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Strategy for Flexible Spaces in Housing – A Study With Reference To Agraharams in Kumbakonam

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Abstract: *Some spaces in architecture have been useful in different applications. Hence let us think of some of these spaces which are flexible for the multi-purpose utilisation of spaces. With the advances in technology the various elements which form the interior spaces such as the walls, floors, and roofs need not be designed in a rigid way. Such flexible options would give more options for flexibility to space and can be called as a multi-application' space. The prehistoric man started constructing his dwelling using his own ideas. Where nature provided caves and trees were the two main paradigms which acted as shelter, stone, and wooden shelters then came into existence. The next stage progressed with the use of animal bones and skins of animals as he used plains for hunting and agriculture being an occupation. This architectural progression of using animal bones and skins gives an option to flexible opening and closing from the past. Hence from centuries back invention of lightweight structures been utilized by man. The main objective of flexible spaces in architecture is providing spaces that change structure pertaining to the required performance and application. Any space or structure that is designed for flexibility should be identified by their interior elements like the floor, ceiling, and walls where there is a scope of shrinking and expanding.*

Keywords: *Flexible Housing, Activity Analysis, Spatial Dump, Agraharams.*

AIM OF THE STUDY

The aim of the study is to explore the extents and limitations of flexible design approaches for housing in India. The main purpose is to find out how flexibility gives the opportunity to architects to produce more creative options for the changing demands of the users during occupancy though they may be or not used by the users.

INTRODUCTION

The concept of flexibility is a very important concern particularly in the design of housing where changes have to be accommodated over time, user and space. Thus, flexible house corresponds to “a house that can adapt to the changing needs of users” (Till and Schneider, 2005, p. 287). The spatial arrangement if fixed directly imply boundaries and inhibit spontaneous adaptations to new forms whereas a flexible arrangement helps in blurring the boundaries. Designing a flexible house is a proposal which will be imagined and coordinated at various scales like the room, building, and urban level. Though the basic modular type of construction is an old tool for economically expanding access to the quality living. Making a house flexible is a call to think where the residential building assets are designed as readily alterable systems with scope for shifting the various components at room level or building level for example from the kitchen to bedroom or from residential to commercial. Any house which is built is static and immovable whereas the occupants of the space are not. Size of families increases, decreases and sometimes change and at the same time the occupants and their needs too. Then what is the solution for designing houses which are adaptable??

ORIGIN AND DEVELOPMENT OF FLEXIBLE HOUSING

How did flexible housing develop? What is its origin?

Flexible housing is said to have its origin from two sources:

1. Vernacular Architecture and interventions of the design of 20th century were the major reason where long-term adjustments happened due to the culture and usage pattern which took into consideration the challenges of climate, site and other limitations.
2. On the other hand, the development of flexible housing was the result of architects or designers “ Deriving solutions through expertise which is an innovative solution”

Vernacular housing for multiple cultures developed to be a flexible solution, for example, multiple activities happened within a single room and it coped up for many generations too. Vernacular housing responded to culture, site, climate and other resource needs. Thus the functional system of a space is designed with the following steps.

Any event zone is configured or arranged by linking or relating to each other by **Proximity, isolation, and overlap between one activity and another**. Thus when analyzing and drawing a function-system diagram of a house the following are to be addressed:

- Isolation of activities
- The degree of accessibility that is required between two activity zones?
- Activities that share same space

What is a house? From prehistoric man to the present, whatever be the culture and type of people the functional interpretation in a system remains the same: Living, Sleeping, Cooking, Eating, Washing/bathing, Working, Storing, and Religious needs. People or the user is the generator of this spatial matrix based on his personal needs and also the needs of the community.

Thus the various types of flexible spatial systems fall under:

Transformable flexibility - In response to the need for spatial Re-configuration and reuse.

Portable flexibility - In response to the need for spatial relocation and mobility. Thus we find two broad categories of flexibility in spatial systems environment, or its parts can be transported to new locations.

Transformable Portable Flexibility

Within transformable space and portable space, one may or may not contain the essence of the other.

We can state at the end of this study that designing with flexibility is to do with

1. The various Layers of systems
2. Different Parts of each system
3. Link between the different layers and their parts
4. Various design parameters (Definition of links)

Using the above definition of systems, one can define flexibility limits for a single project. Analysis of systems gives a better understanding and control of the possibilities that arise and the needs of that project.

AREA OF STUDY

KONERIRAJAPURAM ITS LOCATION AND FABRIC

The samples considered for the study is different traditional types of houses in Konerirajapuram. It is a tiny village on the Kumbakonam Karaikkal route, about 2 kilometers south of Pudur and about 24 kilometers from Kumbakonam. Harith Gothra, Kowsika Gothra, kasvapa Gothra and Shreevastha Gothra are the prominent gothras of the residents of Konerirajapuram. This village is known for its vedic tradition. Most of the Brahmin population are sama vedis with a few Yajur and Rig Vedis. Social obligations were meticulously followed by all people. It was a place where Hindu customs, vedic traditions, Temple worship and social harmony existed like a single family. The front of the house is well laid with a big kolam. The houses were either 4 - Kattu or 5 - Kattu. The 1st kattu has got two portions: Open to the sky and second covered to take care of rain and hot sun. A thinnai on either two or three sides. A part portion is covered with thatch to keep cool. The second portion of 1st kattu is called **Mappilai Thinnai**. This thinnai is divided with a passage for entry to the house. 2nd kattu leads to a passage to the main house along with one small rest thinnai called **Alodi**.

The extended area from thinnai has got rooms to suit the requirements. 3rd Kattu is **Muttham** Open area facing the gate and rear side gate. Adjacent to the muttham area is the hall. The 4th Kattu contains kitchen, store, pathayam, and godown for farm and other implements to the store. The 5th Kattu is exclusive for bath, toilet with a small pin kattu thinnai. The 6th kattu is open with a kitchen garden area with a well and few multi-purpose rooms. In some master bedrooms, there are glass tiles on the roof to get daylight and moonlight to the bedroom. We can seek post wooden trussed roofs in the houses. Courtyards are of both central and eccentric type.

The following samples were chosen and taken for study

This house is further divided into three parts, originally a single property. It stands as an exemplary example of the housing complex. This house is located at the corner of nadu theru or the carnival street. The house has a linear plan with major spaces aligned along an axis. The entrance consists of a thinnai followed by a narrow vestibule with two rooms on the left. The center has a rectangular courtyard with a parallel pillared hallway. The house further divided into kitchen and an anti-space that spans the backyard. Newly built washrooms are seen in the backyard.

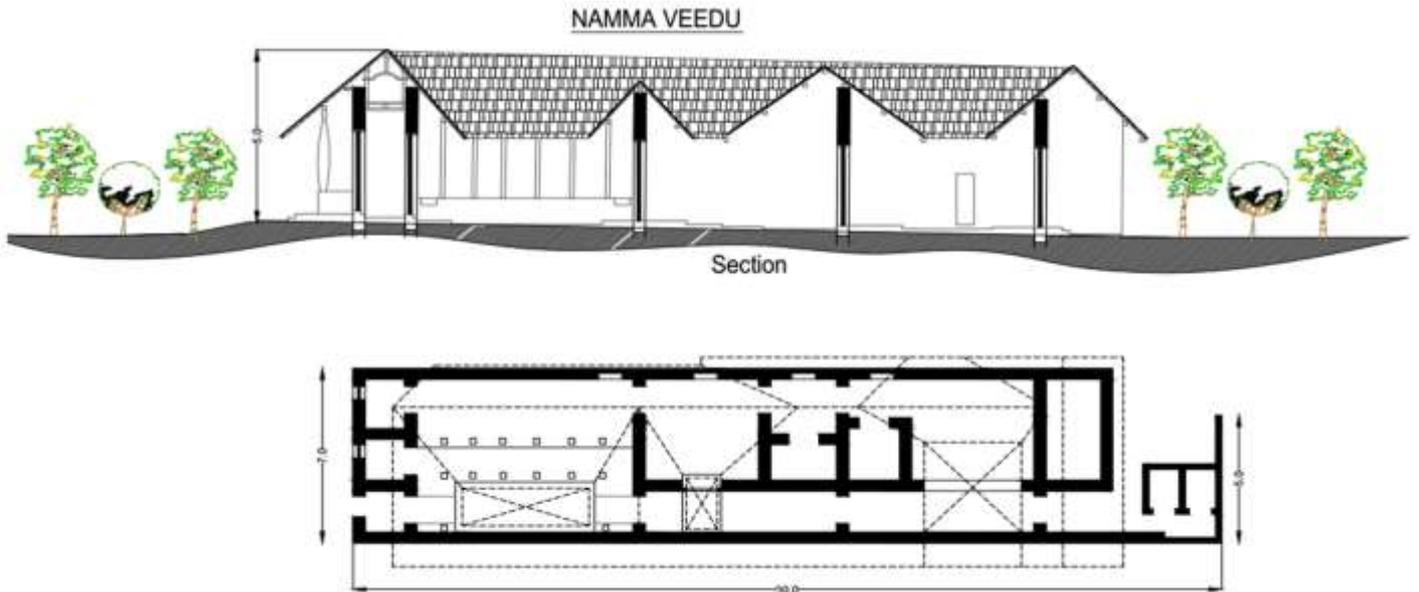


Fig 1 PLAN AND SECTION SHOWING THE VARIOUS SPACES

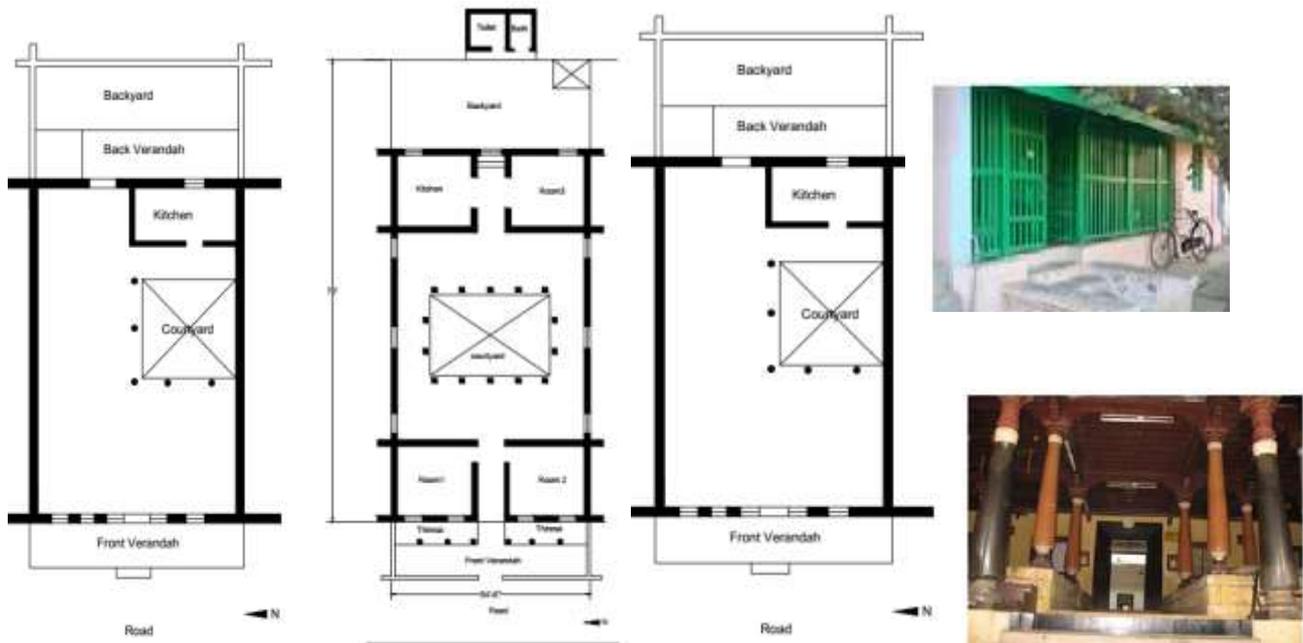


Fig 2 PLAN AND SECTION SHOWING THE VARIOUS TYPES OF COURTYARDS

S.NO	ELEMENT	USE/FUNCTION	SEQUENTIAL SPACES MOVEMENT AND PERCEPTION	TYPE OF SPACE	ACTIVITIES ON NORMAL DAYS	TIME DURATION	ACTIVITIES DURING FESTIVE OCCASION	USER
1	THINNAI	Community gathering space for men to discourse on religion. Children to play and men	Welcoming and broad	Semi-open	Chating and relaxing. Discussing on religion, Playing cards, Reading Newspaper	6.00 p.m to 9.00 p.m	Mass or group dining space on special occasions	Men
					Kids playing,	6.00 a.m to 8.00 a.m	Guest space	Children

		to relax at night			Sleeping and taking naps	2.00 to 04.00 p.m & 9.00 pm to 6.00 a.m	Guest relaxing and Chating	Women
2	REZHI	Entrance Foyer/ verandah/ place for storing cycles and interaction with other people happen	Narrow corridor shows the depth of the house. Different lighting level. Dark place and open space beyond	Semi-open	Cycle parking An area of transition space	Whole Day	Transition Zone	All
3	CAMERA ROOM	Safety room for valuables. Master Bedroom		Closed				
4	MITHAM	Courtyard which receives rainwater and drains to the backyard. A place for drying grains. Tulsi plant for worship.	Can have an enhanced look of koodam, not in the close vicinity of the public from the entrance. Exclamatory sensorial perception.	Open to Sky	Drying Grains	11.00 a.m to 02.00 p.m	Sacred rituals and marriages are conducted in the courtyard on special occasions	Women
					Sleeping of family members	At nights		All
					Kids playing	6.00 p.m to 8.00 p.m		Children
					Tulsi pooja	6.00 a.m to 8.00 a.m & 6.00 pm		Women
5	THAZHVARAM	A transition space provided with timber columns segregating koodam and mitham.	Part of Koodam Sharing all the activities of a living room					All
6	KOODAM	Living space with oonjal An active zone of the house. A multipurpose Zone	Enjoys the expansiveness of the space with oonjal. A pause and punctuation in space for relaxation	Closed	Living room relaxing in Oonjal	In morning and Evening	Marriages happen in courtyard and koodam as the central space. Dining and gathering/relaxing space. Space for sleeping at night for the guests.	All
					Cutting vegetables	6.00 a.m to 8.00 a.m		Women
					Offering Poojas	6.00 a.m to 8.00 a.m & 6.00 pm		Men and Women
					Kids getting ready for school	6.00 a.m to 8.00 a.m		Children

					Sleeping of household	2.00 to 4.00 p.m & 10.00 to 5.00 p.m		All
7	ADUKKALA	Kitchen and Dining	Dark space for domestic purpose with less lighting and ventilation	Closed	Cutting vegetables	6.00 a.m to 8.00 a.m & 4.00 to 9.00 p.m	Preparation, Cooking area occasionally dining on festive occasions and on sacred rituals	Women
					Cooking space	6.00 a.m to 9.00 a.m & 4.00 to 9.00 p.m		Women
					Dining space	10.00 a.m & 7.00 to 9.00 p.m		All
8	SECOND COURTYARD	Service area for taps, bore wells, Vessel washing, bathing and washing clothes.	Expansive area light and open creating a sense of relief from dark interior. Individual foci, interconnected systems, create a visual and sensorial interest.	Open to Sky	Vessel washing, washing clothes	6.00 to 9.00 a.m & 11.00 to 1.00 p.m	Similar purpose on festive occasions too.	Women
					Bathing			All
9	TOILETS	Beyond second courtyard						All
10	KOTTIL	Cattle area in Backyard			Domestic cattle accessed by the road from rear entrance	Whole day	Similar purpose	Men and Women
11	BACKYARD	Garden or Thotam	Unbuilt open space giving much relaxing time with visual pleasure of garden	Open	Separate space used by servants in those days to access the house and women to use during their cycle days. Gardens used for relaxation also.	Early mornings and evenings	Similar purpose	All

Table 1. FUNCTIONAL ANALYSIS OF VARIOUS SPACES

SPACES	TYPE OF SPACE	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	1.00	2.00	3.00	4.00	Total
THINNAI	SEMIOPEN	■	■	■	■						■	■	■		■	■	■	■	■	■	■	■	■	■	■	18
REZHI	SEMIOPEN	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	24
CAMERA ROOM	CLOSED																									8
MITHAM	OPEN TO SKY	■	■	■	■			■	■	■	■				■	■	■	■	■	■	■	■	■	■	■	19
THAZHVARAM	TRANSITION	■	■	■	■						■	■	■		■				■	■	■	■	■	■	■	15
KOODAM	CLOSED	■	■	■	■						■	■	■		■				■	■	■	■	■	■	■	15

SPATIAL ARRANGEMENT

The house usually measures 100 feet (length) by 30 feet (width). Height varies from 5 feet (mutram) to 6 feet (thazhvaram), 8 feet (kitchen), 10 feet (rezhi with a loft) and 12 to 15 feet (hall). There will be a puja room which will be mostly part of the hall itself. The 'Pin Rezhi' which is a semi-open space covered on all 4 sides or on 3 sides is just behind the kitchen. It is a place for storing unused furniture.

Room formation is vibrant around a strong central nodal axis with a courtyard in the center shows the result of occupational practices. For houses with two floors, staircases were the two internal polar elements. The serial rooms were designed as an enclosure around a functional space and there are series of boundaries defining the space around it. The following were the observations:

- ❖ The backyard spaces sometimes back which served as a community gathering space with well-maintained greeneries is just considered as a potential space for expansion with the changing time and users.
- ❖ The most usable semi-open spaces 'Rezhi', 'kottil' 'thinai' and 'mitham' which once was a space for various activities has now transformed into different spaces like expansion of new structure, adding new rooms as per the family structure and covering the semi-open space with metal screens etc.,

The above observations have a strong contribution due to the following factors:

➤ **Changing ATTITUDES**

Openness and adaption to new western cultures, various new technological advancement, new trends in the behavioural pattern of people.

➤ **Cultural and Social**

Nowadays it is very hard to find joint families and at a point is vanishing slowly and mostly gets converted to nuclear families. Many of the houses are kept locked most of the time as people tend to live in abroad.

➤ **Technological**

Introduction of new technologies has reduced the use of many elements like tanks, wells and most importantly the central courtyard which has served as a major source of light and ventilation. Houses that were renovated with R.C.C. have removed the traditional look of the village. Reduction in the size of the courtyard and transformation to other use provides less lighting and ventilation.

SPATIAL DUMP

What will happen when space is not actually planned for adapting changes during time

Spatial Dump is formed when a planning is not taken into consideration for growth or adapting to changes. In the past years, people lived as a community where there were joint families and each community had its own culture, traditional values, and practices which they followed. The community stayed intact with a single location where they can practice all these cultural values and traditional systems. In the recent years, joint family system is vanishing slowly and there is more number of nuclear families. Thus when there is the advancement of technology, the habitat should be planned for accommodating changes for future making an open-ended solution which subsequently makes the houses fail for a change. Hence all the spaces which were originally planned for various activities of the users are disintegrated, modified or refurbished. This is the major cause of creating Spatial Dump and finally all potential earth's resource, money is being wasted. Any development in housing should allow sustainability in the long run and should not be a source of exploitation.

CONCLUSION

As we all know, currently we are facing major challenges due to the rapid urbanization and climate change. Hence there is a need to understand the various resources that will be required for undergoing constant changes. Through the various samples of case studies of traditional houses, it is evident that accommodating changes for future generations is a much-required factor for the housing sector, where the idea of flexibility for inhabitants, associations and other local authorities in providing a choice which is not evident in this sector. Hence when designing houses it is seen that it accommodates the change in both usages and for the users too. Based on the inferences of the study, Flexibility can be achieved in housing only by two methods: Functional flexibility and adaptable flexibility. Functional flexibility allows for changes in the already existing space, wherein space is intended to perform various functions. On the other hand, adaptable flexibility has its own limitations as to the satisfaction achieved based on the spatial requirements.

Then how to estimate the extent of accommodating space change?

The options that are available for flexibility of a space is endless. Any space has always its relation to its surrounding where the activity is linked to its function for giving a better solution for the future generations. Hence, We as Architects should consider space

planning in all aspects which has infinite opportunities. The final decision is left to the user's realm after architects doing the best from their part of planning.

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