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Contextual Comparison of Courtyard Houses in Tamil Nadu

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Abstract

Background/Objectives: Courtyard had been a prototype in residential architecture throughout the past. The objective of this study is to understand the adaptability of the courtyard form in the present day's context. **Methods/Statistical Analysis**: A qualitative analysis is done through comparison of case studies. Two individual residences are considered for study, one located in Thirukazhukundram, a traditional settlement and other located in Medavakkam, a bustling suburb, both in Chennai. The aspects with which the entire study is carried out are physical aspects, environmental aspects and behavioural aspects. **Findings:** From analysis, it has been found that atrium is an adaptive strategy shaped by these factors. Also, atrium in the case of residential architecture is primarily the result of cultural production. It has become alternate in residential context at present. Courtyard form which accommodated change has evolved into atrium for want of increased privacy has adverse psychological effects on the residents. With the introvert forms gaining priority over extrovert forms, atrium has the possibility of becoming a prototype for years to come. **Applications/Improvements:** This research can be applied further to residences in any context with reference to its climate.

Keywords: Atrium, Courtyard, Residences, Suburb, Traditional

1. Introduction

Courtyard can be defined as the opening present inside a building. Home is where every common man communicates with the built environment in his day to day life by means of his daily activities. Every dwelling is inadvertently an expression of its user in terms of built form. Hence, the dwelling is essentially planned in such a way that it instantly satisfies all the basic necessities of the user in terms of its spatial requirements.

Traditional dwellings are a great value to the society as every single element or space has been planned. Spaces were used efficiently. These buildings have become benchmarks since they were closely knitted with the society. They were planned to function as individual units if necessary which can also act as one collective element when required hence are multifunctional. There existed flexibility in space. Courtyard is one of the prominent features of traditional house that had contributed to sustainability. Research on courtyard houses in traditional societies have proved to be contextual which responds to cultural and climatic needs of people. Courtyard has gained an identity in residential planning in India. Urbanization has led to a decrease in individual residences which has diminished the open spaces or courtyards. Over years the transition is witnessed because every minor change that takes place in the design and pattern of use represents a definite but indirect shift in culture and the expectations of the people. Individual residences have become a status symbol of the elite especially in urban areas. Whereas in rural areas irrespective of size, they are still preferred and constructed. The actual essence of courtyards is lost in current construction. Therefore, this study attempts to understand and analyze the significance of courtyard form in the contemporary era.

The courtyard's function depends on its location in the residence. The idea of courtyard can be passed from one generation to the other as a cultural heritage, symbolically or conceptually[1]. Certain biosocial, psychological, and cultural characteristics of human beings influence

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certain characteristics of the built environment. Culture is difficult to see, but its products could be seen. Built form is a minor part of culture and is a subdivision of it[2]. Balance that exists between Nature and built area, traditional units, folk life, art and habits, values of the local communities and nations and the character or culture of the countryside etc., is to be protected for sustainable development of rural settlements[3]. Culture must also be a part of designed environments to achieve "sense of place". The interaction between the form and its meaning is higher which is again because of the culture of the place[4]. In Cairo, the courtyard typology of houses disappeared around 1848, though the revival of the traditional occurred in 1919, the conceptual understanding of its form, position etc. was lacking, it only came out to be more of a surface treatment. Yard existed at the front, back or to one side for recreation in 1930s to late 1940s. In 1950s, Hassan Fathy reintroduced courtyards, small courtyards for light and ventilation and larger courtyards for living and entertainment[5]. Courtyards of vernacular residential building had uses as sleeping, drying, cleansing, cereal preparation, cooking food, having Tulsi plants gardening in centre for worship, socializing, gathering, playing etc[6]. A courtyard allows the older people and the people who cannot move swiftly or with mobility disabilities to enjoy the external environment indoors[7]. Courtyard is the culmination of sustainable housing and the conservative Saudi Islamic culture[8].

For the courtyard to be cool, the ventilation to the courtyard in the horizontal axis must be carefully planned since it affects more than the number of openings[9]. In areas which experience hot arid climates like Cairo, a focal fountain is planned at courtyard's centre to create a "cold air reservoir" which increases the humidity in the dry air[10]. Courtyard may also be defined as an organism, ecosystem etc**.** (made of soil and other minerals, sky, water, plants, human) which are natural bodies and man-made bodies such as frame, architectural material, human products, say built environment adjoining each other[11]. Contemporary courtyards fail to create sustainable solution since they lack ideology[12]. Courtyard has an effect on the behavioral aspects of the residents of the house by bringing in sun, wind, rain and sky as a part of the interior of the house[13]. The courtyard's position along the main axis of the building and its sunken floor level with roof sloping into the yard are few of the passive techniques adopted to bring in cool air and to ensure a better air circulation through openings at the lower level, ventilating all the habitable spaces around the court, otherwise called stack effect[14]. The increase in the number of high rise buildings in the housing sector in contrast to the small traditional house is one of the factors that have led to the difference in the way of construction of the courtyards of modern houses[15]. The physical and the symbolic aspects of **co**urtyard have a strong effect on the evolution of a city[16]. Orientation of fenestration and air velocity fails to maintain better indoor temperature than the outdoor during the day[17].

2. Research Methodology

The purpose of this study is to identify, analyze and understand the adaptability of the courtyard form. Two individual residences have been considered for study one located in Thirukazhukundram, a traditional settlement and other located in Medavakkam, a bustling suburb, both in Chennai.

The aspects with which the entire study was carried out are physical aspects, environmental aspects and behavioral aspects.

2.1 Case 1: Courtyard House at Thirukazhukundram

2.1.1 Description/Character

The traditional house chosen is around 70 years old, built in 1945. It is situated in Thirukazhukundram, in Chennai, Tamil Nadu. The house accommodates 6 members. The house is single storeyed, east facing and detached. At the entrance of the house is the semipublic space called thinnai separated by a small passage that opens upto the private spaces of the house. A courtyard, otherwise called "muttram" in Tamil, is present at the centre of the house. A passageway surrounds it which leads to 3 rooms, a kitchen and a pooja room. Further an anti-space leads to another room on the south and the northern side has a well and a toilet block. The off-centered courtyard is visible from the main door. Figure 1 shows the plan of the courtyard house at Thirukazhukundram.

2.2 Physical Aspects

2.2.1 Proportion

The courtyard is square in shape. The size of courtyard is comparatively smaller when compared to the size of the house. The solid void ratio is 1:0.05.

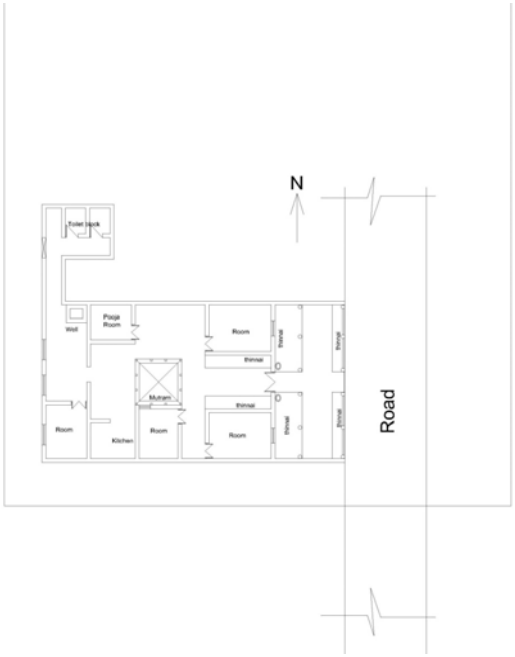

Figure 1. Plan of courtyard house at Thirukazhukundram.

2.2.2 Orientation and Enclosure

Major axis of the house is along north-south direction and hence avoids east-west. Entrance to the house is from the east. The central position of the courtyard allows it to be visible from the main entrance of the house. The courtyard is open on three sides whereas its southern side is enclosed by a wall of the room which abuts the courtyard.

2.2.3 Air Movement

Residents of the house use courtyard and rest of the house according to the changing wind movement within the house (morning wind and evening wind). Induced ventilation takes place due to the movement of convection currents within the courtyard.

2.3 Environmental Aspects

Roofs of the courtyard are sloped to collect rain water.

2.3.1 Temperature and Comfort

Diurnal variations in temperature happen over a period of time/throughout the day. The courtyard assumes more of a functional role than its aesthetic counterpart. It acts as a 'light well' as it connects the indoor to outdoor effortlessly.

2.4 Behavioral Aspects

Courtyard serves for a variety of purposes. Activity within courtyard changes according to time of the day.

2.4.1 Anthropology

The space courtyard offers is also used for drying clothes, groceries and food products like red chilli, groundnuts, etc. safely. It is always noted to be a secured play area for small children of pre-school age who can be taken care by their mother or any aged person from within the house. The courtyard eventually becomes a wash area, collects and stores rain water in rainy season, uses the washed water under recycling process for again washing sunken floor against screenings that are found remaining from cleaning vessels and utensils especially when rain is scarce. This conscious but sophisticated flexibility in plan can be attributed to the proximity between kitchen, pooja and courtyard. Almost every other main space has its direct connection with the courtyard. This has a psychological effect. The dwelling had been planned in such a way that every resident of the house tends to connect consciously or unconsciously to the courtyard physically or visually while carrying out their daily activities. This ensures that through courtyard, interaction tend to take place within the inhabitants formally or informally. Figures 2 and 3 show the central courtyard covered with grill bars.

Figure 2. The central courtyard.

Figure 3. Courtyard covered with grill bars.

2.4.2 Culture

Courtyard with the presence of Tulsi maadam serves as an extended space for performing pooja during mornings and evenings as is popularly known as "Sandhyavandanam". The mere presence of it is taken as an identity for sanctity in Tamil culture.

The courtyard remains semi-covered with grill bars on top of it for security reasons.

3. Case 2: Courtyard House at Medavakkam

3.1 Description/Character

The modern building is 8 years old, built in 2007. It is situated in Medavakkam, Chennai, Tamil Nadu. The house accomodates a family of 4 members. The house is single storeyed, west facing and detached. The house has portico, foyer, living cum dining, kitchen, two bedrooms and a toilet. A semi-open space is present at one corner of the house.

The living cum dining opens to the semi-open space which visually connects to the side yard through jali work interspersed on the wall. The semi open space initially planned as a courtyard with 3 sided wall has a low level informal seating on the fourth side. Figure 4 shows the plan of the courtyard house at Medavakkam.

After two years of construction, the courtyard space was covered on top with receding beams forming an atrium-like structure. Figures 5 and 6 show the semi-open space with receding beams. It was done to avoid dust

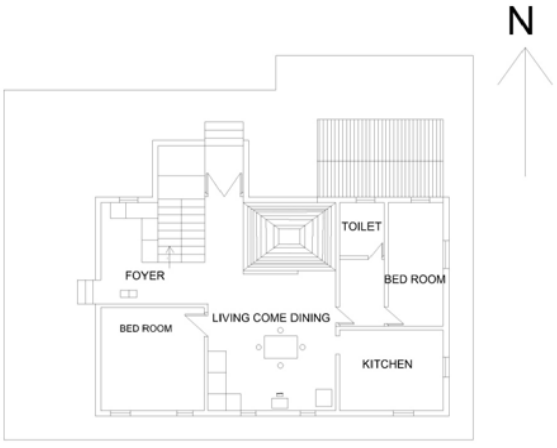

Figure 4. Plan of courtyard house at Medavakkam.

Figure 5. Semi-open space.

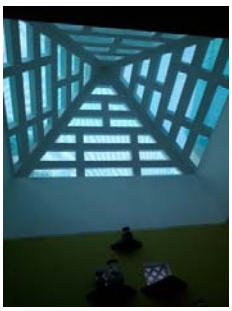

Figure 6. Receding beams.

but allow light. Figures 7 and 8 show the view of living cum dining space and jali work on the exterior wall respectively.

3.2 Physical Aspects

3.2.1 Proportion

The courtyard is rectangular in shape. The size of courtyard is comparatively smaller when compared to the size of the house. The solid void ratio is 1:0.5

3.2.2 Orientation and Enclosure

Major axis of the house is along north-south direction and hence avoids east-west. Entrance to the house is from the west. The semi open space which occupies a corner of the living cum dining room faces south and the extension direction of it is from north-south. It is not visible from the main door. The semi-open space is open only on the south to the living cum dining space.

3.2.3 Air Movement

There is no significant air movement in the semi-open space except that hot air rises to the top. Though the living cum dining space has fenestrations the air movement is

Figure 7. View of living cum dining.

Figure 8. Jali work on the exterior wall.

considerably less and stagnant. The openings in the jali wall does not facilitate cross ventilation.

3.3 Environmental Aspects

The design of the house has no environmental considerations.

3.3.1 Temperature and Comfort

Diurnal variations in temperature happen over a period of time/throughout the day. The courtyard assumes more of a functional role than its aesthetic counterpart. It acts as a 'light well' as it connects the indoor to outdoor effortlessly.

3.4 Behavioral Aspects

The semi-open space serves for a variety of purposes.

3.4.1 Anthropology

It is being used as an extension of the living cum dining room and some food products are stored sparingly. Tiny cuddapah slabs protruding in a staggered way from the wall carry artefacts. The space is used by the female community of the house during mornings and evenings but rarely. After alteration of the existing courtyard form, the space has become like an additional room in the house rather than being a break out space or transitional space connecting the indoors to the outdoors. The proportion might also have contributed to this effect and use.

3.4.2 Culture

A phenomenal shift is taking place in the culture based activities from the open space(s) within the building to open spaces outside the building such as setback open spaces, terraces. Sometimes, the activities happen in the hall or living cum dining room which has become multipurpose these days.

4. Comparison and Analysis

When these two buildings are brought under comparison, the following observations and analyses can be done. In the traditional house, all the activities are connected and focused towards the courtyard due to its central position in planning. It serves as a multifunctional space where it not only becomes the center of activities of the dwelling but also the center of life within, whereas in the modern building, the open space is off-centered. The open space does not accommodate the activities that the space was supposedly planned for. Rather, distribution of activities happens to other spaces in the house especially to the living cum dining due to its central position. The open space is used like a storage area. A higher degree of privacy which is required in the current era is clearly evident when the roof plan of both the houses, especially the plans of their respective open spaces were considered. The atrium turned courtyard open space serves both aesthetically and functionally. Functionally, it acts as light well rather than connecting the indoor to outdoor for which the courtyard form has evolved and has been a prototype for years. It has maintained porosity in the traditional structure ensuring easy communication between people doing various activities within the house. The off-centered atrium fails to do this which is much more needed in the current scenario. Courtyard can be called sustainable because it has space flexibility whereas it has been found missing in the atrium.

5. Results and Discussion

A house or dwelling can be termed as a rationally planned area where the composition of various activities happens.

Hence, these activities within the house shape the spaces and the house is a collective unit of each of these individual spaces. When each of these change according to time and culture, automatically it has its effect when dwelling is planned which becomes a prototype in the following years. The form making process has been going on for a decade and a slow but gradual synthesis has happened between courtyard and atrium leading to cultural change. The courtyard may be called as the space which generates a lot of activities whereas the semi-open space in the modern building shows rigidity in planning. This accentuates when the visual connectivity within spaces in the modern building increases. The courtyard form has evolved into the form of atrium for various reasons of which the cultural reason has taken a front seat. Increased degree of privacy, low maintenance and introvert form which are highly considered as necessity in the modern world are few of the factors which has attributed this change. These have high priority in the mindset of people become habits which are shaped by circumstances which become culture at some point of time.

Modern buildings prove to be a clear example where the evolutionary cultural changes are evident especially atrium in residential architecture which is an outcome of cultural production. At present, the design of residential buildings lack open space for want of enclosure, additional rooms etc. Hence, atrium is an adaptive strategy shaped by behavioral, cultural, environmental and social factors. It has the possibility to become a prototype until the next prototype takes over. When any change or outcome of a change evolves over a particular period of time and a sensible adoption and careful amalgamation of the evolved form in the planning of residential architecture is done, it would definitely contribute more in adding sense to architecture itself, which justifies why vernacular architecture is still an example to be learnt for the present and future. Courtyard has accommodated change in it and has become an atrium to solve functional needs and purpose. It has had maximum adaptability and flexibility.

6. Conclusion

The position of courtyard or any open space decides the users and its pattern of use. Though atrium evolves from courtyard it gives the feel of being indoors rather than outdoors. No other derivatives of courtyard can replace the feel and porosity that the form itself of it gives although it satisfies some functional requirements of courtyard like lighting. Major alterations to the courtyard can completely give a different sense of space and utility. During this recent age of cultural fragmentation it is important for architects to design spaces having a sense of settlement and security especially in residential architecture. Courtyard, the "key element" has established its vital role according to time. Atrium has become an alternate for courtyard in the present context in residential architecture. It acts as 'light well'. But, it gives more sense of a room than an open space.

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