REPRESENTATION OF TRADITIONAL ARCHITECTURE IN THECONTEXT OF SUSTAINABILITY: A CASE OF TRADITIONAL KERALA ARCHITECTURE

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ABSTRACT

Nature is dynamic with its own laws. Everything evolves with its dynamism and continues to evolve with the same laws. Knowingly or unknowingly humans are also a part of this evolution, and their art and architecture. Architecture is said to be sustainable when it performs its functions over the dynamics of environment and of users and their activities, providing psycho-physical-physiological comfort. Traditional architecture is a part of this architectural evolution. Ancient architects have unlatched the secrets to manipulate the built environment, passively to bring psycho-physical-physiological comfort, through the wise use of planning, construction techniques and materials, which may vary with respect to different regions. There is a necessity to explore more and study its patterns in activities, in materials and in spatial arrangement, and its response towards dynamic ecological environment. Traditional architecture is said to be sustainable over a time period, since it obviously failed to accommodate the changing demands of socio-cultural patterns, for example family size. The modern construction impacts are so high on the environment during construction as well as operation. A bird makes its nest within few days, with the resources within its reach, without creating much impact on environment. Astonishingly humans could never do that, even though they are said to be the most intelligent species, making their own tombs to live in future. Hence, there is a need to understand traditional architectural context, that how it was sustainable, and relate it with modern architectural context to evolve the factors that will affect the sustainability. A case of traditional Kerala architecture is taken for study to understand the context. The paper will make an attempt to understand and provide the factors which will affect the sustainability of architecture.

KEYWORDS: Sustainable architecture; Agricultural Nalukettu; Built environment; Traditional architecture; Modern architecture
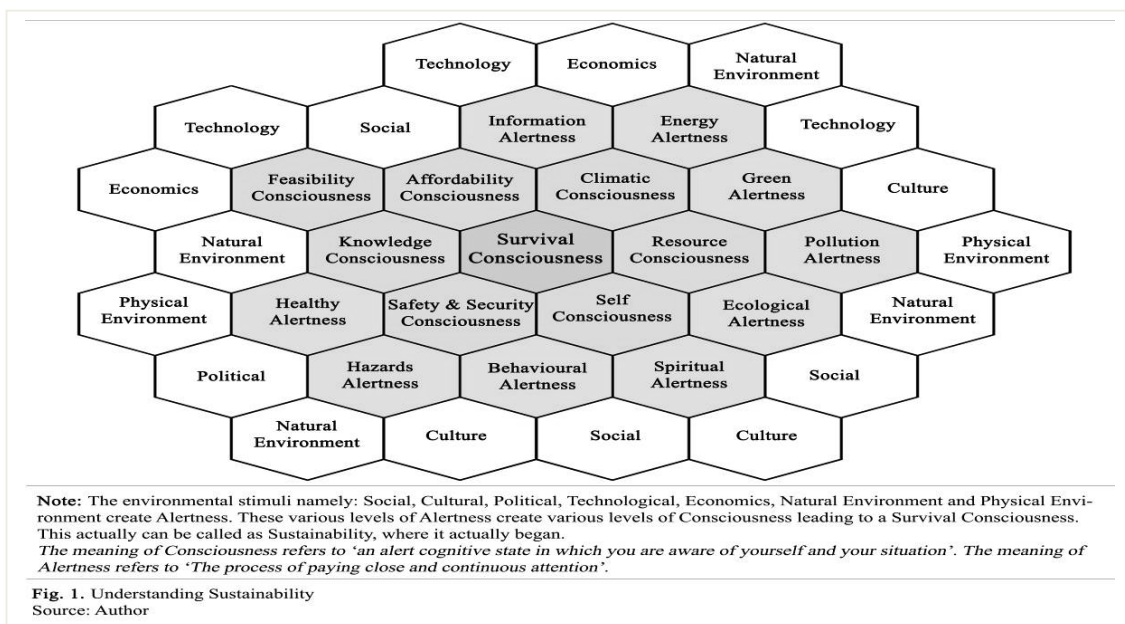
1. INTRODUCTION

Today people are alert with resource depletion and energy usage, in the way they are conscious of their survival, individually and socially. Interestingly people are living such a complex life; they forgot nature and its simplicity. Sustainability is a factor of time; this

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invisible dimension creates dynamism everywhere. The basic concern of sustainability is the future. As today's concern the buildings are designed in such a way to contribute to serious environmental problems through excess consumption of natural resources and pollution emission; rather than buildings to become productive, today every building is only emitter. We all have a responsibility to give back the stolen future to the people who owes next. The responsibility is not only extending towards natural environment but towards all kinds of inhabiting species, without them we will never exist. Now it is the time to look back to the past and learn by tracing the path taken.

1. Understanding Sustainability

According with the definition given from the Brundtl and et al, 1987 in our common future, "Sustainable development is that development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Human is a social animal. An individual or habitat can never become sustainable, since sustainability is an impact network, with many elements. So, when the society becomes sustainable the individual will. Fig.1 explains an understanding towards sustainability, where it began.

Architects are responsible for the creation of sustainable humane design, since they are the creators of built environment. There are many factors to discuss and outline with the sustainability. Some of the main factors which are derived from study are discussed below, representing traditional Kerala architecture to answer all of them.

Note: The environmental stimuli namely: Social, Cultural, Political, Technological, Economics, Natural Environment and Physical Environment create Alertness. These various levels of Alertness create various levels of Consciousness leading to a Survival Consciousness. This actually can be called as Sustainability, where it actually began.
The meaning of Consciousness refers to 'an alert cognitive state in which you are aware of yourself and your situation'. The meaning of Alertness refers to 'The process of paying close and continuous attention'.

Fig. 1. Understanding Sustainability
Source: Author

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2. Technology Vs Sustainability

As mentioned before, it is the time to look back; Traditional Architecture teaches us the lessons of simplicity and healthiness, which is evolved through time, which we could never negotiate. Each space is also formed due to certain necessities for example menstruation out house for women. Kerala Architecture is also one of the evolved architecture which sustained many years like in other regions, which people may or may not have noticed. Laurie Baker, the legend of architecture for the poor, designed houses for many, using down to earth techniques in Kerala. In his words "The few examples of attempts to modernize housing merely demonstrated, only too clearly, our modern conceit and showed how very foolish we are when we attempt to ignore or abandon these hundreds of years of 'research' in local building materials…". He also said, "The resources are in scrutiny, the natural reserves are depleting, with the high tech stuff nobody has been able to come up with solutions that are energy-conserving both in the production of materials and how they are assembled". Do the technologies are really paying? This question is raised because rather than developing and underdeveloped countries developed countries is the major donor of pollution and environmental problems. This might be due to the unique cultural heritage of those countries.

3. Methodology

This paper discusses on traditional Kerala architecture in terms of sustainability. How and what way they were sustainable. This will lead to a conclusion that reflects the major factors regulating the sustainability principle in today's context. To come to a conclusion of factors affecting the sustainability, the study has to go through certain process, which is outlined as,

- ° To understand the reasons and the methods of Traditional ways of construction in Kerala.
- ° To understand the factors better, through analyzing traditional and modern context with respect to Kerala Traditional Architecture.
- ° Conclude with the major factors affecting the sustainability.

4. Representation of Traditional Architecture of Kerala

The Nalukettuis a popular representation of Kerala's traditional domestic architecture. Its typology changes with respect to the user caste, class, profession and region (Jacob 1997). Here to represent traditional architecture in regards for sustainability the best example chosen is with an agricultural context. In an agricultural Nalukettu the character of sustainability will be very much visible, since it got more historic value rather than any. Also the spatial

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activities vary from agricultural use, public use to domestic use. The profession have a direct contact with all other societies in the region making the house socially flexible and rich with culture and makes it politically strong and climatically responsive.

Kerala Architecture goes with certain regional treaties – Vaastushastra; this masons use them for designing, namely: Manusyalaya Candrika, and Thatchusastram. They have used it throughout the phases of building construction starting from site selection to building completion. The study will definitely shed light to sustainability factors, since it gently walked through generations. (See Fig. 5. Probable evolution of Nalukettu).

5.1. Location and Principles

Traditional Architecture followed Vaastushastra for the selection of site and building construction methods. It provides the probable locations of spaces with respect to cardinal directions. It relates the character of building to a demon Vaastupurush. In other way it is understood, building as a living organism. The humans are living within living. Furthermore any living organism requires certain place to live, which is its habitat. The habitat for a building we can technically call as Location. A seed may not grow everywhere it grows only that locations, where the probability of resource consumptions are high in the future. In older days, a site was chosen in such a manner, identifying the resources such as land and water, as well as safety and security from wild. The site also locates with possible goods distribution ways (road and water). Fig. 2 shows a typical site plan of an Agricultural Nalukettu, showing a suitable location to build as seed.

5.2. Site Planning

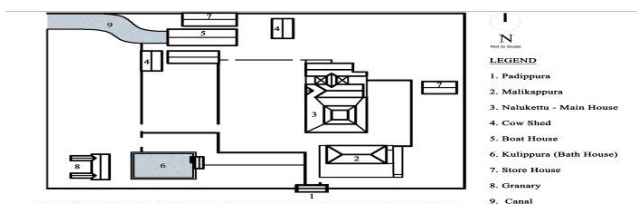Fig. 2 shows a typical site plan showing the facilities and amenities created for a sustainable living

Fig. 2. Typical Site Plan of Nalukettu - Agricultural oriented. *(Modified and used from Jacob (2007))*
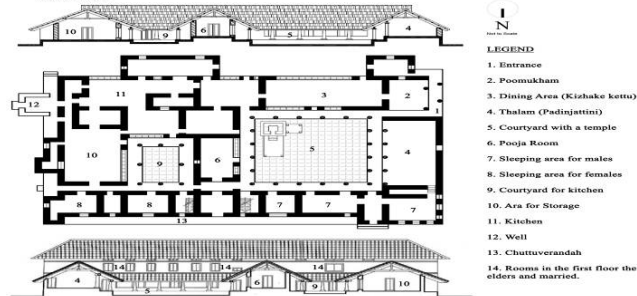Source: Author

LEGEND
1. Padippura
2. Malikappura
3. Nalukettu - Main House
4. Cow Shed
5. Boat House
6. Kulippura (Bath House)
7. Store House
8. Granary
9. Canal

Fig. 3. Typical Plan of Nalukettu - Agricultural oriented. *(Modified and used from Dili et al. (2009) and Vyas (2005))*
Source: Author

LEGEND
1. Entrance
2. Poomukham
3. Dining Area (Kizhake kettu)
4. Thalam (Padinjattini)
5. Courtyard with a temple
6. Pooja Room
7. Sleeping area for males
8. Sleeping area for females
9. Courtyard for kitchen
10. Ara for Storage
11. Kitchen
12. Well
13. Chuttuverandah
14. Rooms in the first floor the elders and married.

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It is visible from the site plan that they were sustainable for that time period. The site is chosen such a way there is abundance of natural resources available around. The site is secured with a Padippura (Entrance Gate) where any stranger can come only till that point. After that, Malikappura is used by the Karanavar (male head) of the house to guard everyone as well as the guests. This reveals the safety measures accommodated. Inside the Nalukettu is used by rest of the family. A part of it is being used by the workers. Adjacent to the Kitchen a well is always present to use water for drinking and cooking purposes. A Kulippura (Bathing House) is located in the site for taking bathing and washing, so that the well water may not be got contaminated. The materials are also taken sometimes from the construction of Kulippura. They were getting grains and vegetable from the field. The hay being used to feed cows, which was getting from the field. Hence there were granaries, store houses and cow sheds were present. For the distribution of these goods they used road ways and water ways. Hence the house was located with a boat house. The resources generated were plenty for all including servants and workers. This definitely created a socio-cultural harmony in the system.

5.3. Building Planning

A typical Nalukettu plan is being showed in Fig. 3.

5.3.1.Spatial Pattern

The building is planned around a courtyard and rooms are positioned according to Vaastu Mandala. This method of courtyard planning brings climatic comfort in warm & humid climatic region (Dili et al. (2009)). The larger courtyard shown in Fig.3 is used for ritualistic purpose, playing area for young and family gathering also.
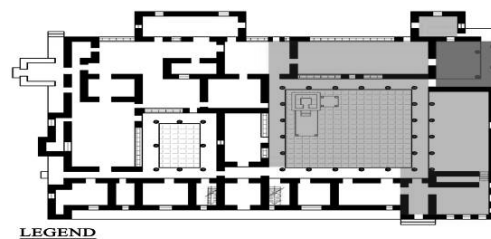
Fig. 4. Typical Plan of Nalukettu - showing Private, Semi Private and Public Area
Source: Author

Mainly the space around is devoted to men for interaction, dining and sleeping. The smallest courtyard refers to the use of washing dishes, interaction space for women and is surrounded with kitchen, storage and sleeping.

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5.3.2.Safety and Security

The main character of the building is that it is divided into public, semipublic/ semiprivate and private spaces (See Fig. 4), so that the level of the safety, security and privacy of the spaces can be brought. Sleeping area for the elders is provided in the first floor. The Public spaces are used by the timely visitors, vendors, etc; there the Karanavar seats.

5.3.3. Flexibility of Spaces

Rather than the spaces to be flexible the activities were. During rainy season people preferred more to sit inside rather than outside. Courtyards were multifunctional as described above, and the kind of arrangement of spaces around the courtyard always had a choice for expansion. (See Fig. 5.)

5.4. Climatic Responsiveness

The traditional buildings are climatically responsive now also (Dili et al. (2009) and Shanthipriya et al.(2012)) the climatic changes had least effect on them. Since, it is possible to call these buildings climatically sustainable.

5.4.1. Materials

There are two major skill of construction practiced in Kerala, notably laterite masonry and wood carpentry. It was available in abundance, and helps to make the design climatically responsive.

5.4.2. Technology and methods

They have adopted passive techniques. The courtyard acted as a major element. Slope roof to respond to heavy rain. And the use of wood regulated the humidity. The use of terracotta roof tiles accommodated infiltration of air. Attic spaces helped to regulate the temperature inside, these were acted as storage area also.

5.5. Social and Cultural Pattern

(See Fig. 5.) According to Thampuran (2001) it is a single hall structure (Stage 1), due to the consequences of structure (Stage 2), lighting and water cistern there formed courtyard Planning (Stage 3). Further people started living as joint families created the hall systems around the courtyard (Stage 4). It made the house even adaptive. The agricultural practice made the house a productive one, lead to the creation of storage spaces. Further according to the sex and activities practiced by them, spaces were segregated. Also the social relations divided the spaces into different levels of privacy. The culture was adopted with climate, life

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style, dressing, food, etc. Due to its simplicity it was sustainable for long. The market force effects were low.

Fig. 5. Probable evolution of Nalukettu
Source: Author
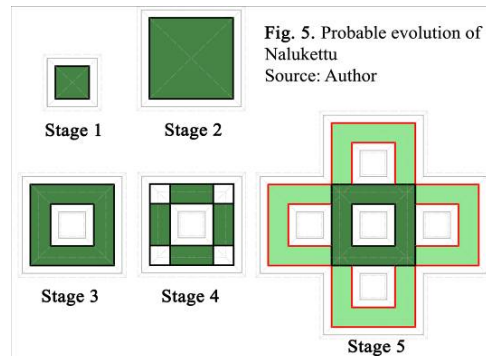
5.6. Aesthetics or Beauty

Aesthetics or beauty refers to healthiness of an organism. Here the beauty refers to the psychological comfort of the user living in, representing cleanliness and healthiness of built environment created. Traditional buildings are carved beautifully in teak wood, and used traditional proportion system to make it beautiful. Their simple lifestyle created lower impacts on the environment, through reduced levels of inorganic wastes. This is lead to a creation of healthy environment and healthy users.

5.7. Civic Interventions

Civic interventions through building bye laws and regulations were limited. This is a positive point towards the freedom of designer or architect, providing a choice to create better designs. They were mostly constrained with the regional treaties alone.

6. Evaluation of Traditional and Modern Context

Nothing can stand in the way of time, even architecture. But it is possible to see some of the principles of traditional architecture withstood the test of time. It is definitely possible to use those principles to create a sustainable modern architecture.

6.1. Standardization

Each and every material available now is standardized (Anil (2013)), irrespective of where they produced had similar standards. That eventually may lead to structural failure of that element. The workers of today have forgotten the methods of construction using locally available materials. In a very contrary sense very soon the society may collapse due to affordability to buy the material and technology.

6.2. Market Forces

The locally available materials increase the affordability and decrease the embodied energy, through the cost and price of the material and technology will be reduced. Today the market acts vice versa through producing new materials with high embodied energy and forcing the population to buy through advertisements, even though they were not climatically responsive (Eg: Asbestos sheet). This forcefully created demand causes an effect on increasing price, cost and embodied energy. This is leading to increase in operational cost of the building. The ads have certain impact on life style of population through the communication of information. In today's context, these may eventually lead to collapsing of the system through chaos of information.

6.3. Technology

Rather than necessity the technologies are becoming a part of life style. Each and every house now a day has HVAC systems, keeping the doors and windows closed throughout the day. This is actually making the population low responsive towards natural environment, and making them going forward to pollute it.

6.4. Civic Interventions

As Baker (Bhatia (1987)) and Anil (2013) stated that Government is the problem not the solution. Today there are more bye laws and regulations attached to the building, rather than giving freedom to the architect. The question further may arise is that, 'why the architectural course then?'

6.5. Social and Cultural Pattern

There was a rapid change in family size from joint to nuclear. This led to change in life style, which was market oriented. The average resources required for a nuclear family is higher than joint. It is visible that traditional architecture was not socially or culturally sustainable, due to the effects of market forces.

6.6. Productive Houses

The earlier houses were productive; most of them were practicing gardening and agriculture, also the women in the family were purely house wives. Today everyone is employed to make up with affordability to live, due to the market forces acting on them. Living is becoming

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short. The houses are becoming machines to create wastes. The architects definitely have a responsibility to recreate the link between natural and built environment.

7. Conclusion

The solutions are actually simple as noticed from the past. Today the solutions are highly technological and infinitely complex. The roots of the problems are often ignored since the challenge it may pose. The major factors which are influencing the sustainability of modern architecture are:

° Life Style factor: It is the factor of market forces and info pollution. There is necessity to lead a simple life style. This is user responsibility to organize.

° Location factor: Where the building is constructed and to preconceive the impact with the environment.

° Material factor: Use of locally available materials, which may bring climatic sustainability, and increases the affordability and reduces the embodied energy.

° Technology factor: Adoption of passive techniques and use the technology with respect to necessity.

° Crime factor: It is a new socio-cultural concern due to the kind of lifestyle created. This factor even made Pruitt-Igoe housing complex containing 33 apartment building blocks in US city of St. Louis, Missouri built in 1954 to torn down in 1970's.

° Ecological factor: There is a necessity to understand that we are a small part of this ecological system. We have to respect this system through creating contact with them. Through creating a Holistic human settlement design.

° User factor: There should be provisions for people to participate in planning and decision making in civic matters is a way forward.

Anil (2013) states, it is almost as if living in the past would soon be considered futuristic'. It is not about going back to the old systems. But there is a requirement to adopt intelligent use of present technologies. Also to develop a humane architectural culture, so that everyone will be satisfied materially and spiritually.

8. Acknowledgements

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