

Symbiotic Housing: A More Tangible Approach for Resolving the Deteriorating Existing Housing Conditions in Indian Urban Settings

Anamika Nandan¹, Dr. Manjari Chakraborty²

¹PhD Scholar, Architecture Dept, BIT Mesra, Ranchi & Asst. Prof. and Head, Department of Architecture, BIT Patna, India

²Professor at Dept of Architecture; BIT Mesra, Ranchi, Jharkhand, India

Abstract: - Housing is one of the most important needs of a human being.

In recent years, condition of existing housing localities in many of the Indian towns has deteriorated drastically due to growing population, ill maintenance, increasing encroachments, inappropriate basic amenities and also due to ill effects of the practices of construction industries. There is a difference between “How people are living” and “How they are supposed to live”. With the pace of time, new innovations, technology and new concepts in architecture are required to mitigate the existing social, environmental and spacial needs in the housing sector.

Symbiotic housing is such a new concept in the development of a better planning mainly experimented and researched in Japan.

This paper includes investigations showing the possibilities of improving those existing housing colonies of an average medium sized town of India which are approximately 40 years old and which show better/apt conditions for incorporating Symbiotic housing concepts.. The investigation and the proposal, both are based on the concept of Symbiotic housing.

The investigation was mainly performed in two phases. First phase demonstrated the existing conditions of planned and unplanned localities as compared to those conditions of a Symbiotic housing which can be achieved in the present scenario of the study area. Second part of the study is based on the previous study of phase 1. A more tangible approach was aimed at capturing, assessing and portraying aspects of an anticipated quality of symbiotic housing in any mid-sized Indian Town.

Key words: Symbiotic housing, deteriorated housing condition, effective use of natural resources, social life, healthy environment, architectural approach and urban settings

I. INTRODUCTION

Housing is one of the basic needs of a human being. The problems of existing housing localities in an average mid-sized Indian town have taken shape in gigantic proportions. These issues need attention otherwise our urbanization will lead to urban decay rather than urban development. Some of the issues associated with the conditions of urban housing in India need to be addressed.

These are as follows:

- Deterioration of existing urban housing conditions
- Housing and health related problems of its residents
- Housing and living standards
- Housing and environment
- Housing and architectural need
- Role of new approaches in improving the existing condition of urban housing

Searching for new options and new approaches for mitigating these problems has become a great challenge for architects. Though the problem is not concerned with any particular group of people but it is a matter of concern for all.

The overall aim of this study is to evaluate the existing housing of a mid-sized Indian town, with a view to examine the extent up to which different housing can be modified through architectural approaches and how these modifications will help in establishing the concept of Symbiotic Housing while providing adequate and satisfactory housing and influencing the quality of life of residents.

II. SYMBIOTIC HOUSING CONCEPT

The word “Symbiotic” has been evolved from “Symbiosis”. The main concept behind this theory is that the state of life of two different living things which depend on each other for certain purposes are sometimes mutually benefitted while in some cases one is benefitted and the other one is harmed. Here the topic is mainly concerned with the two things i) Housing and ii) Environment. Components of a housing system and the associated environment should be related in a way as to benefit each other. The relationship between housing and the environment is symbiotic, involving both resources (opportunities) and hazards (constraints). And this cycle should be maintained which is essentially the need of the day.

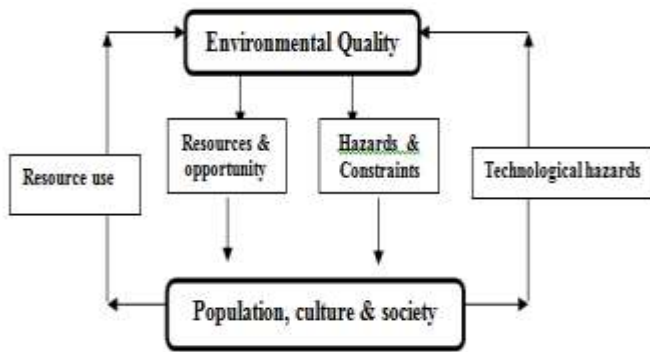


Figure1: Representation of two way relationship between people and environment

Symbiotic Housing is a concept. There is a flexibility with which this concept can be used and which is based within the available resources and techniques. Architectural approach is one of the relevant approaches which can provide a very positive result in this direction. It can be helpful in incorporating and maintaining the concept of Symbiotic housing. Hence it can be used in a very methodical way after the systematic and relevant study of existing housing conditions.

The concept is being used in various parts of the world in recent years. Symbiotic housing is a new step in the development of a better planning concept mainly experimented and researched in Japan. It is associated with energy conservation approaches which are for the people and which are executed & maintained by the people. In 1990, a group of professionals and firms from public and private sector joined forces. Initially this association functioned as a research body then as an organization for the promotion and realization of Symbiotic Housing from north to south in Japan. Uses of roof top for gardening, uses of windmill for generating common electricity, use of solar energy collector, uses of permeable surfaces for streets and parking areas are a few of the measures which were incorporated in many new housing projects. Application of simple and basic principles, smaller independent systems of energy and water supply in housing colonies were some of the important features in the first symbiotic housing complex which was Setagaya-ku Fukasawa Symbiotic Housing Complex. Not only in Japan, but elsewhere also, the concept of symbiotic housing has become popular.

III. HOUSING CONDITIONS OF A MIDSIZED TOWN IN INDIA

In recent years, conditions of existing housing localities in many of the Indian towns have deteriorated drastically. Some of the prominent issues are as follows:

- Growing population
- Ill maintenance

- Increasing encroachments
- Inappropriate basic amenities
- Ill effects of the practices of construction industries
- Problems due to ageing and,
- Pollution

Technocrats, Scientists, Agriculturists, Journalists, Town Planners, Economists and many other people are concerned with the problem in one way or the other. It is their responsibility to contribute in their respective fields. Over 31% of the Indian population resides in the urban areas (Census data of India, 2011). Due to the increasing trends of population in urban areas, various problems have arisen such as problem of housing, water, disposal of wastes, treatment of sewer water, and generation of slums etc. Increasing population has a direct impact on the housing system. Census data of India (2011) indicates that the quality of per capita shelter has declined during the last 40 years as measured by indices of crowding.

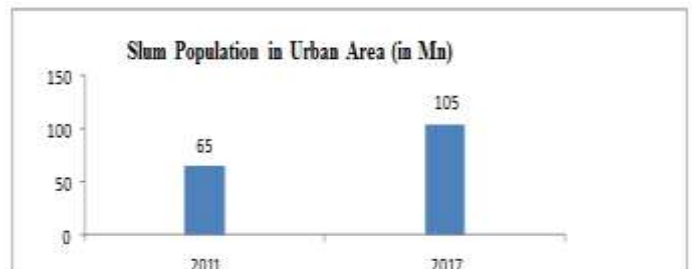


Figure 2: Slum Population in Urban Area, Source: Census 2011

According to 2011 census, the slum population will increase by 40 million till 2017. By 2021, the urban population is expected to increase by nearly 500 million, totalling to about 35% of the total population of India. Hence, the total housing demand in the country by 2017 could be as high as 88.78 million units.

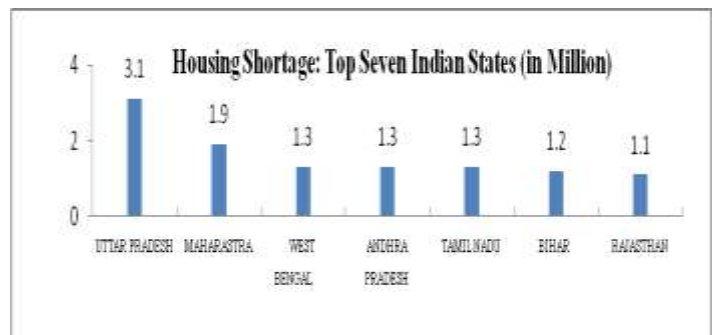


Figure 3: Housing Shortage: Top Seven Indian States (in Million), Source: Ministry of Housing and Urban Poverty alleviation (MHUPA), 2012

Bihar is ranked among top seven Indian states which are facing an acute shortage of housing.

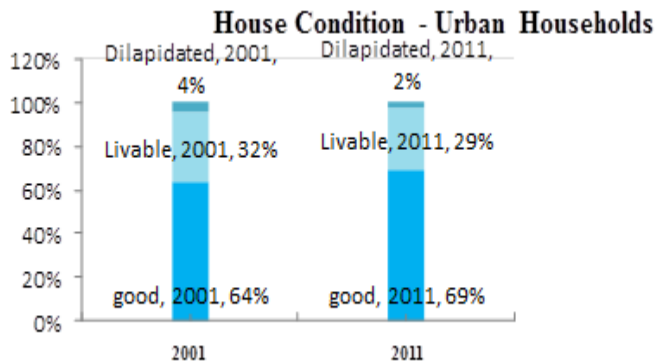


Figure 4: House Condition- Urban Households in India, Source: Census 2011

Meeting the housing demand for future is a great challenge. At the same time, improving the livable housing condition such that it can meet the requirements of current generation is of great concern for all of us. From the figure 1.3, 29% urban households are considered as livable which certainly needs attention. The census definition of good housing is “Houses which do not require any repair and are in fairly good condition”. Although the situation is marginally improved from 2001, the overall scenario is still depressing. In this regard, specific action plans definitely needs to be chalked out

Table 1: Benefits in housing and benefits for environment

Benefits required in Housing	Benefits required for Environment
1. Improvement of quality of life	1. Conservation of energy
2. Maintenance of improved standard	2. Conservation of resources
3. Harmonisation with climate	3. Recycling of materials
4. Harmonization with tradition, culture	4. Reduction of hazardous substances

A building does not reject naturally occurring features of the landscape or harm them instead these structures must connect to nature and exist with the environment (Angen, Courtney, 2013). There should be a balance between the human activities and the natural system.

IV. APPROACHES AND METHODS OF EVALUATION IN PUBLIC HOUSING

Conceptual approaches to evaluation of public housing comprise basically subjective opinions from different interest groups in public housing provision and consumption. The different dimensions of evaluation of public housing involved human perceptions on the product of public housing and its impact on the users. The assessment of individual buildings with respect to performance of building spaces and fabrics is often based on quality attributes as identified by housing

occupants. It principally provides inputs for the development of quality standard for spatial and material performance of the building (Liu, A.M. 2003).

Onibokun (1985) noted that housing quality encompasses the structure and internal adequacies of dwelling units, availability of amenities, occupancy rate, neighborhood conditions, and the habitability of housing. Subjective evaluation approach relates to occupants perception of the quality and level of satisfaction with housing environment (Onibokun, A.G. 1985).

The approaches to evaluation of Symbiotic housing in Japan were basically post occupancy evaluations (POEs), satisfaction studies, evaluation of quality and adequacy of housing. These approaches were based on the notion that buildings and built environment are socially constructed solutions to human needs for shelter and no one objective method of evaluation can be a complete test of building quality and satisfaction of users.

The single bottom line approach of a conventional design grows to a multi – criteria approach of sustainability and then to the even more ambitious parameters of Symbiotic housing based on sustainability.

Earlier literature studies showed that following four broader areas are very important as these constitute the basic frame of environmentally symbiotic housing.

- a) Energy saving
- b) More effective use of natural resources
- c) Compatibility and harmony with the local environment
- d) Health and hygiene

Parameters in this research study were formulated from these four broader areas and these were confined because of the existing set of characteristics of the housing localities.. Moreover, only those parameters are included which are directly or indirectly associated with architecture and design of the building/ neighborhood in both indoor as well as outdoor conditions. More specific values have been assigned to these parameters in terms of user’s satisfaction level.

V. METHODOLOGY

The methodology adopted for the study is both qualitative research and quantitative research in two phases. Result and methodology of 2nd phase was dependent on the results of 1st phase work. Quantitative research is direct data collection from the site regarding the user’s feedback and satisfaction. Information was sought on the socio-economic characteristics of the respondent and his/her family, different features of the dwelling unit, opinion of the respondent about internal features of the house and outside features of the locality. It is important to assess the respondent’s opinion in terms of the

degree of importance attached to various elements. Information was also drawn about social reactions the respondents had within the residential area, concern and willingness to participate in community efforts directed towards the improvement of the area based on the concept of Symbiotic Housing.

Qualitative research consists of collecting data from Architects, engineers in the form of questionnaire which was further analyzed and interpreted.

PHASE -1

In the first phase of work, a comparison between planned and unplanned localities was done. It was tried to finalize those housings which showed maximum potential of its improvement into a symbiotic housing.

Various data, after primary scrutiny were compared with symbiotic expects for indoor conditions and outdoor conditions, Some logical assumptions were made at the start of the data collection and for the analysis of the same. It is well known that existing housing conditions need substantial improvement in its condition for achieving the level of symbiotic housing. The parameters/criterion of existing condition of housing colonies were compared for indoor conditions and for outdoor conditions separately with the standard of parameters/criterion of symbiotic housing. Further investigation is required for setting priority and relevance to the different criterion.

It is assumed that there will be certain limitations within which changes can be made for achieving conditions of symbiotic housing.

From the comparison shown in the graph it is concluded that available criterion in unplanned localities do not show that level which can be improved for achieving symbiotic housing conditions. **Hence, regarding indoor conditions, unplanned localities are rejected for the incorporation of the concept of symbiotic housing. It is concluded that planned localities can be improved for its transformation in Symbiotic housing with certain changes in above mentioned values.** Similarly, on the basis of outdoor conditions, unplanned localities show a situation where even after the improvement of conditions within the range of 0%-35%, no single criteria can achieve the level of symbiotic housing. Hence, **in outdoor conditions also, unplanned localities are left for further study. Phase 1 study revealed a remarkable difference between the conditions of planned and unplanned localities. The difference between unplanned and symbiotic conditions is even much more than that of between planned and symbiotic conditions. So for more detailed and specific approach, further study was done only for planned locality. Possibility of improvement seems to be on higher side in planned localities.**

Planned vs Un-Planned (Indoor)

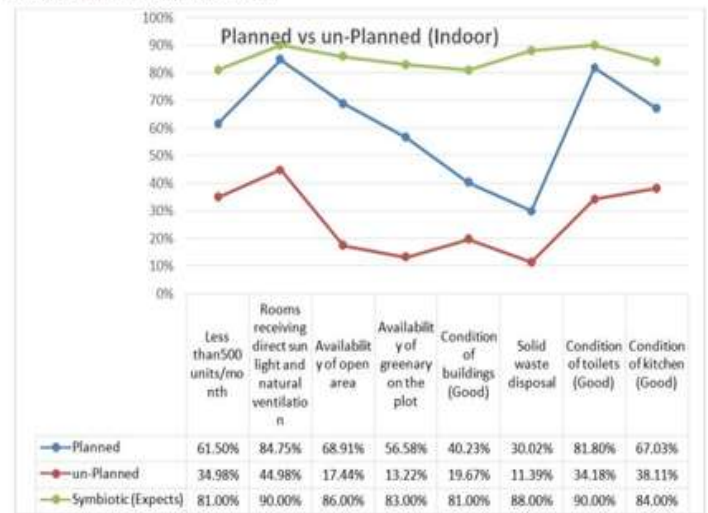


Figure 5: Comparison among Planned, Unplanned and Symbiotic expects regarding indoor conditions

Planned vs un-Planned (Outdoor)

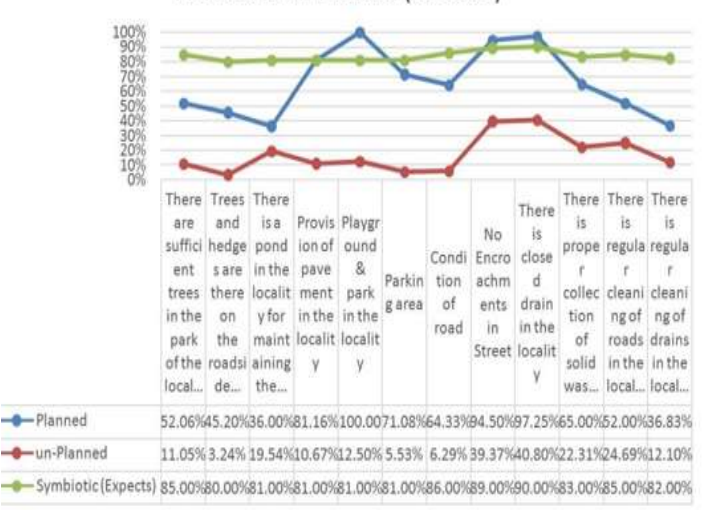


Figure 6: Comparison among Planned, Unplanned and Symbiotic expects regarding outdoor conditions

PHASE -2

In **second phase** of the study, Fifteen indicators for housing unit level, eleven indicators for housing block level and seven indicators for neighborhood unit were finalized after the discussion with some engineers, architects and actual residents of the locality. These were arranged as to get a relative judgment by ten selected architects. A score between 0-10 was assigned to each indicator based on the assessment of the present condition. The table below clearly helps in developing a clear idea as to which part needs more attention and under what priority.

Table 2: Scores and corresponding explanations

Score range	Explanation with the corresponding score range	In a general opinion what needs to be done
9.1-10	Excellent	Needs nothing to be done as the condition is appropriate
7.1 – 9.0	Good and slight improvement is needed	Redesign, conscious use of building materials and innovative techniques for better performance but not on essential and urgent basis
5.1- 7.0	Need attention	Redesign/renovation is essentially required
3.1 – 5.0	Need immediate attention	If possible new construction of affected part is required at urgent basis.
0.0 – 3.0	Absent or present in very worst condition	Careful thinking and proper planning for long term benefits/ quick action with quick result is needed if any part is existing and in the worst condition depending on the type of indicator. These need careful considerations.

VI. RESULTS

The success of environmental improvement in symbiotic housing is linked to social understanding. Community consultation and participation during the pre design, design and post design are the imperative requirements.

Phase -1 study revealed a strong dissimilarity between indoor and outdoor conditions of planned localities and unplanned localities. In this phase following points are concluded:

Through the summarized information, respondents showed negligible satisfaction level for practices such as use of natural resources for saving energy, for water recycling process and for waste recycling process.

Regarding indoor conditions, maximum difference was found (51.47%) for **the availability of open area inside the buildings of planned and unplanned localities**. Other high differences were found for good condition of toilets. **In**

planned localities, approx. 75% conditions can be improved to achieve symbiotic housing level regarding its indoor conditions. Phase 1 study revealed a remarkable difference between the conditions of planned and unplanned localities. The difference between unplanned and symbiotic conditions is even more than that between planned and symbiotic conditions. Phase 2 studies showed that in planned colonies, a proper setting can be developed in outdoors with the available amenities and facilities for the use of renewable energy and many other associated techniques. These open areas can provide space for storing rain water, for developing biotope and use of it for various purposes at collective level.

REFERENCES

- [1]. www.inive.org. IWAMURA,K. (May 2005). "Passive and Low Energy Cooling for the Built Environment"-paper presented in an International Conference at Santorini, Greece, viewed 12/6/2007.
- [2]. CHATTOPADHYAY, S. (September-October 2004). *Spatio – Economic Development Record*, Vol.11, No. 5, pp. 17-21.
- [3]. KUNDOO, ANUPAMA. (2004).*Sustainable Buildings, Design Manual, volume – 2*, published by The Energy and Resource Institute, New Delhi, p- 4.
- [4]. BAYO, AKINBAMJO OLUMUYIWA. "Sustainable Development And Gender Relation: The Housing Dimension", Ondo State Nigeria.
- [5]. DATAR, RAHUL. (July 2001). "Towards Sustainable Construction", *Journal of Indian Institute of Architects*, PP. 21-24.
- [6]. Journal of Housing Research Foundation, 2006, No.32.
- [7]. www.patna.nic.in. viewed 17.09.2007.
- [8]. Census records 2011 of Patna Town, www.gov.bih.nic.in.
- [9]. SINGH, NALINI MOHAN & RAO, S.NARAYAN. (Oct. 2006). *Indian J. Environ Health. Vol.-43, No.-4*, p.138-143.
- [10]. KARATSU, T. Oct. 1998. Japan, "Establishment of Symbiotic Housing Evaluation Guideline", *France Open Forum*.
- [11]. IWAMURA, K. 1999. "Global Document" 1999, Japan Institute of Architects.
- [12]. <http://www.iwamura-at.com/> "The Research Group for environmentally symbiotic house 1993", viewed 21/07/2011.
- [13]. MAJUMDAR, MILLI. (2002). *Energy- efficient Buildings in India by Tata Energy Research Institute and Ministry of Non – Conventional Energy Sources*, Government of India.
- [14]. Report of a survey on "The assessment of the generation of the quality as well as quantity of the solid waste in the municipal areas of Patna" (2008) done by the PG department of environmental sciences, A.N.College, Patna