) analyzed the changes in housing provision system in Malaysia that have gone through various changes to keep pace with the country's political changes and globalization, promoted by the international agencies such as the World Bank and International Monetary Fund (IMF). The Structure of Housing Provision (SHP) framework was used to analyze the changes of housing provision system in Malaysia since 1970s. Housing provision in Malaysia since 1971 can be divided into four phases, namely Housing the Poor (1971-1985), Market Reform (1986-1997), Slums Clearance (1998-2011), and the State Affordable Housing (2012-till date). The state and market has played an important role in housing provision in Malaysia, as a result more than 1.3 million low cost housing units have been built by both private and public sector from 1971 to 2010 to cope up with the housing problem for poor throughout the country. To meet the need for housing for growing middle class and people's changing lifestyle another 1 million affordable housing units are planned to be built in the next 5 years by 2020, mainly through the state affordable housing programs. At the end of the study author came to a conclusion that, the government affordable housing programs have raised the expectations of the middle class for owning their own house. However the limited availability of land, funding from the governments end and numerous housing programs competing for the same target group constraints its implementation. Also, various affordable housing programs cause confusion among the general public. According to author government should not permanently focus on housing for the middle class, which is available at subsidized rates. In the long run this responsibility should be returned to the private sector.

Sabnani and Patel (2014) focus on the fact that despite possessing qualities which are needed for structural members in tension, Bamboo is still not very popular. Author points out the fact that we urgently need an appropriate Delivery system for mass housing for the poor in our country which can be achieved by using Bamboo as an Alternative Building Material. Author also shares the fact that by efficient management of the housing delivery system, cost can be reduced up to 28%.

Rahman et al. (2014) authors studied the several housing programs which were introduced by the government of Malaysia, however the success of these programs was reduced due to the reported quality problems and defects. Authors main aim was to identify the defects and what caused these defects. A survey was conducted by the authors among 310

residents in affordable housing located in four different regions in the Klang valley, Malaysia. The defects which occurred most commonly were the pipe leakages, total failure of the water supply system, cracking in concrete walls and concrete wall dampness. All this suggests that the use of improved workmanship, use of superior materials, and more customer oriented supervision may reduce the defects.

Mekawy (2014) addresses the fact that affordable housing challenges in Egypt need a direct public support, as markets and market actors would never succeed in delivering decent affordable housing for low and lower middle income group. Applying the partnership approach in affordable housing for low and middle income groups in Egypt is still limited and not effective totally. This can be done through local level partnership schemes, with decentralizing the role of the local government. But this method is still limited and not totally effective. To make this scheme countable and guarantee its success, the national government must come up with a decentralized institutional framework. To make housing more affordable, we can use innovative financial mechanisms that reduce cost and time.

Esruq-Labin et al. (2014) in this paper author explore the proposal for affordable housing measurement with six assessment components, author studies the factors which affect affordable housing. 20 criteria given for affordable housing assessment by Mulliner and Maliene were investigated. Then these criteria were divided into five components and one more component Grow Home was added. Grow Home is an option which can be used as a cost-saving to make houses more affordable. A lower land prices and a smaller house area also decreases the number of workers required for construction thus decreasing the house prices. As a result, the house will become more affordable for the people belonging to lower income groups.

Shinde and Karankal (2013) studied various eco friendly and alternative building materials such as Pozzolona Material (fly ash/slag) as blending material with cement, author found out that upto 35% of suitable fly ash can directly be substituted in place of cement as blending material keeping the structural consideration. It significantly improves the characteristics of resulting concrete in terms of quality and durability. Recycled Steel Reinforcement can save a huge amount of energy and power and also gives the added advantages of not producing the toxic gases or harmful smoke when subjected to elevated temperature. Author also focuses on the use of pre-cast building elements and components as pre-cast components are 85% recyclable, have low carbon-dioxide generation, use less energy, easy to install and cost effective.

Nikam and Attar (2013) examined the one type of bamboo based construction and carried out some experiments, confirming that bamboo construction is a suitable alternative for walling of the low cost housing. Bamboo because of its availability in abundance and due to its qualities such as eco-friendly, regenerative, low cost, etc. can be very useful in the construction of low income houses. From the detailed estimation the author found out that the per square meter cost of bamboo house is one fourth of the R.C. Construction. By performing buckling tests on the bamboo wall panel it was concluded that its average load carrying capacity is 15.99Kn and average maximum displacement was 7.99mm. With the proper technical know how any member of society can purchase bamboo at cheap rates and can improve their living conditions and immediate environment.

Kayode and Olusegun (2013) investigated the factors that are responsible for the persistent housing unaffordability and inadequacy among the low income earners of the Nigeria. It was found out by the author that despite government, public and private promotion low income housing is still a problem in Nigeria. Imported materials, use of high end technology make the cost of housing higher and unaffordable for low income groups. But there are a variety of local building materials that are available in Nigeria, which can be used to make houses which are affordable for low income group, who constitutes the larger population of the country.

Haselau (2013) compared different alternative construction methods for low-cost housing in order to identify the best method regarding cost, time and quality. A questionnaire survey was conducted by the author on how different construction methods can be applied for developing and delivering low cost houses in South Africa. It was found out that there are quite a few alternative construction methods which take less time and are cost effective for building low-cost housing, but the lack of awareness regarding alternative construction methods is a limitation in their application for low-cost housing, but it is difficult to determine the ultimate construction method as each method has its own positives and negative attributes.

Fadairo and Olotuah (2013) author has examined the various materials which can be used for construction that are readily available in abundance in Nigeria. Author further discusses the construction techniques to build affordable house for the urban poor in Nigeria. Author suggests use of Fired clay bricks and Laterite stabilized blocks over conventional bricks to bring down the cost of the affordable house. Author observed that laterite materials have desirable qualities for the construction of affordable houses which also suit the climatic conditions of the Nigeria because of their thermal properties.

Chowdhury and Roy (2013) studied the present work on low-cost and sustainable alternative building materials having advantages in areas such as our country where cost of steel and concrete housing has become very expensive. There are various challenges and stereotypes of using these low-cost and sustainable building materials as a structural components for low cost housing. Author has classified low cost housing materials broadly into natural materials and manmade materials according to the source of the building materials. Natural materials mainly consists of Bamboo, Corrugated Bamboo Roofing Sheet, Life Extended Thatch Roofing, Compressed Earth Block, Non-erodable Mud Plaster, Jute-Coir Composites, Coconut and Wooden Chips Roofing Sheet etc. Manmade materials mainly consists of Fly Ash (Fly Ash bricks), Cement Concrete Hollow Blocks, Rice Husk, Ferro-Cement etc. Authors also point out that depending upon the availability of materials in a particular region, these materials can be selected to cut down the transportation cost as it makes up to approximately 30% of the total construction budget. At the local levels several attempts have been made to use bamboo, mud or natural fibers but it still lacks the scientific precisions and proper techniques to be used precisely. Further there is a need to study on the usage of industrial waste for their better use, all these materials if studied and developed properly hold the key to solve the current housing problem.

Bakhtyar et al. (2013) studied the Malaysian Government's emphasis on housing policy, its provision of adequate, affordable and quality housing for all of its residents. The Malaysian government has urged the private sector to produce LIG Housing at affordable prices. But the problem lies in the fact that urban land has become very costly, labor and material cost affect these types of housing programs. The key for building more and more Low cost houses in Malaysia lies in the fact that a balance is needed between the low income obligations and developer's profit-making.

Alpuche et al. (2013) authors used Energy Plus software to compare the thermal performance of a low-cost housing located in a warm, dry climate, Hermosillo, Sonora (Mexico). Further, an analysis of the effect of the colour exterior finish, represented as a gradual change in the absorption to solar radiation. This stimulation was performed for two conditions of use of low-cost housing, the first condition considered the room without air conditioner and the second considered the air conditioned room. The evaluation of the interior thermal behavior of a low-cost dwelling, by varying the solar absorption coefficients of the building exterior finish was done. The results showed that, in a warm climatic regions with high levels of solar radiations, the use of colours which have lower solar absorption coefficients can significantly reduce the heat gains in the buildings. In the end authors conclude that, to

achieve maximum efficiency in the building located in dry, warm weather, architects and engineers must take into account the design strategies such as formal, functional and technical aspects, using passive and active strategies, which can help us to reduce energy required for interior conditioning.

Rao and Apparao (2012) examined the basic nuances of the financial system of India which provide hindrance in affordable housing projects. The authors recommend greater political priority should be attached to the housing sector, a national housing strategy should be elaborated, housing policies should be implemented by involving international the capability of the ministry responsible for housing should be strengthened, the cooperation between different ministries and stakeholders in the field of urban development, housing and construction should be intensified. The authors also estimated that the overall employment generation in the economy due to investment in housing /construction is eight times the direct employment.

Jain and Paliwal (2012) author focuses on the need to adopt the cost-effective construction methods by using locally available materials or by the up-gradation of the conventional construction technologies and by applying modern construction technique and materials which could lead to economic solutions. As the cost of construction is has gone beyond the limits of affordability for low income groups as well as large section of middle income group. The Author tells about various alternatives which can be used to bring down the cost of the house such as precast walling units using lightweight cellular concrete, Plank & Joist system, hollow block construction, ferrocement roofing elements, RCC channel units, Prefabricated brick panels, Precast RCC solid planks etc. By making use of these technologies approximately 10-30% of savings in the cost can be achieved. Plenty of technological options are available but to use them we need to have an increased understanding of them.

Tam (2011) author did a comparison of construction cost between the traditional and low cost housing technologies, for this an Indian case study was investigated. Construction methods of foundation, walls, roof and lintel were compared. Structural stability, durability, safety and mental satisfaction are the factors that assume top priority during cost reduction. Construction method for walling and roofing were selected for the detailed cost analysis, for comparison between traditional construction and low cost housing technologies. Two case studies were conducted in India and it was found out that about 26.11% and 22.68% of the construction cost, including material and labour cost, can be saved by using the low cost housing technologies compared to traditional methods of construction for walls and roofs respectively.

Ponce (2010) analyzed the role of affordable housing as an element to promote social inclusion. The comparison between some European countries allowed the author to discover some similarities in legal regulation which is aimed at achieving mixed communities, to avoid or reduce urban segregation by compulsory affordable housing projects. In Spain and France, regulations seem to be based on the assumption that urban segregation is a negative phenomenon, which can be prevented by compulsory affordable housing projects. Furthermore, it is the duty of the government to act against economic segregation and in favour of preventing or reducing concentrations of poor households in some urban areas.

Taur and Devi T (2009) studied the various aspects of pre-fabricated building methods for low cost housing by highlighting different techniques of pre-fabrication, and their economical advantages. In any building the foundation, walls, doors and windows, floors and roof are the most important components, by their individual analysis we can improve the speed of construction and can also reduce the cost of construction. The general methods of construction which are considered by the originator are mortar less block walls, prefabricated roofing components like precast RC planks, precast hollow concrete panels, precast concrete/Ferro cement panels. To achieve mass housing, conventional methods have to be replaced, more importantly, there is a need for rational use of materials and resources. Adoption of alternative technology for construction of large scale needs a market guarantee and this can't be established until the product is effective and economical. Partial prefabrication is such an approach towards the above concerned problem of mass and affordable housing under controlled conditions.

Olenik and Cheng (1994) authors examine the housing problem in New Jersey in USA. At present in New Jersey many land development projects including affordable housing projects face independent action from various national and state planning boards and a long list of individual permits which they require from New Jersey Department of Environment Protection and Energy (NJDEPE). The average time it takes for the developer to acquire these necessary approvals is around two years. So if the US is serious about providing affordable housing, then every single aspect of the site development must be reversed, the validity of many environmental regulations must be re-examined and curtail them if necessary in order to provide affordable housing in the quantity that is required to meet the current and future demand of the state of New Jersey.

Bhattacharya (1993) recommends in the context of housing policy, in developing countries that governments must plan for the growing number of urban poor and provide affordable

land, housing and infrastructure. Author also urges the government to modify their housing policies to ensure that policies are implemented at the right time and reach the one in need of it. Author states that about 30% of the urban population still do not have access to minimum shelter, safe drinking water and sanitation. Affordability must be given due consideration before undertaking any housing program.

III. DISCUSSIONS & CONCLUSIONS

Costs obtained of the Affordable House in Plane Region, using affordable housing technology and conventional materials will be compared. The house constructed using conventional method compared to house constructed using cost-effective technology, requires more building materials, more labour and is time consuming.

House constructed using affordable housing technology not only proves to be economical but also, helps us in saving the total time of construction.

In future with the increase of their technical aspect, these technologies can be used for mass construction of affordable housing projects in India for the poor and needy.

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