Affordable Housing : Need of Upcoming Smart Cities

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Abstract

In globalization, idea of smart city is turning into a significant part. Smart city is a urban territory that utilizes various kinds of electronic Internet of things, sensors to gather information and afterward use guidelines earned from data to oversee resources assets and administrations adequately. In Maharashtra, as of now many cities having proposal of smart cities. In such cities population & floating population is growing rapidly. People living in such cities are mostly middle class income group and they are looking for habitat which is affordable. It is becoming a important need for such cities. Various factors like land availability, eco friendly environment, social surroundings, segregation of residential area etc. plays an important role. For proper development it becomes important to analyze all needs of such smart cities.

This paper is focused on key elements of smart cities and also identifying various demands and their depth for habitat for people living in such cities. At the same time, it is also focusing on various needs for requirement of affordable housing in upcoming smart cities. Outcome of this paper will be the guideline for the upcoming smart cities about requirement of affordable housing.

Keywords; *Globalization, smart city, demands, affordable housing, Development*

I. INTRODUCTION

1. Worldwide Summary:

One of the basic need of human is Shelter (Housing) and major requirement of any human being and predominant need of any person or society. Every person needs a private space and that can be achieved from owning a house. Globally around more than one billion people live in slums. In developing countries more 80% of population lives in slums and squatter settlements. In coming 20 years the number of people living in slums may raise from one billion to two billion. City in any country is the focus of social and economic activities, people from rural background move to the urban areas in search of better life and employment. In 1996 a declaration was adopted known as "The United Nations Habitat Agenda". The document outlines clearly commits to provide shelter for all. In 2002 this commitment was strengthen by formulating this agenda as a fully fledged program UN Program.

1.2 Indian Scenario:

India is a Developing country. India is known for its democracy and equality but many people are with low income group and below lower income group. To overcome the need of every citizen housing is a major problem faced by the government. Many schemes and Policies are worked out and proposed for the need of housing. Government of India has started Scheme like PradhanMantriAwasYojana (PMAY) which was before known as Indira AwasYojana (IAY) which aims of providing shelter for all till 2022.

India is urbanizing country facing some problems in rapid growth and one of the key problem is Housing. People living in Slums and lower income group are majorly affected due to housing problem. The demand and shortage of housing is more than 18.78 million homes at the start of which 95% EWS (Economically Weaker Sections) and LIG (Low Income Group) segments. Approximately the

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estimated shortage will be 30 million by 2022. The increasing gap in demand and supply in the supply of affordable housing is major concern for the growth of slums and Informal settlements leading encroachments of lands. Hence it is important for the Government to concentrate on Policy making and programmes for Affordable Housing for The Poor and needy people.

The Government of India is stepping up to the for PPP Public– private Partnerships to conquer the interest of Affordable Housing. The Government of India has additionally propelled SMART CITIES MISSION on 25th June 2015. The significant goals behind this strategy are to give conventional personal satisfaction to the citizens, clean sustainable conditions and give center framework in the urban communities. Affordable Housing is one of the significant needs of the upcoming Smart Cities. Out of the 100 proposed Smart cities all over the nation, Seven Cities of Maharashtra were chosen for Smart City Mission. In first round Pune and Solapur were chosen. In second round Thane, Nashik, Nagpur and Aurangabad were selected and PimpriChinchwad in third place.

1.3 Maharashtra's Scenario:

Maharashtra state is concerned about the total demand and total supply of the housing and its significance. This causes an abnormal state of housing deficiency in the state. Because of the rising ascent in cost of structure materials the housing has turned out to be absolutely inaccessible to many. Presently, the cost of structure materials alone adds to 60-70 percent of the expense of development. Cities like Nashik and Solapur are having an potential to be the ideal smart cities of Maharashtra, India both the cities have their own peculiarity individually and to avoid future problems of housing sector, growing slums etc there is a need of affordable housing.

1.4 Smart City Mission and Concept

There is no inside and out recognized importance of a Smart city. It suggests different things to different people. The conceptualization of Smart City, thus, contrasts from city to city and country to country, dependent upon the level of progress, preparation to change and change, resources and desires of the city occupants.

Smart Cities Mission of the Indian Government is a prominent, new movement. It is intended to set models that can be duplicated both inside and outside the Smart City, catalyzing the making of comparable Smart Cities in different districts and parts of the nation.(India, 2018)

The center framework components in a smart city would include: The core infrastructure elements in a smart city would include:

• Sample water supply
• Guaranteed electricity supply
• Proper Management of Solid Waste
• Good Public Transport
• Affordable Housing for the Poor Section
• Growth of IT Sector
• Good Governance and Digitalization
• Environment with Sustainable Growth
• Women And Children's Safety
• Good Health and Security

About 98 cities from India are been selected from different states of India

Major cities like Pune, Indore, Hyderabad, Jaipur, Agra, Chennai, Thane, Solapur, Kohima, Amritsar etc are been shortlisted for the Smart Cities Mission in 4 Phase System.

If we Study the basic proposals of smart cities mission we can clearly see that Affordable housing is one of the major concern and requirements of this mission.

1.5 Affordable Housing:

Affordable housing means the housing units which are affordable to the lower income groups and sections of society to buy or to live in. Affordable housing can be achieved through the Appropriate Design Strategies, Proper management skills and techniques done by the Architects before starting the project so engineers and contractors can get idea how they to set the approach for the Affordable Housing. Affordable housing does not mean affordability of the house for the buyer but it also means the Construction, maintenance, operational cost. Construction cost can be controlled by the Time, Material and Labour Management and must also affordable to the developer or Government with the help some new construction techniques and materials operational cost can be controlled by which buyer will be satisfied.

Affordable housing must be affordable in both ways firstly with developer and secondly for the buyer. Anyway, the houses worked by minimal effort innovation is prominently fit to Maharashtra environment and such houses guarantee longer life, lesser upkeep, better stylish and more noteworthy solace. In this way, minimal effort housing is as yet an interesting issue among specialists and organizers as the development expenses have gone up over the time of most recent two decades. To fulfill the requirement of the Housing some new cost optimization some techniques should be applied to achieve affordable houses to the needy and lower income group people.

1.5.1 Parameter of Affordable Housing

The word "Affordable" is not correct in design. It can therefore be a comparatively sort of idea and could have many-implied implications in many specific ways. "Affordability" on the urban-housing page means the provision on a parameter basis of "satisfactory habitable area" or "least livable region," making certain security for residency with - in the mean of the generally urban unit.

In different straight definition, that AH is that; DU providing to those whose needs the market doesn't seem to be meeting. Internationally, the affordability of housing is outlined in several ways. (Ghosh, 2016) Commonly accepted definition of affordability may be studied may be affordability of housing that could be taken as a measure of family income-group housing expenditure. That is agreed unanimously by the Indian Govt. Which notes "AH applies to any housing which meets any variety of prerequisites of affordability, that could be income pay standard, size of the home house unit or moderateness to the extent EMI size or significance relationship of house worth to yearly income"[High-Level Task Force on AH for All, Dec-2008, page. 7]. While the majority of the AH ideas consider the inhabitant's region run, value range, and affordability range, the center thoughts of building AH stay unanswered by giving sufficient civic amenities and suitable location. As per my review and study AH ought to be shown on the idea of comparing requirements according to the assessment of the builder: Need for minimum housing standards for income groups.

- Availability of services
- House costs
- Building costs
- House location
- High land prices
- Purchasing and service costs
- Civil, tax and technical fees
- Private operators and profit margins;

1.5.2 Affordability and its Concepts

'Affordability ' can typically be seen as a magnitude relation
hip between the value or rent of DU and the income of the
social unit. The magnitude relationship could disagree with
completelydifferent incomegroups. LIG will ' pay abundantly

less of their earned income for DU expenditure than that of different income-groups.

Community Earnings	Size of an Area	EMI/Rent income ratio	Cost of housing to income ratio.
Economic weaker sections – Low Income Group	27 – 55 sq.mt	30% family unit net month to month salary	>4 times family unit net yearly pay
Middle Income Group	>111 sq.mt	40% family unit net month to month salary	>5 times family unit net yearly pay

Table 1: Housing costs to income-expenses ratio

Filtering out the Economic Weaker Sections and Low Income Group from the Middle Income Group / Higher Income Group would be very useful for us. The quantitative relationship of Economic Weaker Sections is reduced to no more than 20 % of EMI or Rent and 3 times the total yearly financial gain of the household for the value of the house, while the quantitative relationship for Low Income Group or Middle Income Group as stated by the "Parekh Committee" is maintained. There is a sub-category of urban poor who is also part of the progressive program of government to provide AH specifically for people BPL. This study must be viewed as a single section rather than as a EWS sub-part. The "level of affordability" of families in this specific category would be no more than 5% of earned income. This form of sub-income and its level of affordability will be outlined below:-

Pay classification (in Rs)	Affordability to pay Equated Monthly Interest /Rent(% of income)	Affordability to pay cost of house (numerous of yearly pay)
Below Poverty Line <= 2690	05	02
Economically Weaker Section 539-3300	20	03
Low Income Group 3301-7300	30	04
Middle Income Group 7301-14500	40	05

Table 2: To pay Equated Monthly Installment/Rent (% of pay)

It is known that all sorts of DU will not be distributed at the upper end of the income group in each income division. Most of the disadvantaged population's "accessibility-levels" could be much below what the statistics in Table 6 describe. Additionally, it is unobtrusively treated, that at certain value levels it is difficult to acquire a house in most urban regions. Along these lines it is critical to indicate as far as possible for every income group level, specifically to decide for the arrangement of the most low income group in each class.

"Affordability" is in this manner in any case to be communicated not just as far as the price of the house proprietorship or rent, yet it ought to likewise involve replacement expenses and registration charges and moreover quest costs etc. payable within the DU's ownership and contract period. It should also consist of in-building income price on lease term. These would come with legislative taxes; cost of maintenance for DU, quality of operation for DU. the "cost of driving" to the local employer will be included in turn, or by the entirely different interests of family members may likely be different places.

1.6 Demand and Supply Limitation (Constraints)

Figure 1 Demand Supply Limitations (Constraints)

1.6.1 "Affordable Housing" and its generators of demand

A) Urbanizing:

It's a "List of change from conventional rural economies to trendy industrial economy." India's urbanized population is increasing more than its population. At 28.83%, the range of urban-development in India has been slower than the normal range of urban-development in Asia sub-mainland. Subsequently, completely the scope of population in urban areas and communities has gone up gradually. In context, growing urbanization could be delineated as a "by-product of demographic explosion and poorness induced rural-urban migration". Due to the current scenario there is a rapid growth of homeless individuals accommodating on streets, there is also burden on the urban services due to the increasing urban population. As indicated by the 2011 census, the metropolitan homeless population was 8, 87,600 which, regardless of the "insufficient accessibility of modest and low-evaluated accommodation," can be essentially later.

a) Rising income levels making a sizeable MIG segment:

Over the past decade, there has been a wonderful development transition within the country and also the adoption of one of Indian history's most effective "anti-poverty programs." Although 92 percent of the gross population was below the low level in 1985, this decreased in 2005 to 55 percent of the gross population and is more expected to decline by 2025 to 26 percent. In addition, our economic growth expects Indian income-slabs to be surprisingly modified by a "significant layer of Middle Income Group." Middle Income Group section in particular expects to be AH's first driver.

II. KEY DELIVERY CONSTRAINTS FOR AH

a) Availability of Land:

One of the major questions that Indian government has to give answer is the "adequate supply" of land for "residential and housing purposes." The "Affordable Housing for All" vision would force the acquisition of land and yet, at regular intervals, the offer of huge parcels of land. According to the 2011 census, the Indian urban land mass (3 percent total land mass) houses around 28.83 percent of the Indian population, excluding those EWS people who still exist on the streets According to estimates produced by the "Town and Country Planning Organization (TCPO), only 85,835 to 130,892 hectares of extra land would be required to satisfy the demand of the EWS or LIG division. Land price is another critical parameter which affects land availability. Govt. holds an enormous amount of urban land under the possession of India's port trusts, railway lands, defense land and land acquired under the Urban Land Ceiling and Regulation Act, the Indian Civil Aviation and Airport Authority, and various government and nodal departments. This provides rigid accessibility of land in Urban-location; it's unviable for private developers to produce adequate cheap housing without Govt. backing.

b) Finance and Regulatory Support:

Finance limitation has created restrictions in the housing sector of India. This support for the recipient system generated within the nation primarily affects the company's MIG and HIG income groups, whereas the opposite segment comes under the umbrella of Low Income Group and Economic Weaker Section, making it hard to obtain structured loan and housing financing. Commercial and Private Banks and conventional housing financing methods does not usually include LIG whose income is below the edge of confirming re-payment or who are unable to issue certificates for housing loans. Within the group of EWS and LIG, microfinance-establishment is considered to be the future best option for loan. However, microfinance institutions are facing many obstacles that prohibit them from expanding housing loans municipally.

The main challenges encountered during this period are basically due to the longer duration of repayment of housing loans (minimum 5-7 years) and the larger amount of loans relative to traditional loans issued by microfinance institutions. Yet one more drawback of refinancing is with microfinance establishments. While National Housing Bank (NHB) provides them with a loan facility, current interest rates are also changes they are not fixed and timely reviewed. The shortage of created obligations markets adds considerable constraints to microfinance companies, creating long-term availability of affordable money as they can currently manage most of the money.

2.1 Difference between adequate and affordable households

DU housing choices are made in terms of no matter is "possible" under housing limits in the limitations on (ATP) Affordability to pay of several most especially the LIG. Housing is defined as a bundle with many additional features such as place, tenure, scale, and services etc.–it is generated mainly from location and size. In fact, the affordability issue is closely coupled with the housing case, significantly for the poor. The informal sector represents the majority of the people. For these, the most suitable sites are near their places of work.

Because most of them are paid to keep up with work completed, the time spent commuting from areas away from (potential) jobs will mean fewer working hours, lower income-group, and lower pay flexibility. The inflated commutation interest from remote employers would have an additional negative impact on "income" on the housing marketplace. Therefore, the goal of providing "open accommodation for all" is not only to offer homes under their "accessibility boundaries, but also to provide a better housing plan" than they do today. The trade-off between position and "tenure of services will not be necessarily" is a most loved incentive for the disadvantaged.
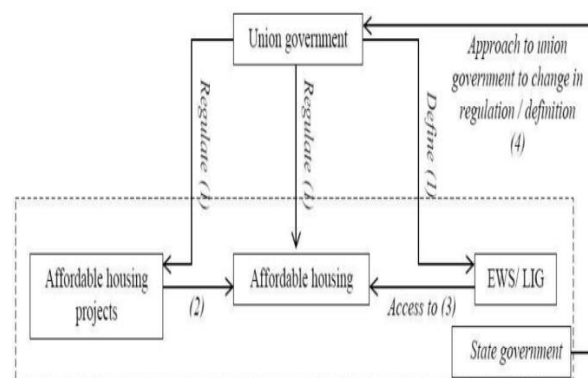
Figure 2: Concept map of cost effective (affordable) housing control and supply network in India

Similarly, the arrangement of very small scale units (one room) with marginal area to match among the "lower income community affordability restrictions" must be required to be re-evaluated. Now housing dialect is drawing back in varied govt. Records are not only in terms of tumbled housing conditions but also in terms of an excessive nos. of households living in complete (one unit space) surroundings.

Planning to provide 1-Room apartments doesn't fix the housing issue. It should even be remembered

that housing could also be a resilient commodity and will mean the next 40-50 years if built. By having a small size high-density DU, one kind of slum would be replaced by another type of slums. Consequently, the agenda of housing policy must not to produce Affordable Housing exclusively, but to provide housing that meets minimally sufficient standards. Majorly to stipulate adequate housing, and then focus on the best way of creating such affordable housing for various income classes. The ATP (in terms of income-price ratio) for the country as a whole is illustrated. Therefore, is that housing size which is among this ATP. It is quite obvious that for all urban areas within the country such cannot be the case. Therefore, in Mumbai there may be only a few DUs with incomes below the EWS cap, but even one sqft cannot be afforded in the city of land. In some modest towns income pay levels of the poor may likewise be at the lower end of EWS pay limits, and regardless of low housing costs, the issue of un-affordability may be seen. Nonetheless, there might be intra-state differences in the degree of availability of income groups as well as inter-state variations. Housing could be a problem specific to a region. The income limits, the Economic Weaker Section, Low Income Group and Middle Income Group liquidity rates should required from the native stage to be defined. It may not be possible to produce expected results by formulating policies that promoted these "generalized affordability criteria."The important problem to be look is whether or not the Adequate Housing mentioned can be consistent for various household typologies.

It must be perceived that households may vary as indicated by income as well as per household unit size, social unit arrangement, occupation, ability level, stability or in any case of work employment etc. Consequently the market and wants for accommodation will differ. The synopsis of "Adequate Housing can't be consistent for every family unit." Accordingly, the demand of Housing (as far as area, residency, capacity etc.) of single male or female new migrants is different from alternative houses. It may not be a practical way to deal with plan to give dwelling units of a particular size between as far as possible (outlined in terms of income pay) for all. It should even be remembered that the attitude to pay for' a suitable glove' is greater than that of an odd individual. One is usually to escape the "Adequate Housing" method, the words 'x' sq.ft of the region for the different income classes. Adequate Housing and Affordable Housing outline will disagree between each income cluster from place to place and for various DU groups. At native level this has to be illustrated.

2.2 Variables to be consider for Affordable Housing

Materials, Cost, Management Skills, Design and Planning are some variables which should be taken in consideration for Affordable Housing.
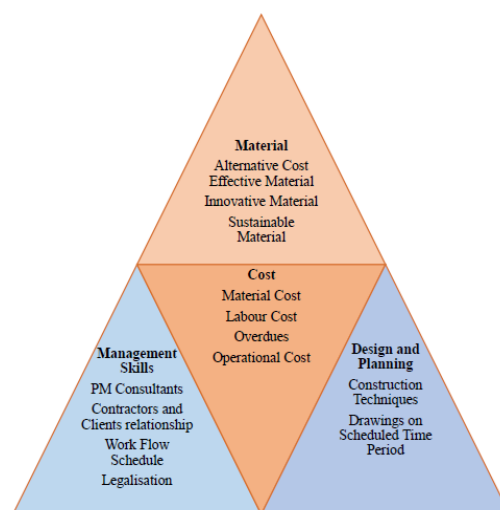

Figure 3:- Variables for AH

2.1 Affordable Housing Schemes in India
(Ramakrishna Nallathinga, 2018)

Housing Group	Annual Household Income	Carpet Area (sq m)
Rajiv Awas Yojana Criteria/ Definition		
EWS	Up to Rs 100,000	21 – 27
LIG – A	Rs 100,000-200,000	28 – 40
LIG – B		41 – 60
Prime Minister Awas Yojana Criteria/ Definition		
EWS	Up to Rs 300,000	Upto 30
LIG	Rs 300,000-600,000	Upto 60

Table 1 :- Housing Schemes in India

2.2 Parameters to be considered for Affordable Housing (Rewatkar, 2016)

Cost	Response from User
• Design • Walls Sharing • Increment of building services	Open Spaces Private Open Spaces Adaptable Community Spaces Design suitable for all age group
• Optimum space design Space efficiency • Circulation	Gradual Housing Expansion of Horizontal and Vertical Space
• Minimal use of volume • Use of Built-In storage spaces Multi-layered use of space	Flexible User Friendly to activity needs different time of day
• Time saving • Prefabrication • Industrialization	Physical & Mental Comfort Protection from Climatic elements Good light and ventilation Adequate Space for Interaction Activity and Privacy Reaction to Socio Economic Lifestyle and Behaviour

2.2.1 Sustainability

• 3R Reduce , Recycle , Reuse

• Use of Eco friendly and Low Embodied energy Materials

• Maximum use of Solar Energy

• Use of Rain water Harvesting and Waste Water Treatments

• Climate Responsive Designs

III. DIFFERENT MODELS OF AFFORDABLE HOUSING ADOPTED IN INDIA
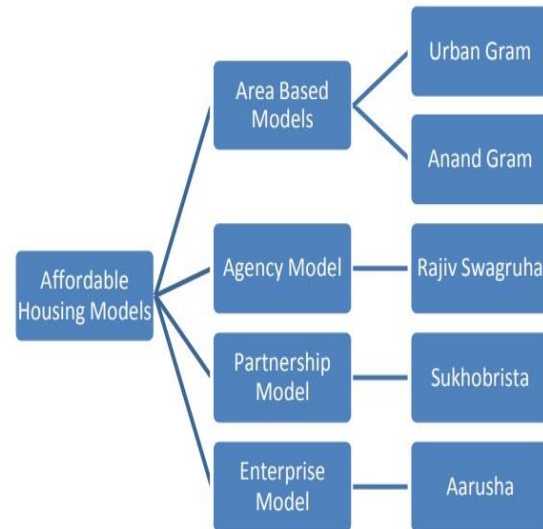
Figure 4: Affordable Housing Models in India

3.1 Various Building Construction Materials for Affordable construction. (Ar. Vidya, 2014)

Natural Material	Manmade Material
• Coconut Fibre • Bamboo • Earth • Straw • Thatch • Fibre Cement Composites • Bagasse-Cement Boards/ Panels • Bagasse – PVC Boards • Coir Boards • Jute Coir Composites	Structural Materials • Polymer – Bamboo Reinforced Concrete • Recycled Steel Reinforcement • Ferro Cement & Precast Components • Precast RCC/ Ferro Cement Frames Bricks and Blocks • Fly ash • Aerocon Blocks and Panels • C- Brick • Cement Concrete Hollow Bricks • Plaster • Calcium Silicate Plaster • Fiber Reinforced Clay Plaster Roofing • Bamboo mat Corrugated Roofing sheets • Micro concrete tiles

IV.   CONCLUSIONS

- Affordable housing will be a boon to upcoming smart cities.
- Slums Rehabilitation projects must be undertaken by the authorities to avoid increasing number of slums.
- Affordable housing can be achieved with Proper Management Skills, Cost, Design and Planning Alternative Construction Materials and Techniques.

Awareness and Study of the Affordable Housing must be done on large scale

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