House Forms and Transformations: The case of rural Andhra Pradesh, India

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Abstract

Architectural forms arise from architectural purposes, such as the practicalities of spatial organization and control of the flow of occupants. Architectural forms are also concerned with the sense of space a structure creates, its symbolism and its relationship to the setting.

This research examines and analyses the house forms and transformations in rural Andhra Pradesh, India. It examines nine villages: Bodiguda, Etikoppaka, Kondapalli, Mangalagiri, Mukkollupadu, Pedana, Uppada, Velnuthala and Peruru from different districts of the state. The objective is to explore different housing forms and transformations using exploratory, descriptive, and explanatory methods within a case study approach in delineating the important rural built forms. This research documents the rural house forms and propose to restructure the housing policies related design of rural housing.

Keywords: House, Form, Rural, Village, Transformation

Introduction

Architectural forms are as a medium through which the architect and the user can communicate with each other. Architectural form can arise from an architects' mind, can come from the experience of engineers & architects and can also come from Nature. Indeed, it even can come from an unconscious mind. Needless to say, one of the important purposes of architects engaging in architectural design is to pursuit the beauty of the architecture form. (Fang & Jiao, 2013).

In ancient Greek, the word 'idea' was the word 'form' in Latin. Therefore, an idea is the origin of form; there is no form without an idea. Form is the result of the relation with an idea, with a purpose; idea is the generative force of form. Therefore, there cannot be a form without an idea (Brojevi, 2016).

House Form

Architectural form results from architectural purposes, such as the practicalities of spatial organization and control of the flow of occupants. It is also concerned with the sense of space a structure creates, its symbolism and its relationship to its setting. In architectural "Form Analysis", main information on achieving both the improvement of visual analysis and the analytical approach has great importance. Achieving visual analysis through a concrete concept is a kind of image visualization (Gunce, et al, 2011).

Profile of the Andhra Pradesh

Andhra was the first Indian state formed primarily on a linguistic basis. It was carved from the Madras Presidency in 1953. In 1956, the state was merged with the Telugu speaking portion of Hyderabad state to create the state of Andhra Pradesh. On June 2, 2014, the state of Andhra Pradesh was bifurcated under the section 26 of the Andhra Pradesh Reorganization Act, 2014 into two states, the state of Andhra Pradesh and Telangana as shown in Figure 1.

Fig. 1: Andhra Pradesh at Different Periods, 1951, 1956 & 2014. (not to scale)
Source: www.mapsofindia.com/andhrapradesh/geography

Selection Criteria of the Case Study Areas

The research chose nine areas based on the study objectives for the primary data collection. The selection of villages is from the districts where agriculture is practiced predominantly although the villages also have diverse occupational patterns.

Fig. 2: Andhra Pradesh case study areas
Source: Google Earth image (accessed 2018)

The study focused on Krishna, East Godavari, West Godavari and Visakhapatnam districts in the state of Andhra Pradesh, India. A comparative study of three selected

occupations with similar socio-cultural milieu enabled the examination of the role of occupations. The regions identified for the study were from the rural Andhra Pradesh and comprised of villages Bodiguda, Etikoppaka, Kondapalli, Mangalagiri, Mukkollupadu, Pedana, Uppada, Velnuthala and Peruru as shown in Figure 2.

The research examines and analyses the house forms and transformations in rural Andhra Pradesh, India. The objective is to explore different housing forms and transformations and document these. Literature on rural housing schemes shows lack of focus on quality of housing and have concentrated more on the numbers and quantity of housing supplied. It also show a lack of design quality and focus on the real necessities of the rural dwellers. Therefore, these existing policies and programs need to be restructured and revised with introduction of new and stringent policies.

The rural houses, because of their history of housing and also the fact that during the ages, have been able to response to sustainable, energy and climatic issues and coordination with the environment, although there were difficult environmental factors such as earth, context and material. Extraction of such principles and using them as pattern by designers, can help to have newer and better designs; because it will be a wrong expectation from a designer to have an ideal design without paying attention to such thought which comes from long-term occupancy of human beings (Salahedin, 2016). Hence, there is necessity of house form analysis and transformation of these housing, which would in turn help us to document the existing rural house forms. This paper aims to explore and analyze different housing forms in rural Andhra Pradesh, India. The research also emphasizes on the transformation of these housing forms and various influences resulting in to transformation. This research documents, the rural house forms and propose to restructure the housing policies related to rural housing design.

Literature Review

It is often said that architectural theory and history have traditionally been pre-occupied mainly with the study of monuments. As Rapoport (1969) points out, architects have emphasized and have been fascinated with the work of men of genius, the unusual and the rare. In this context, the study of vernacular architecture is important to give recognition to the role of the ordinary people. The built environment conceives meanings that represent the dignities chosen, determined, and owned by the society that cannot be separated from Nature since they are relevant (Rapoport, 1981). Architecture has been formed for developing the values within the culture of a nation. Indeed, the ancient values of a culture are depicted in the architectural designs which have been further considered as the identified elements in the cultural aspects evolving the homogeneity of culture and architecture across the world of architecture (Bemanian, 2010).

Moreover, a suitable living environment can be established when users' preferences are met (Rapoport, 2001) by personalization (Jusan, 2010). Therefore, it is necessary to investigate in what way architectural attributes are linked to a user's different level of needs in order to achieve an individual's perception. Efforts have been made to systematically link human needs to their living environments, which will be helpful in identifying operable definitions in architectural design. Some works have been dedicated toward understanding the nature and the effects of certain human motivational factors on the living environment. Jusan (2010), and Collen & Hoekstra (2001) for example, experimented with the association of user-values with housing attributes based on the theory of means-end chain.

According to Kallio & Blomberg (2015), architecture influences and reflects culture simultaneously using obvious design language and symbols of a particular religion, individual or a community. Architecture is the product of a culture for which it is designed for. Since ages, architects design and build spaces for the people who use them and for the time. The buildings are not just designed as strong and sturdy structures. Rather, they are environments that are created to benefit people in different ways looking into the future needs also (Siláči & Vitková, 2017). The relationship between culture and architecture is revolutionary which is not a static

creation built to function for a while but designed in such a way that adapts well to one's dynamic cultural needs changing with time

Groth (1999) reveals that to many architectural historians, vernacular architecture was once seen as a quaint and not of important interest, very much at the edges of the discipline. Writing about vernacular architecture may still be at the margins of architectural history, but it no longer seems eccentric to be immersed in the study of ordinary buildings. Turker (2007) states that, the responsibility of designers is to find the ways of analyzing and interpreting the rural housing tradition for the continuity of the tried, developed and evolved design principals in traditional architecture. Without doubt, the past experiences suitably respond to the cultural and environmental needs of the context.

This means that while answering the increase in the building demands for housing for rural purposes, conservation and continuity of traditional environments have to be considered primarily. Lidon et.al (2020) in his research on vernacular architecture and transformations states that in the age of globalization, it becomes necessary to assess the possibilities for the conservation of the characteristic identity features of vernacular architectural heritage. As traditional housing types have proven to be more sustainable and disaster resilient, these practices can serve the purpose of success stories in policy formulation and implementation. Promotion and mainstreaming of these practices for marginalized groups will reduce their risk of disaster vulnerability and as well as will give them cost effective alternative ways of housing (Ramesh, 2012).

One of the early initiatives during 1970's were the studies on desert regions in the state of Rajasthan, India by Kulbhushan Jain and Minakshi Jain. They have initiated the documentation of the housing types, the influence of socio cultural aspects on the habitat and study of relations between architecture and craft. The article by Kumari et.al (2015) focused on the observed changes in architecture, building typologies and lifestyle in rural areas. It brings together the multiple well-being dimensions to define what sustainable well-being is, and the need for a rural design agenda for sustainable well-being. Documentation of the building types and interviews with the villagers were carried out to understand why people choose these changes and how these associates with their well-being.

The study made by Nageswara Rao (1984) examined the housing conditions in rural Andhra Pradesh. They argued that in spite of planned economic development in India, the problem of housing has not shown any signs of improvement. The problem of housing in India and more so in Andhra Pradesh is not only quantitative but also qualitative. Housing sector is one of the most neglected aspects of planning. People continue to live under very severe strenuous physical conditions. It is suggested that there is a need for a comprehensive and perspective plan to provide decent shelter to all the poor households in rural areas. The housing plan must be conducive to create employment initiatives among the rural poor.

In this context, Indira (1987) attempts to examine the nature of the rural housing problem and reviews the adequacy of the government policies and programmes in facing the problem. Vashist (1988) says that merely providing living accommodation that too inadequate under some of the on-going housing beneficiary schemes is not sufficient. Even after decades of national planning, the country does not have a well-defined, workable and a comprehensive national housing policy with the objective of eliminating the housing shortage in the economy within a prescribed time limit. The beneficiaries from rural housing schemes or the end users were not satisfied with the housing designs and the government should encourage to ensure cohesion in the housing scenario as a whole (Sadhu, 2019).

Simultaneously, Golpelwar (1996) has pointed out that no housing scheme takes care of the fact that rural people stay together with their animals such as goats and cows and their traditional dwellings. They will take care of this requirement whenever they build a house. Housing is not just providing a shelter in vacuum. It must meet the interests and ideas of the people. It is suggested that due consideration with regard to affordability, materials to be used and people's participation in designing their shelter and new technology would be taken while designing the housing policies. Public housing programme in India started with the rehabilitation of refugees immediately after the Independence and since then, it has been a

major focus area of the government as an instrument of poverty alleviation. As per the "National Rural Housing & Habitat Policy, 2007", shelter is universally recognized as a basic human need next only to food and clothing. The right to adequate housing has been widely interpreted as a human right in international and national forums. This right is considered integral to the realization of the right to live with dignity.

From these, it is evident that there is a neglect in the rural and vernacular studies. Even after almost fifty years since Rapoport's initial concern stating that architectural theory and history have traditionally been pre-occupied mainly with the study of monuments, the concern still exist today as very little documentation and research has been done on rural traditional settlements.

Research Methodology

The objective is to explore different housing forms and transformations using exploratory, descriptive, and explanatory methods within a case study approach in delineating the important rural built forms. Form can be described as a reference to both the internal structure and external outline, often in the shape of a three-dimensional mass or volume. In order to understand the built forms, the general plan, roof and volumetric forms were analyzed from 45 houses in 9 villages. The details are shown as plan forms, roof forms, extensions and blocks at the site level in Fig. 3. The form analysis is based on the basic forms of the built environment in the case study areas. The first row shows the different plan forms like circular, square, rectangular, pentagon. The transformation studies of the households was based on the primary data and discussion with family members of different age-groups and also the village head.

House Form Analysis
Findings and Discussion

The roof forms are shown in the second row as sloped and flat roofs. Houses with sloped and conical roofs are old, whereas the new developed buildings have flat roofs. To suit the functional requirements of the internal spaces, different additions have been made to the basic form, which are extensions for various activities as shown in the third row in Fig. 3. There are often occasions where two geometries will collide to create a new composite form, which displayed the symbolic importance or they are directed towards a space or away from a specific site context. Sometimes they created a volume of space within an existing form and they also demonstrated the nature of the structure. The basic form becomes the main unit of the building and the additional forms become the spaces for other activities like work spaces, informal activities, storage and sometimes for cooking. These additional forms will also respond to an existing path or movement through the site. The fourth row shows the arrangement of various blocks in the site, representing different activities. The occupational related activities are distributed either within the main block, or within the extension or at the site level, which depends on the type of occupation practiced in their respective households. The main block is mostly a multipurpose activity room in lower income and middle-income households, whereas the higher income households have multiple rooms for different activities.

The study of 4 agricultural villages and 16 houses observed the plan forms of houses. One house is circular and another one is octagonal in shape as shown in Fig. 3. It was observed that, these were the basic shelter forms, when the settlements were formed in Velnuthala and Mukkollupadu villages and hence though smaller in number, the circular and octagonal house forms were selected as part of study area. The occupational spaces such as the granary, the cattle shed, and the multipurpose room were also identified in this type. 7 houses consisted of the rectangular shaped plan form with sloped and thatched roofs, whereas 6 houses had the same rectangular form with Mangalore tiled roofs. The remaining 2 houses were of single floored with flat roofs and RCC construction with modern materials.

The study of 8 houses from two toy-making villages resulted in to 4 houses of rectangular shape in plan, and RCC structure with a flat roof. Two houses had thatch or tiled

roofing with rectangular plan forms. The remaining 2 houses are two-storey buildings, rectangular in plan, flat roof and RCC construction with modern materials.
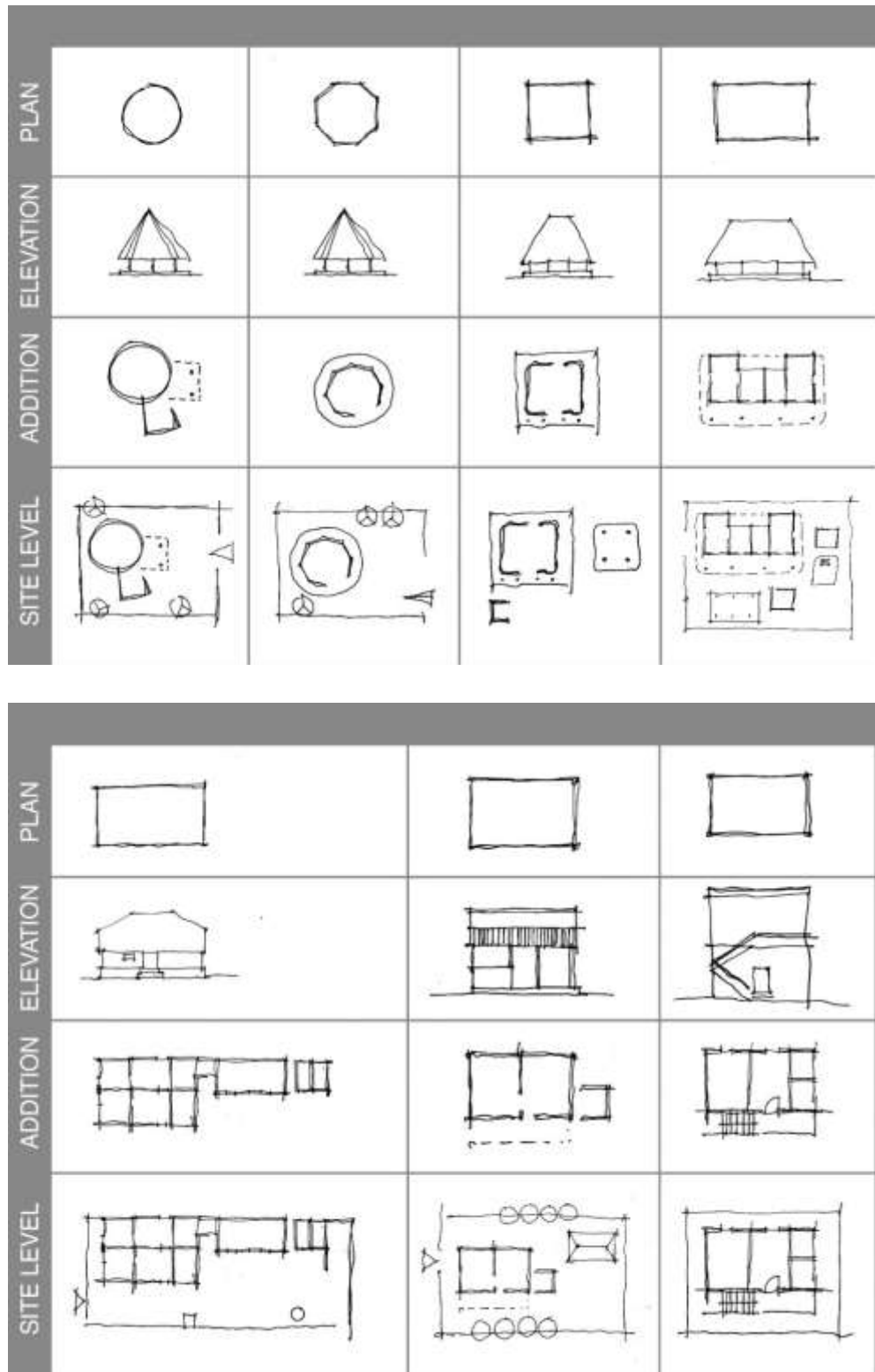

Fig. 3: House Form Analysis
Source: Author

Seven houses from three weaver's villages (total:15 houses) had rectangular or square shape in plan and thatched roof. Five houses were rectangular form in plan with tile roofing. The remaining 3 houses are two-storey buildings, rectangular in plan, flat roof and RCC construction with modern materials.

Within the 45 houses from 09 villages, 38% of households were either rectangular/square in plan with thatched roofing and 34% were rectangular in plan with Mangalore tiled roofing. The remaining 28% were RCC structures with flat roofs and modern building materials.

If a development can be justified by reference to two of these systems, either the ecological or the architectural system, as well as either the social series of alternative routes for gaining planning permission opens up. We are still able to prescribe acceptable architectural forms, but in a more holistic way, whilst operating a more liberal, less dictatorial system which recognizes innovation and the fact that there is a variety of valid rationales for carrying out development (Pearson, 2001). The study of forms of houses in the case areas has led to understand the form derivation, addition and the role of various day to day activities in the derived form of the house at various stages.

Transformations

Transformation in general is a natural phenomenon. In village settings, it happens often. The villages, Velnuthala and Mukkollupadu, where maximum transformation occurred are identified for the study. Such transformation was studied critically in four houses, two each in the respective villages. It was found that the plots were sub divided due to incremental growth of the families. However, still spaces like the verandah, the granary storage, the haystack, the storage for tools and equipment shows the occupational influence.

A typical residence with an agricultural background in Velnuthala village was studied to understand the general transformation process. Studies and discussions were made to identify the built fabric since 1930, when the house was a small circular single room unit, which was made of thatch. The land belongs to a family with two sons and two daughters who migrated from the Vizianagaram district in Andhra Pradesh, which is around 450 km from Velnuthala. Later, in 1940, the house was built with mud walls, mud flooring and thatched roofing. The house consists of four large utility rooms with verandahs in the front and the rear, a kitchen, which is separate from the main living area, and also outdoor kitchen space. The plot also has a granary storage space, cattle shed, pooja space, semi-open areas (like verandahs to sit and spend time outside). There is no electricity, drinking water and toilet facilities. They purely depend on kerosene lanterns and most of the activities are carried out during the daytime. Drinking water is collected from an existing drinking water pond by the inhabitants. There is another pond, which is used only for washing clothes and cattle. The inhabitants move to the fields for toilet related services.

An extended family lived here for few decades. The change has occurred when marriages took place in the family. The daughters have moved to different villages. The sons had their own families, which were combined for few years but separated with agricultural lands divided. The sketch as shown in Fig. 4, which is transformed in 1970 shows an interesting phenomenon. The house was comfortably divided with an addition of a kitchen, a cattle shed and a granary storage. There was no physical barrier made on the site. The internal four rooms were divided among the two brothers. The house when seen from outside is like a joint family, as they share the same open spaces, the open, and semi open spaces. Informal meetings and discussions happen within the same compound. The central dotted line in Fig. 4 (third house) shows an imaginary division of space for two families. The site has entry from the East and West pathways or kuccha roads, which helped them for easy division of spaces. The first brother has one son and two daughters; the second brother has four sisters and three brothers. However, the influence of urbanization, and finding jobs from urban centres have started during this period. The next generation started settling in the urban areas and one or two members of the family who could not get through formal education or who is interested in farming or the elder son who inherited the father's occupation was left in the village. The properties got subdivided

again with less areas of land in the hands of the individuals. The government interventions in building pucca houses like Indira Awaas Yojana, Raajiv Awaas Yojana etc., attracted the villagers to take advantage and built pucca houses (Srinivas & Ramesh, 2021).
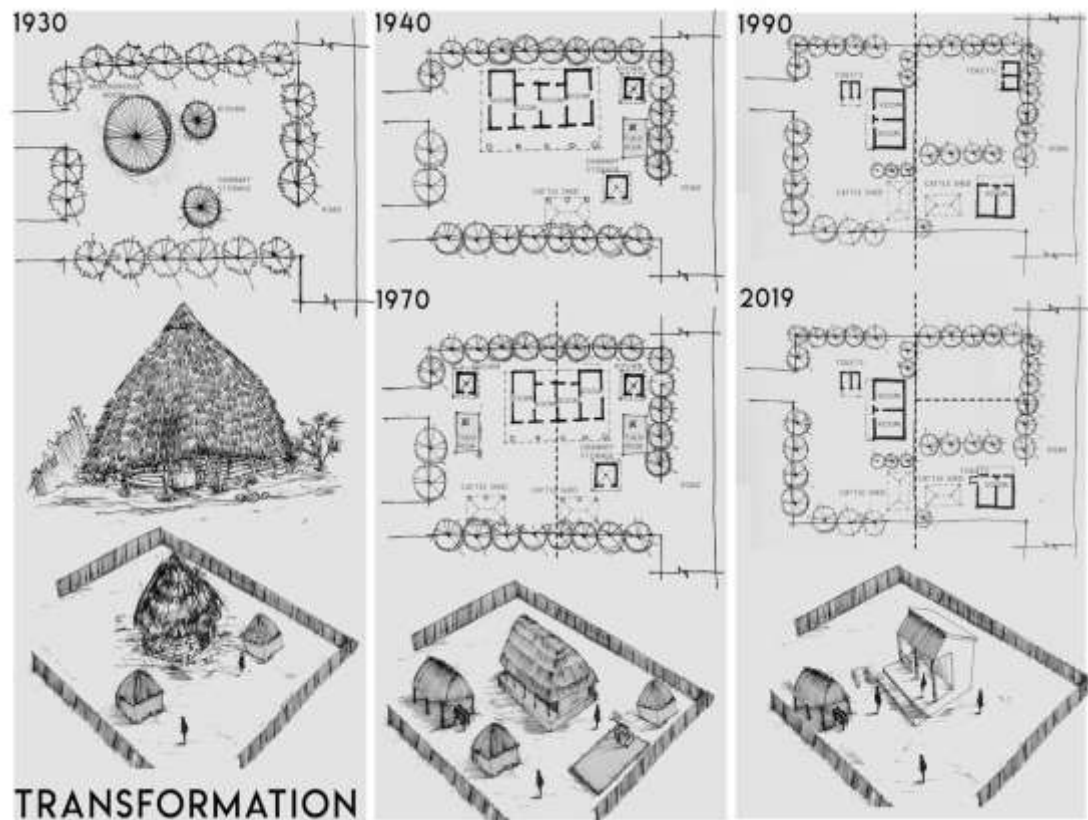

Fig. 4: Transformation of House Forms
Source: Author

The house in 1990 as shown in Fig. 4 shows the division of the plot within the two families. They are left with only two families who take care of farming. The remaining have settled in different rural and urban areas. However, the land ownership remains the same for the whole family. A typical RCC house and an extension verandah for semi open space and for granary storage becomes an additional feature to the concrete house. The toilet is placed at another end of the plot. The cattle shed becomes a necessity for any household. The house in 2019 shows the further subdivision of the second part of the plot with three sons dividing the property and yet only one family residing in the house. The toilet has become attached and in one of the plots the cattle shed is removed. This is the present stage of the plot in 2019. This is the transformation process of the built fabric and also the division of the plot since 1930. The plot was purchased and house was built in 1930. The changes which have taken place is a result of various parameters, like change in the family structure, growth of the family, subdivision of the agricultural lands and residential plot, socio-economic aspects, urbanization etc. Fig. 4 shows thevarious transformation stages of the house forms since 1930 to 2019, but the requirement of the occupational spatial needs remained the same and time to time the families have been making the use of granary storage spaces, cattle sheds, storage for agricultural tools and other activities.

Conclusion
Golpelwar (1996) has pointed out that no housing scheme has taken care of the fact that rural people stay together with their animals such as goats and cows and their traditional dwellings and will take care of this requirement whenever they build a house. Housing is not

just providing a shelter in a vacuum. The study made by Sen (1996) reveals that no provision is made for the house owners who might like to keep their goats and buffaloes within the premises of their houses. Seetharaman (2006) has said that rural housing needs special provisions for providing support facilities for the occupational groups. These include spaces for the preparation of yarn and keeping weaving equipment for weavers, space for beedi rolling for beedi workers, for carpet weaving and shredding operations for carpet weavers, for pottery wheel and for drying and firing of pottery for potters, etc. For building components based on raw materials available in the rural areas, other alternative material components could use environment-friendly approaches.

The study observed that 38% of households were either rectangular/square in plan with thatched roofing and 34% were rectangular in plan with Mangalore tiled roofing. The remaining 28% were of RCC structures with flat roofs and modern building materials. The housing form analysis has recognized seven different types, which were repetitive in all the rural areas of the state of Andhra Pradesh with changes in percentages. This was also due to the transformation occurred in the housing forms resulting from various reasons like urbanization, migration, change in building materials, technological shift, cultural changes etc.

Transformation in general is a natural phenomenon. It was found that the plots were sub divided due to incremental growth of the families. Still spaces like verandah, granary storage, hay stack, storage for tools and equipment shows the occupational influence.

The designs, materials and techniques being presently followed by the villages have emerged because of centuries of usage and have been established as traditions because these are the methods backed by the knowledge and experience gained their fore-fathers over many generations. These should be understood, documented and improved upon instead of being discarded or radically changed without properly understanding them.

Extraction of such principles and using them as pattern by designers can help to have newer and better designs because it will be wrong expectation from a designer to have an ideal design without paying attention to such thought which comes from long-term occupancy of human (Salahedin, 2016). Hence, the analysis of housing form and the transformation process in rural areas would help in understanding the rural housing scenario. This documentation and analysis of housing forms and transformations will help in restructuring and revising design guidelines. The introduction of new and stringent policies as a part of therural development schemes in India will help to serve every rural poor Indian family with basic housing and essentials. The detailed studies and documentation of rural housing for different contexts in India could be the further scope of this research.

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