VIPIN KUMAR

GOVERNMENT HOUSING, NEW DELHI

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GOVERNMENT HOUSING, SAROJINI NAGAR, NEW DELHI

BACHELOR OF ARCHITECTURE

VIPIN KUMAR

2015BARC040

SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL

NEELBAD ROAD, BHAURI, BHOPAL (MP)- 462030

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GOVERNMENT HOUSING, SAROJINI NAGAR, NEW DELHI

Thesis submitted in partial fulfillment of the requirements for the award of the degree of

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By

VIPIN KUMAR

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To my family, with love

Declaration

I, **Vipin Kumar**, Scholar No. **2015BARC040**, hereby declare that the thesis titled '**Government Housing, New Delhi'**, submitted by me in partial fulfilment for the award of the degree of Bachelor of Architecture at School of Planning and Architecture, Bhopal, India, is a record of bonafide work carried out by me. The design work presented and submitted herewith is my original work and I take sole responsibility for its authenticity. The matter/result embodied in this thesis has not been submitted to any other University or Institute for the award of any degree or diploma.

Signature of the Student

Date: _20/07/2020

Certificate

This is to certify that the declaration of **Vipin Kumar** is true to the best of my knowledge and that the student has worked under my guidance in preparing this thesis.

RECOMMENDED

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Signature of the Guide

Prof. Sukanta Majumdar

ACCEPTED

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Prof. Piyush Hajela

Head, Department of Architecture

July, 2020, Bhopal

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Thesis Abstract

This thesis is an attempt to create a living space in city for people who are from rural areas. This space is going to accommodate people from different religion, culture, region and occupation. The present scenario of the housing provided by the government is filled with the lot of problems regarding proper spaces, type of spaces, social interaction on upper floors, open spaces with trees and heating of building. This project 'Government Housing Sarojini Nagar, New Delhi' is a model project which resolve the above problems and provide a liveable space for the user of different background. Providing a house to people is just not to provide a shelter, it is a space which fulfil the all human needs by following the mass law's hierarchy of needs. The main motive of this project is to increase a social interaction, creating a sustainable environment and enhancing the ecological relationship.

Thesis Abstract (in Hindi)

यह थीसिस उन लोगों के लिए शहर में रहने की जगह बनाने का एक प्रयास है जो ग्रामीण क्षेत्रों से हैं। यह स्थान विभिन्न धर्म, संस्कृति, क्षेत्र और व्यवसाय के लोगों को समायोजित करने वाला है। सरकार द्वारा प्रदान किए गए आवास का वर्तमान परिदृश्य उचित स्थानों, स्थान के प्रकार, ऊपरी मंजिलों पर सामाजिक संपर्क, पेड़ों के साथ खुली जगह और इमारत के हीटिंग के बारे में बहुत सारी समस्याओं से भरा है। यह परियोजना 'सरकारी आवास सरोजिनी नगर, नई दिल्ली' एक मॉडल परियोजना है जो उपरोक्त समस्याओं को हल करती है और विभिन्न पृष्ठभूमि के उपयोगकर्ता के लिए एक रहने योग्य स्थान प्रदान करती है। लोगों को एक घर प्रदान करना सिर्फ एक आश्रय प्रदान करने के लिए नहीं है, यह एक ऐसा स्थान है जो सभी मानवीय जरूरतों को बड़े पैमाने पर कानून के पदानुक्रम का पालन करके पूरा करता है। इस परियोजना का मुख्य उद्देश्य एक सामाजिक संपर्क बढ़ाना, एक स्थायी वातावरण बनाना और पारिस्थितिक संबंध को बढ़ाना है।

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CHAPTER 1. INTRODUCTION

"Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect." – Chief Seattle, 1854

All living things are connected and environments by some invisible threads that are known as ecological relationship. The gap between these relationships misbalance the whole ecosystem. As Dalai Lama said 'The natural environments sustain the life of all beings universally' if there is a change in an unnatural way then there is a problem come out in the name of disaster. Humans are the most advance species in the world and the last few centuries, they tried to overcome the nature for their advantage and sometimes for a new invention. That's why today we are facing a problem of climate change. On the other hand, the excess use of natural resources the next human generation will not have sufficient resources for them. This is not a problem of a country its problem of the whole world so, what can the solution and current needs?

The building construction is the biggest industry in the world and contributes to the world's economy but it has a detrimental impact on the environment. The construction industry uses approx. 400 million tons of material a year and the extraction of these materials harm environments. There are a lot of other industries which are connected to the building construction like as textile industries, metal production, electrical equipment industry, paint industries etc. so all these industries flourish along with the construction industry. The production of these industries also contributes to the production of toxic gases and chemicals. The construction activities significantly change the surface of the land in the process of site cleaning and excavation which harms the ecology of the site. There is a lot of waste products also in the construction industry and most of the amount is non-biodegradable. The building materials such as concrete, aluminium and steel produce a high amount of CO2. The million tons CO2 emitted from the construction every year which increase greenhouse gas pollution. Today there are a lot of projects are going on which support the sustainable construction and explain how the cost of building can be reduced, what are the eco-friendly materials, how the solar gain of a building can be reduced etc. but in the field, people don't apply these

approaches and they go for the easiest way of construction and less time-consuming way of construction. The government housing projects have a lot of restrictions regarding areas, spaces and services. So, when the building erected on-site there are lots of problems faced by users.

The thesis project is aimed to create a living space for people who belong from rural areas and going to live in the city. This project is focused on the needs of the user, their culture and believes. it also binds them to nature like their previous living environments. The spaces in apartments are provided according to their needs and there are some spaces which are flexible and multipurpose in use. A house is an expression of the user's personality and it starts from the spaces and physical elements of the house and their uses. Flexibility in spaces allows using that space in a different way for a different user group.

The site of the project in Delhi which is the capital city of India and has a lot of environmental issues and the problem of social isolation in residential areas. In residential areas, the common areas are very important which increase the social interaction in different gender group and age group. The terraces, corridors, public balcony and green parks are the most common areas in the residential zones which increase the social interaction. For a healthy life, it is necessary to have human warmth which has a good impact on mental health as well as physical health.

Delhi has a composite climate which is very hot in summer and very cold in winter. The construction process and the material selection of this project are chosen in such a way so that there will be a minimum adverse impact on the site and the environment. The material of the building also helps to reduce solar gain and provide a comfortable interior space in different weather.

CHAPTER 2. THE RESEARCH

This research aims to study how social spaces help people to interact and how these spaces increase physical activities in residential areas. Social interaction is one of the most important factors to measure the development in the built environment. The social interaction is lacking in our society in residential areas today. One of the main reasons is the dissatisfactory condition of social spaces in residential areas which leads to the people to isolate. Due to the increase of social networking apps, people engage with the virtual world rather than the physical world around us. This also leads to the physical and mental health of people. The warmth achieved due to human interaction is completely absent in residential areas. There is a spatial interrelationship between people's interaction and social spaces which affects the health of people. The physical elements of the social spaces attract people and engage them in activity and physical interaction. So, there is a need to understand the values and the designing aspects of successful social space/public space in residential areas.

Keywords*- Social Interaction, Social Spaces, Social Activity, Social Values, Social Health.*

2.1. Introduction

Since years, people are moving towards cities for employment and in the search for a better quality of life. So, the rate of urbanization is increasing day by day. There is a chaotic situation in the cities because of overpopulation. To cater to this population there is a rapid growth in housing construction in cities. To maximise the benefits all are building a compact vertical residential block so that people can fit into a small space in different layers. There is also the scarcity of land in the cities so people want to utilise the land in all the aspects of designing and construction of a block. Because of the advancement of technology nowadays there is a revolution in the construction field. In every city, there are a lot of vertical blocks taking a breath by touching the sky. Between the groups of these vertical blocks, there are open spaces which work as a social or public space. These spaces help to create a communal feel in a specific area and these are the social determinants which help induce interaction between people. But nowadays, there is an immense problem of interaction in cities which is our society is facing. Therefore, these spaces are failing in their social functional role. The reason may be behind is these spaces are not able to offer any physical activities for the residents who are living there.

Social spaces are the open, cover and closed spaces provided in a residential or commercial area for common to all residents which is accessible to all so that people can interact and share their thoughts. Social interaction is known as one of the most important needs of a human being. Social spaces are the physical factor which helps to create an opportunity for people so that people can come and achieved social warmth. These spaces offer a place for physical activities like kids playing, people gathering, festival celebration and other ceremonies. In this way, social spaces hold people together in the form of a community or a society. Human is a social animal and humans are dependent on each other. They full fill their need by an exchange of goods and ideas according to their needs. That's why social interaction is also a parameter to measure the human growth and development.

According to the United Nations report the 55% of a total population of the world is living in the cities and till 2050 it will be the 68% of a total population of the world and the total population of the world is 7.7 billion and as rapid growth, it will be 9.7 billion till 2050. So, the rate of urbanization will increase in the coming years. Therefore, there will be a need for lots of residential building in the cities in future. Already, people are facing are problem-related to the social interaction and this problem leads to the mental and social health of people also. So, there is a need to understand the values of social spaces and all the design aspects of an upright social space. So, people can have a better world which will be lying on the foundation of social relationship. As Winston Churchill said 'we shape our buildings; thereafter they shape us'. This quote is a reference to an approach in environmental psychology which says that the spaces around us and the perception of those spaces by humankind shapes, or at the very least, influences to some extent how humankind behaves.

2.2. Aims

To study the value of social spaces in residential areas.

2.3. Objective

- What are social spaces and type of social spaces in residential areas
- To understand the interrelationship between people's interaction and social spaces.
- To understand the value of social spaces in residential areas

- To understand the designing aspects of social spaces in residential areas.

2.4. Methodology

This part of the research explains the outline of this research paper. It explains the research method and procedure for this study. The research dealing with the study of the social interaction between people in residential areas and how social spaces increase social interaction. Therefore, this research conducted based on literature study about social interaction and social spaces. For a better understanding of social aspects of socially successful space two case studies done based on their socially successful values. In both case studies, the analysis was done based on the provided type of social spaces and the number of activities offered by a space.

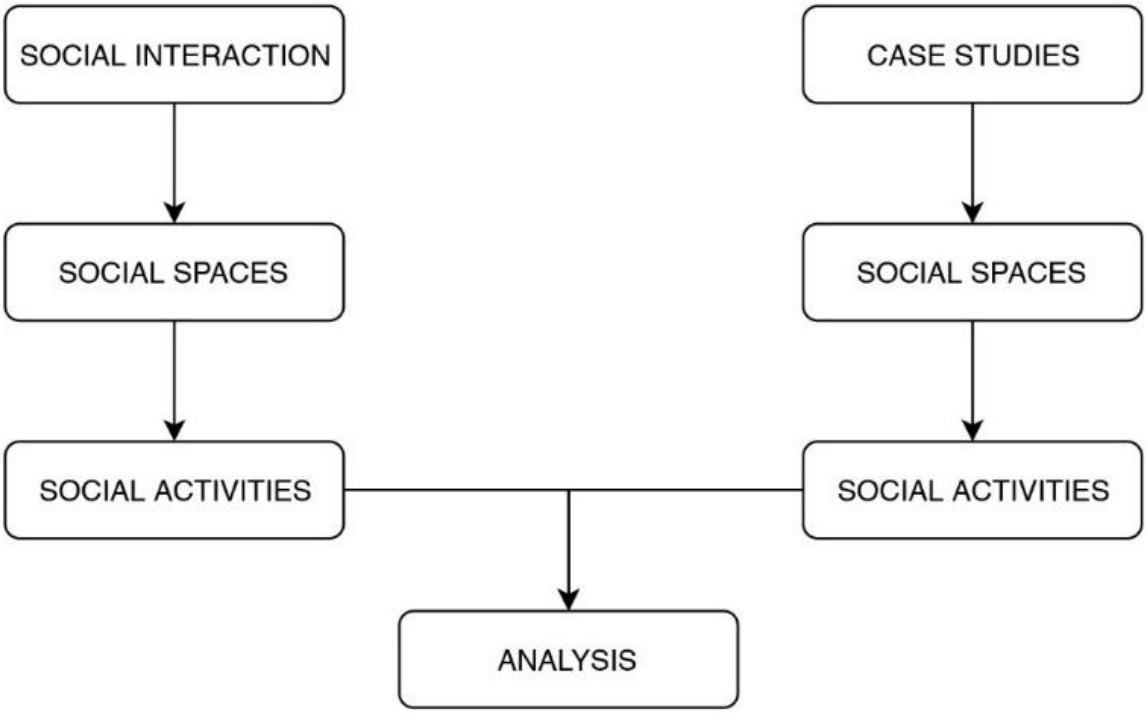


Figure 1: Methodology flow chart

2.5. Literature Study

2.5.1. Social Interaction

Social contact is a relationship between two or more people who have a physical conversation on a common ground. This relation is very important which helps to live in a group and formed a community. Every living species need a social warmth from a similar organism which creates a feeling of safety and belongingness. Humans fulfil their need by sharing goods and ideas in a community or neighbourhood. In this way, human life depends on each other. So, social

interaction is a need for human development and growth. In urban areas, social interaction is a parameter to measure the quality of life. (Shahpasand, Hosseini, Yazdanfar, & Maleki, , 2015)

2.5.2. Social Spaces

All the outdoor spaces in the housing and commercial estate to create relations in neighbour, interactions and social activities are called social spaces. These spaces are legible in the form of their identity and accessible to all. These spaces are placed where different people come from a different group and share their ideas and information. (Shahpasand, Hosseini, Yazdanfar, & Maleki, , 2015)

The perception of the social spaces is very old and known as common spaces which are produced by a social group to perform common activities. Since the civilization begins in the form of community, there was the concept of these social spaces in the form of market, temple, garden in Egyptian and public courtyard, market, great bath in Indus valley civilization. There is a spatial relationship which exists differently in different societies. Social spaces provide an environmental framework to perform a specific behaviour of a specific group. In this way, social spaces are the catalyst which increases social interaction.

2.5.3. Social Activities

Social activities are the activities which are performed by a group of people in a social space. Social activities are different for people of different age group and a different gender. These activities are different for different kind of social spaces like public areas and residential areas. Human life relies on interaction with the other human being. The social activities bring people together and bind them in the form of a social group. The relation between human and nature is very necessary for a human to survive and therefore these outdoor spaces help to create that relationship. Social spaces offer different activities for people of different age group and a different gender. The social activities have the psychological and emotional effects on the individual at a place which create a sense of belongingness and social relationship. This relationship also left an impression of a sense of place and identity. Which creates an indissoluble bond within users and their surroundings. To engage themselves in activities for an individual is also important because it

affects the mental and social health. (Shahpasand, Hosseini, Yazdanfar, & Maleki, , 2015)

2.6. The Characteristics of Social spaces

2.6.1. Physical characteristic

The social spaces have some specific characteristic by which these spaces attract or invite more people in it to spend time. These characteristics depend on the location, legibility, access, linkage and the orientation of the social spaces. Based on the following characteristics, a social or open space judged according to the users. Based on their perception. The above characteristics increase the excitement of the users if during the proposal of that spaces all characteristic were kept in mind. Sometimes the presence of a natural element increases the vitality and essence of social space (Shahpasand, Hosseini, Yazdanfar, & Maleki, , 2015). With these benefits, a natural element also helps to clean the atmosphere and reduce the suffocation by producing fresh air. (NaceurFarida, 2013)

2.6.2. Functional characteristic

The function of a social space decides the number of users. Therefore, the multifunctional social or spaces are the most successful social spaces because these spaces attract users from different age group and a different gender. so, the multifunctional social spaces have more importance and therefore there are multifunctional social spaces in the residential areas. All the physical characteristic helps to create a successful social space and strengthen its socio functional aspects. (Shahpasand, Hosseini, Yazdanfar, & Maleki, , 2015)

2.7. The relationship between social interaction and build space

The physical infrastructure of a built environment encourages human interaction concerning physical characteristics. The idea of social interaction in a way can be invigorated by the physical design of space is not new. Many writers have written about the design principles which promote social interaction. Jane Jacobs was one of them who has written and supported this notion. In her book, (Jacob, 1961) the death and life of great American cities she explained that the relationship between house, streets and activities around it promotes the social interaction. She explained the activities in the streets, around the doorways and on the steps In front of each housing units are very important to knit the households in the form of

communities. In urban settings, these spaces are work as the catalyst to enhance the sense of unity and also encourage the feeling of satisfaction in the households. So, in this way, the interaction increases the quality of a residential or built environment concerning the built environment increase the quality of human life in urban areas. (Namin, Najafpour, & Lamit, June, 2013)

2.8. Values of social spaces

2.8.1. Social values

Social or open spaces have great social values. Such spaces contribute to the attachment of people to their locality and provide opportunities for mixing with others. These spaces also provide social inclusion, social interaction and social mixing which bind all households into a social chain.

2.8.2. Health values

The outdoor open spaces in built environment work as a breathing space. Spending time in green spaces has been shown to create rates and patterns of chemicals in the brain associated with low stress and positive blood pressure effects. Positive correlations have also been found between how well people perform attention-demanding tasks and time spent, either in advance or during, in green space.

In urban areas, people visit green spaces for the physical exercise and yoga which affects their health in a good way and also increase social interaction. These green spaces also filter the polluted air which is the reason for the respiratory problems and cardiovascular disease. The vegetation also helps to regulate the temperature of the built environment and the green ground surface absorbs the rainwater and reduces the volume of rainwater run-off to avoid the flooding. So, outdoor open spaces have a great impact on human health. (Kresl, 2012)

2.9. Social interaction in residential areas

The residential areas are the identity of a specific group of people, the design and layout and the infrastructure affect the behaviour of the user. The interaction between neighbours in residential areas bring all residents into the form of society or community. All neighbour participates in each other's family function and celebrates common festivals with each other. Their need fulfils by each other so

their life running parallel to each other. So, the interaction is very important for a successful and prosperous neighbourhood. Therefore, common or social spaces play a very important role to form a neighbourhood in residential areas. These spaces offer interactive opportunities for a different group of people. (Bonenberg, 2015)

2.10. Social spaces in residential areas

The social space in residential areas which provide opportunities for a different group of people to interact. The most usable social spaces in residential areas are mentioned as following areas are i) Courtyard, ii) Corridor, iii) Terrace, iv) Balcony, v) Steps in front of the doors, vi) Entrance foyer of a group housing, vii) Common open space, viii) Streets, ix) Parking, x) pedestrian path and xi) Green parks.

These spaces have unique importance in terms of providing opportunities for different people in terms of age and gender. In the case study, there is a detailed analysis of the group housing based on the availability of these spaces and their physical characteristic. This study focused on the socio functioning of the social spaces in a specific area and how these spaces affecting user's life. (Bonenberg, 2015)

2.11. Case study

There is a case of group housing to get a better result. This is a theoretic approach which explain the types of social space and how these social spaces functioning in group housing.

2.11.1. Asian Games Village, New Delhi, India

This housing project is designed by an Indian architect Raj Rewal. The idea behind the designed was he tried to create a sequence of the traditional village in the form of a sequence of courtyards and gardens. This residential colony has 853 flats of which 793 housetop officials of PSUs, bureaucrats, public servants, and union ministers. This group house was built in 1982 to house athletes for the games. The number of housing units in the area of 35 acres is 500. This project aimed to create a low-rise high-density housing with creating a relationship of each unit and open space. There is a connection between all the dwellings and the shaded pedestrian area, which connects to the periphery roads, and the roads lead to the cul-de-sac

parking space, which gives way to the individual garages or car porches attached to the building. The definition of housing is based on the interweaving of the series of all open spaces, interweaving the shaded streets and holding them alive through the process of recreational and communal area. All streets are divided into several visually cohesive groups, often with gateways, so that there can be a break in traffic and a resting place and a shifting view. The middle spline of the site is reserved for pedestrian courts and streets of different clusters. Most housing units provide access to both the pedestrian enclosure and the parking spaces. (Projects, n.d.)

Site plan

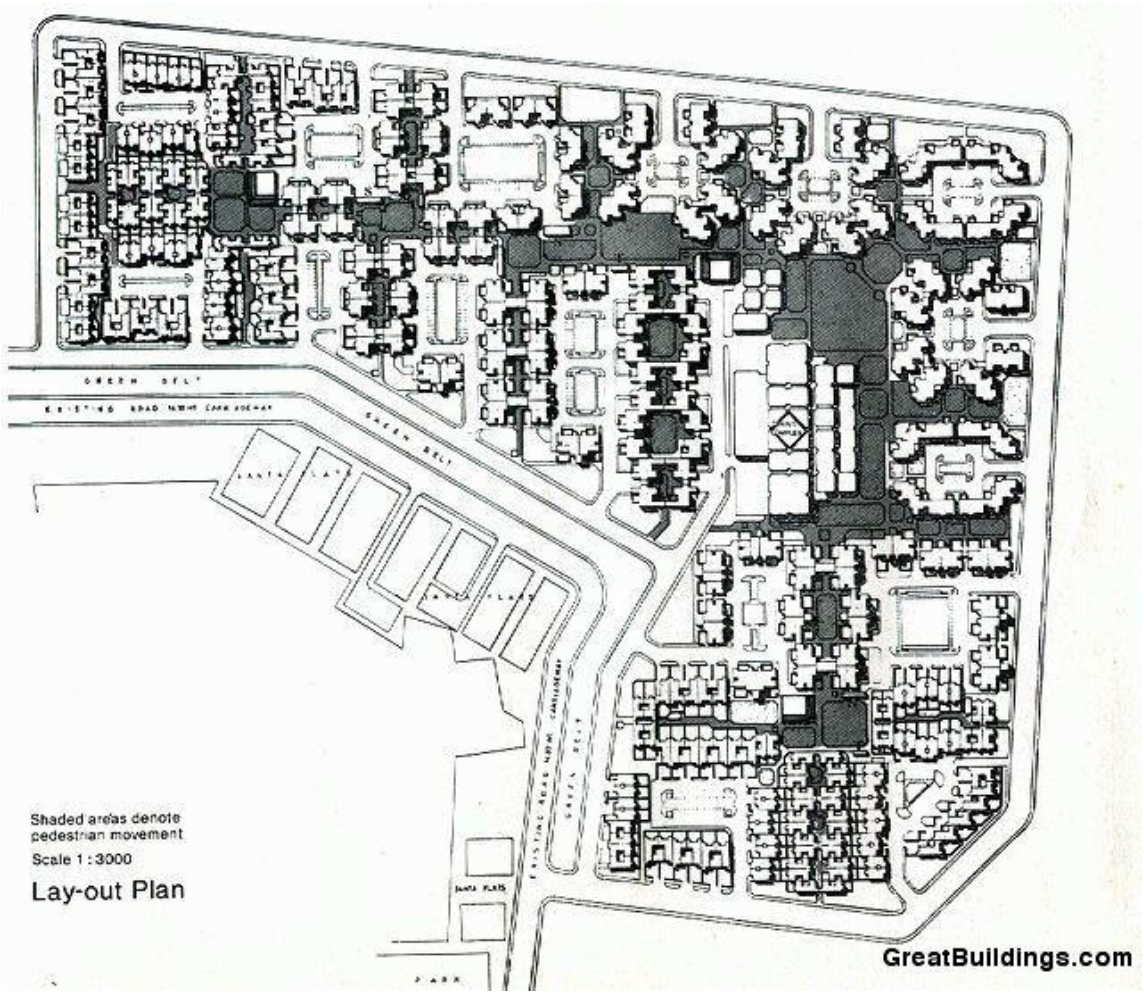


Figure 2: Site plan

Source: (asian games village, n.d.)

<u>Design features of Asian games village housing which make it successful social housing project</u>

Clustering of blocks

All the housing units are developed in the form of a cluster so that the maximum open spaces can be used by people. The open spaces have high values in the residential areas. These open spaces create a buffer with adjacent land use. The clustering of housing helps a lot preserve the common area between respective building blocks. These spaces offer common shaded areas with many physical activities for different people of different age group. These buffer spaces create opportunities for people to come in and physical interaction. Children can play there and old age people sit there and have a conversation with neighbours. Sometimes it offers private spaces for women where they perform their work with the others. So these spaces have an important role in a neighbourhood which stick people together in the form of society. (asian games village , n.d.)

Figure 3: 3D view

Source: (asian games village, n.d.)

Courtyards

Courtyards are the traditional spaces which are in used since Indus valley civilization. The courtyard has a great value in Indian architecture. The courtyard serves two purposes one is climate responsiveness and other are social values. The courtyards are a very important feature of houses in the hot dry climate which helps to regulate the inner temperature of a house by the stack effect and also

helps to distribute the diffused daylight in rooms around it. In vast shastra courtyard also has an important place which is known as Brahmasthan. The mythology says it is the gateway of positive cosmic energy from space.

The courtyard uses as a gathering space in group housing and it also offers spaces for people of different age group and gender. In the Asian games village, there is a courtyard in each cluster and all the houses open in the courtyard which helps to create a communal feeling. The courtyard also has green spaces which attract people and offer a pleasant environment.

The climate of Delhi is semi-arid mean there is a high-temperature difference between summer temperature and winter temperature. In this situation, courtyards play a big role in passive cooling. It collects the cool air and distributes in the houses around it. The cluster in the Asian Games Village – the basic unit of four apartments is built in such a way that it can be connected to the Courtyard in Between to create a variety of interconnecting spaces. so that it will be easily accessible for all people and also can increase the sense of safety and security for children.

Figure 4: Courtyards

Source: (asian games village, n.d.)

Green Areas

Green spaces have very important spaces in built areas. These spaces provide active and passive recreational activities for the residents. Green spaces improve human health by providing oxygen and green vegetation also helps to clean

polluted air. Green spaces provide a pleasant environment for the mind and eyes. These spaces also help to shape land use pattern and create a more feasible space.

Green spaces have a great impact on a building in the hot climate. These spaces provide passive cooling. It is also known as the heat island effect. It reduces energy consumption by a building and helps to create a sustainable environment. During the rainy season, green surfaces absorb the water and reduce the water run-off which avoids the flooding and help to recharge the groundwater.

Green spaces define the community image and create a distinctive character of a particular space and bind people together. These spaces also facilitate the cultural benefits in a community. These spaces enhance the lifestyle of people by facilitating the positive emotional, intellectual and social experience. These spaces have a special place in Indian culture people believe that natural element completes a living environment. In Vaastu green spaces have also considered an important factor of sustainable and a healthy living environment. These spaces invite people for various activities.

The plan shows the Green Areas on site

Figure 5: Green Spaces

Source: (asian games village , n.d.)

Streets

Streets are the well know social spaces. In Asian Games Village there are narrow streets which connect one cluster to the other cluster. All the streets are pedestrian which offer a space for the children to play and aged people to walk. Being vehicle-free, create a sense of safety so that people can allow their children to play there.

There are sitting spaces on the streets so that people can sit down and talk to each other. There are walls between the entrance of the housing unit and streets till a certain level which create a partial enclosure of private space in front of entrance and public space in streets. All the streets are narrow so that in summer the shadow of the building provide a cooling effect. So, these streets attract people the whole day and offer many activities.

Peripheral roads are connected to cul-de-sac Parking areas which, in turn, provide access to individual garages or porches attached to houses or apartment blocks. All the streets are connected to the parking areas so that the streets can be free of charge and parking can be easily reached.

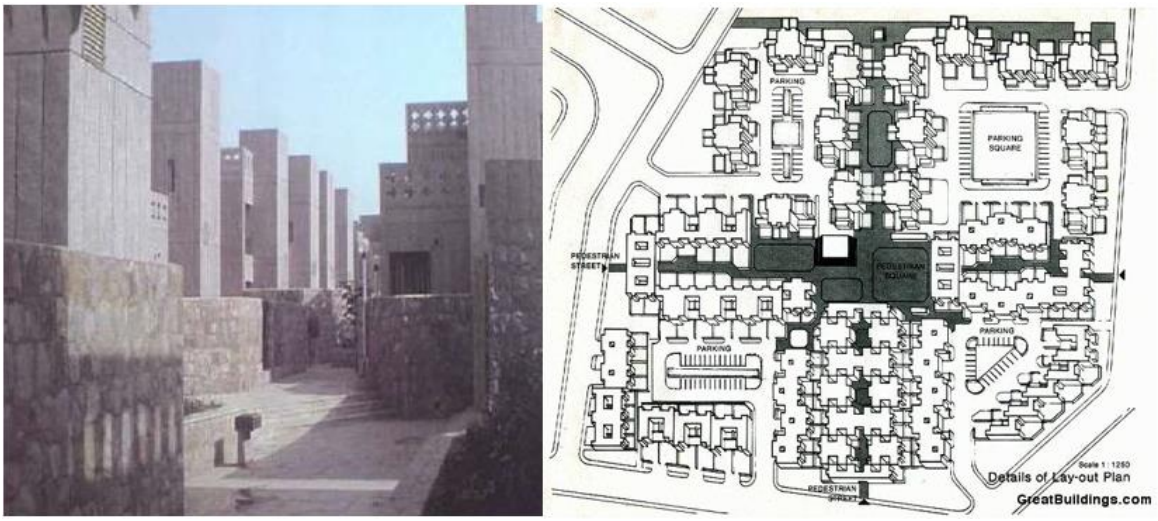


Figure 6: Street view and Plan

Source: (asian games village , n.d.)

Terrace

The Terraces built on the upper floor provide a semi-private space for people and offer a variety of activities for men, women and children. The scattering characteristic of terraces offers an opportunity to interact with neighbours. Terraces

also use for the kitchen garden which also enhances the community of neighbourhood bonding.

Figure 7: Terrace View and plan

Source: (asian games village , n.d.)

Gateways

Asian games village housing has a different cluster of housing units. Each cluster has a grand gateway to enter in each block. These gateways offer a welcoming and interactive space. There are the sitting spaces and green space at the entrance which works as a pause point for the visitors. The grand entrance also offers an eye-pleasing vista which affects people's psychological and sentimental relationship. It also helps to create an identity and sense of place.

All the gateways directly connected to the shaded pedestrian pathway which make it more active and safer for the children and aged people. On the edge of the pathway, there is a level difference where people can sit can have a conversation.

Figure 8: Gateway View

Source: (asian games village , n.d.)

Activities offered by all these social spaces in the Asian games village

There is table social concerning what kind of activities they offer to the people of different age group and gender.

Table 1: Activities offered by Social spaces

Open Spaces	Offering activities for different gender		Offering activities for different Age Group		
	Male	female	Children	Young	Aged
Clustering of Blocks	Commonplace to keep goods	Common Kitchen garden	Playing Area	Gathering	Sitting in the open spaces
	Sitting	Drying Clothes			Physical exercise
	Parking of bicycle				
Courtyards	Gathering	Gathering	Playing Area	Gathering	Gathering
	Meeting	Meeting		Meeting	
	Festivals celebration	Festival celebration	Festival celebration	Festival celebration	Festival celebration
	Community Function	Community Function	Community Function	Community Function	Community Function
	Physical exercise	Physical exercise	Common Reading Area	Physical exercise	Yoga
	Common Storage	Kitchen Garden			Walk
		Common Work			
Green Areas	Physical exercise	Physical exercise	Playing Area	Physical exercise	Yoga
	Common Meetings	Kitchen Garden		walking	Walk
		Walk		Common Meetings	
Streets	Sitting		Playing Area	Sitting	Sitting
	Sitting	Drying clothes	Playing Area	Sitting area	

Terrace	Sitting space in winter	Drying spices		Sitting space in winter	
		Kitchen garden			
Gateway	Sitting		Playing area	Sitting	
				Neighbourhood Meetings	

Inference

The above study of the Asian Games village shows how social spaces enhance social interaction in a society. These spaces provide different opportunities for the people of different group and engage them in those activities. Social interaction is depending on social activities. In the above study, the social spaces which are found in Asian games village housing are spaces between cluster, Courtyards, Green spaces, Streets, Terraces and Gateways. These all spaces are multipurpose and use at a different time for a different time. The other aspect is the quantity of the spaces available for the users at a place. There is a discussion of the physical characteristics of the social spaces which are location, legibility, access, linkage and the orientation of the social spaces. These properties help to enhance the quality of social space. The quality of these spaces defines the number of users and the intensity of users attracted by a space at a time. So, the maintenance of spaces is very important of these common spaces which promote the importance of that space and this also binds people together in society by creating the identity of that place and promoting the feeling of the sense of place in the user's perspective.

2.11.2. Sublime Ordinariness Vasind, Maharashtra

There is a study of a low-rise housing project which is located in Vasind, Maharashtra, India. This housing project is a socially successful project which provides a space for the people to live and formed a neighbourhood in which open spaces work as a catalyst for social interaction.

This housing project is situated approximately 60 km northeast of Mumbai in the state of Maharashtra , India. This accommodation is made up of 54 families of workers in the manufacturing sector. Both staff work in a color coating plant for the

group of companies. Families, relatives and the community have a vital role to play in creating a neighbourhood in Indian society. Architect build in such a way that people can knit together by engaging in activities. Festivals, religious ceremonies and other practices are unlikely without larger communities and societies. This housing is built to hold these social ideals in mind and to provide a place for people to carry out a range of activities. Such spaces are built in conjunction with these socio-cultural activities. The architect used the Mumbai chawl as a guide to the nature of housing and the arrangement of various spaces. The ultimate probability of this typology is to be a social catalyst. There are four apartments in a total of 540 squares. Ft. And they're all in the corridor. At the end of the corridor, there is a stairway that connects all floors. All the rooms in the ground floor. They are individually accessible with their own small semi-private space, resembling the characteristic "otla" (raised entrance level plinth) seen in the traditional Indian houses (pols, wadas, etc.). Three blocks come together with a semi-round monolithic block to create this large central community space in which all the corridors of all floors open. (jsw-housing, n.d.)

Site plan

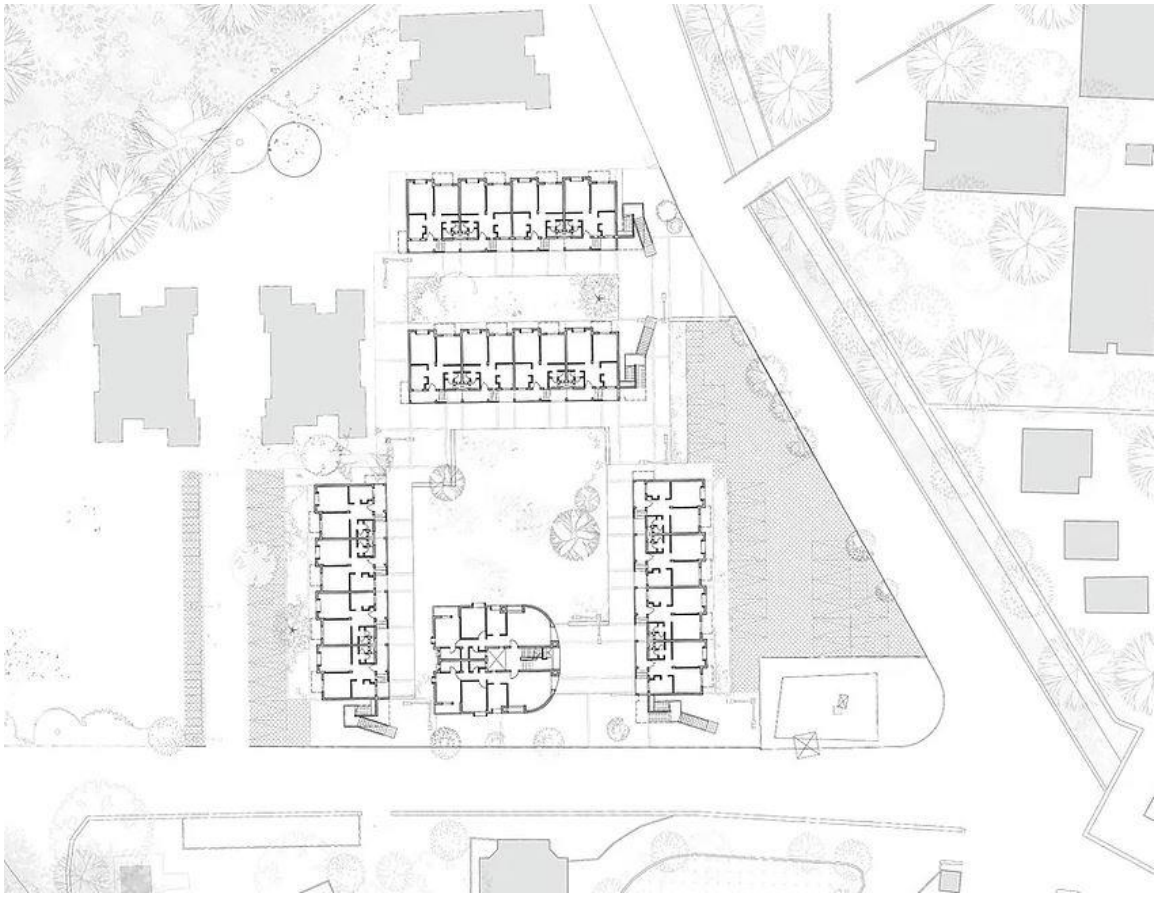


Figure 9: Site Plan

Source: (jsw-housing, n.d.)

Design features Sublime Ordinariness housing which makes it successful social housing project

Courtyards

There are two courtyards in between all four building blocks which offer different activities for all the people for different age and gender group. The courtyard is having been the most important part of Indian architecture for years. It also is known is Brahma sthan in Vaastu shastra. It helps to provide diffuse light in the building and also regulate the cool breeze inside the building.

Figure 10: courtyards

Source: (jsw-housing, n.d.)

Interactive Walk-Way

A pedestrian walkway connects all the blocks and provides an opportunity to interact with people. This space provides an opportunity to prole to interact,

children to play and women to dry spices and clothes. People also keep their common use of goods. All parking spaces are connected to the building blocks by a pedestrian walkway which provides a safe and easily accessible space for all group of people.

This is the space which is used by everyone in a neighbourhood so walk-way is a place which has high potential to perform as a catalyst to perform physical activities between people which will help to interact with people. This is the place which is used for different purposes in a community.

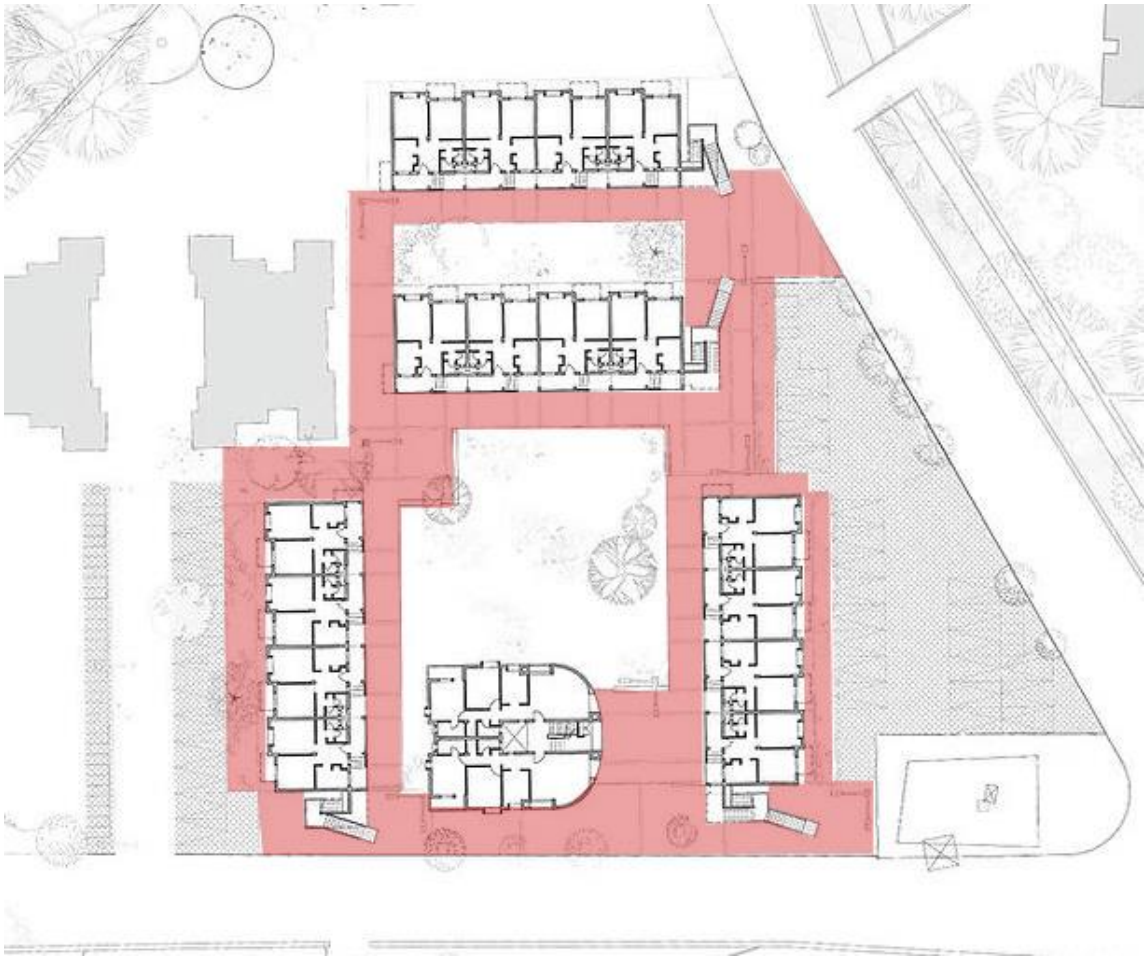


Figure 11: Walkway

Source: (jsw-housing, n.d.)

Corridors

All the apartments are along the corridors which provide a semiprivate space for all users and invite people to interact and other activities. These are the most active

areas connected to entrance directly. For women, it is the most useable are for drying clothes, spices and other activities. All the corridors have an opening towards the courtyard which invite diffuse light inside and offer an opportunity to interact with people who are in the courtyard.

Figure 12: Corridor

Source: (jsw-housing, n.d.)

Steps in front the doors

All the ground floors have a semi-open space with steps. This space is the most active for women because it offers an opportunity to interact with the neighbour. In India, there is a custom in villages to maintain their privacy and somewhere there is parda system. All the residents are belonging to a village so the spaces are provided according to them. This space is good for the children to play because these spaces visually connected to their parents which make it safer.

Figure 13: Steps in front the Entrance

Source: (jsw-housing, n.d.)

Activities offered by all these social spaces in Sublime Ordinariness housing

There is table social concerning what kind of activities they offer to the people of different age group and gender.

Table 2: Activities offered by Social Spaces

Open Spaces	Offering activities for different gender		Offering activities for different Age Group		
	Male	female	Children	Young	Aged
Courtyards	Gathering	Gathering	Playing Area	Gathering	Gathering
	Meeting	Meeting		Meeting	
	Festivals celebration	Festivals celebration	Festivals celebration	Festivals celebration	Festivals celebration
	Community Function	Community Function	Community Function	Community Function	Community Function
	Physical exercise	Physical exercise	Common Reading Area	Physical exercise	Yoga
	Common Storage	Kitchen Garden			Walk
		Common Work			
Steps Infront doors	Sitting		Playing Area	Sitting	Sitting
Corridors	Sitting	Drying clothes	Playing Area	Sitting area	
	Sitting space in winter	Drying spices		Sitting space in winter	
Walkway	Sitting	Conversation with neighbour	Playing area	Sitting	A small meeting with a neighbour
			Sitting	Neighbourhood Meetings	

Inference

The study of Sublime Ordinariness housing shows how social spaces work as a catalyst for social interaction. This housing has four major spaces courtyards, corridors, walkway and steps in front of the doors which offer an opportunity for users to come and interact. In the above study, the analysis proves that a small space can offer more activities that big space. So, the size of the space provided sometimes does not matter their location and orientation matter. The different user group use a space according to their needs it is better to design a space for multipurpose.

In this project architect focused on small open or semi-open spaces. The whole design is inspired by the old Indian architecture community-based design which explains that after the modernism the values of these small spaces did not change. Due to the small in size, it is easy to maintain these spaces. All they are connected in the through a pathway or opening and have a common view which ends at the centralized courtyard. In this way, it makes it safer and easier environment for the user. The parents always want to keep an eye on their children, the connection between spaces offer that opportunity. This small space also has importance for women they interact with other women by sitting there and do common activities. So, the common inference from the analysis is that the only providing space does not enhance the social interaction for that the user study and the physical properties are important which shaped the functional characteristic to accelerate the rate of social interaction.

2.12. Conclusion and Discussion

This study aimed at the effective factors of open space of residential areas in social activities which increase the social interaction. There is two case study done based on the open spaces provided in those residential buildings. The analysis shows that social interaction increases through social activities and to perform these activities there is a need for social spaces. So, there is a relationship between social interaction, activities and spaces. This relationship also affects the user's perspective to perform social activities. There is the cognitive, behavioural and emotional relationship between people to a place based on which a community or a society formed. These social spaces help to create these relationships.

After the case study the following social spaces are identified which are i) Courtyards, ii) Corridors, iii) Gateways, iv) Streets, v) Space between cluster, vi) Terraces, vii) steps in the front entrance, viii) Walkways, ix) Green areas. These spaces offer different activities and help to create a socially connected living environment. To make a social space successful there is a need to understand the design aspects. These design aspects are location, legibility, access, linkage and the orientation of social space. The location should be in such a way so that people can easily access given space and it should be legible in terms of use and type of activities. The social space should be accessible for all types of group of people like old age, children young and physically challenged. The orientation of a social space plays an important role to collect people from the neighbourhood who are living nearby. It should be placed centrally so that people can come from all around and perform activities and it also increases the sense of security for children. So, social interaction depends on social activities and for every social activity the social spaces act as a catalyst to enhance the physical interaction.

CHAPTER 3. THE RESEARCH – II

This research aims to study how a human being reflects their culture and habits in their living environments. A human being who belongs from different places has different culture and habits which are inherited from their forefathers. It moves from generation to generation. After the food and clothes, the house is the third most important basic need of human being. After fulfilling the first two basic needs human being looks forward to finding a living place. Then they made houses according to their needs. After so many years there is a revolution in construction field therefore there is a culture of high-rise apartments in cities. But most of the high-rise apartment projects are not successful because there is a lack of user study and these apartments are very rigid in the respect of spaces and interaction from the exterior environment. A single dwelling of the apartment is not a finished project but it is a part of the process. There is a spatial interrelationship between the user and house because there is a change in needs according to time and family growth. So, there is a need to understand the user perspective and their habits before designing a house so that the user can transform a space into his reflection.

Keywords*- Basic needs of human beings, House as an identity of a user, Spaces in a house, Human psychology.*

Introduction

Many forms of work have led to the design of housing in terms of human needs. For that, there are some rules related to areas and services of a housing building. Bureau of Indian standards had published the National Building Code to highlight the home standards by providing the guidelines related to areas of different spaces in a house according to the family sizes based on comfort-area provided for the individuals to supply relevant housing. They intended that the house should fulfil their human desire and needs. It is a very general overview that the house is the third most basic need of human being. It is a general notion that a house is a physical space to perform other biological needs and other essential needs which are necessary to live. After that, it also provides a sense of belongingness where he grew up from childhood to an adult and has a lot of memories. These memorise are the bond of attachment between that person to that house. These virtual relationship between to person and the places are the thread through which he developed some physical elements through which he recognised his house.

Since years, people are living in houses in cities as well in rural areas. But when we go through the form and spaces of these houses there are common things that

the houses from the same community have the same type of spaces and form. Which explain that the people who have the same culture follow some sets of beliefs and rules and when it comes to their surrounding environments, they try to express their culture in the forms of physical elements of their houses and all open spaces. They transform surrounding according to their need. Human is a social animal and always try to interact with others. So, they try to have a have space for communication with neighbourhoods. Human life was never independent because there are some needs which are fulfilled by others.

Nowadays in housing design, people are facing lots of problem-related to the interior spaces according to their needs, social spaces, interaction with exterior environments and natural elements which are very important for human life. So, it is necessary to understand what the needs of what he desires or wants are. As a result, housing cannot simply be defined as a dwelling or a physical unit which encloses the space for its residences to provide shelter and protection from domestic damage.(wahl, 2005, p. 21).

Housing is insufficient if its inhabitants do not have sufficient physical conditions or if it does not respect and take into account the expression of cultural identity. Physical needs are also important to any community and can be easily recognized as they are common to all people around the world, but even those needs should not be considered when designing housing. There is also a need to understand the cultural needs as well as physical needs of the user before building design.

3.1. Aims

To study the reflection of individual personality on their residence.

3.2. Objective

- To study the basic needs of human life.
- To study the basic needs of human life.
- How residence affects the behaviour of human.
- To study the cultural elements in a house.
- To study the cultural elements in a house.
- To study how landscape and furniture setting reflect the personality of residents.

3.3. Methodology

This part of the research explains the outline of this research paper. It explains the research method and procedure for this study.

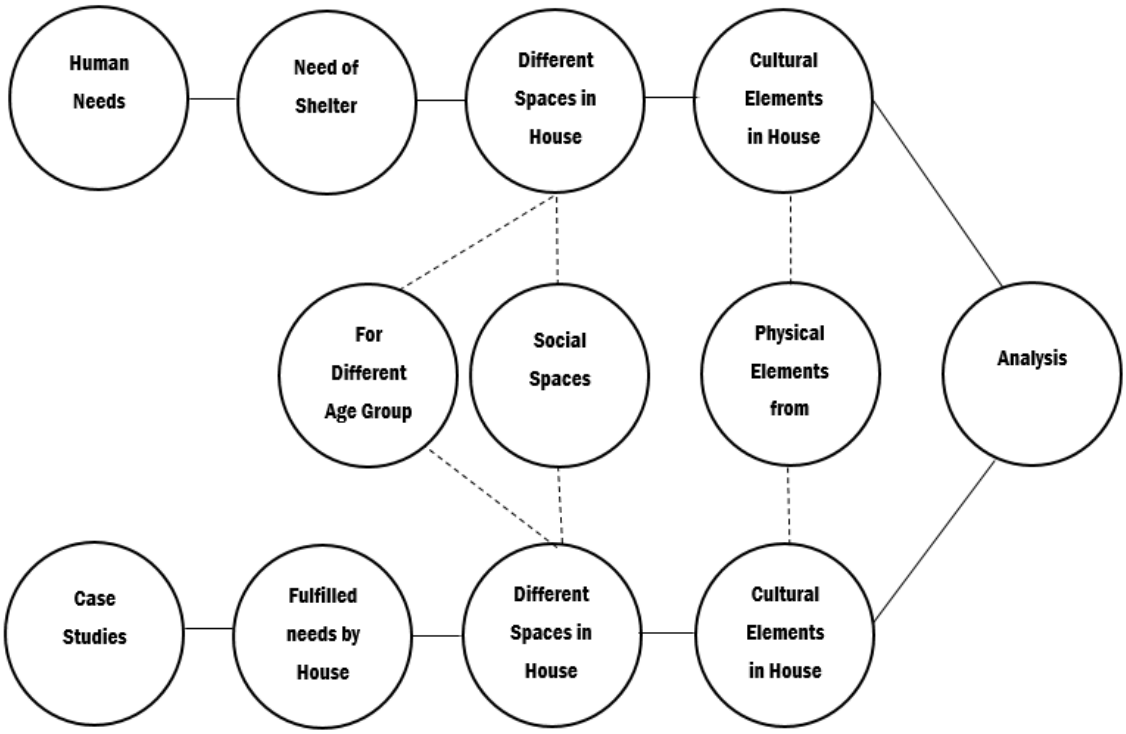


Figure 14: Methodology framework

The research dealing with the study of reflection of a person on their living space concerning their needs and culture. It explains how a house reflects the nature of the owner of the house through some physical elements of house and some interior and exterior spaces. Therefore, this research is conducted based on literature study about the human needs and the physical aspects of the house which help to reflect the individual personality. For a better understanding of present scenario case studies of a building is done in the context of India anonymously. These case studies are done based on spaces provided and the cultural aspect of building.

3.4. Literature Study

3.4.1. Human Needs

Every living animal has some biological need to survive. So, in 1975 Abraham Maslow gave the concept of human needs. He explained how all the needs are interconnected through each other. Through this theory, he explained how human needs motivate a person. Subsequently, Maslow expanded the theory to include

his understanding of human inherent curiosity. Maslow used some specific term “physiological”, “safety”, “belonging and love”, “social needs”, or “esteem needs” and “self-actualisation”. (Itma, 2018)

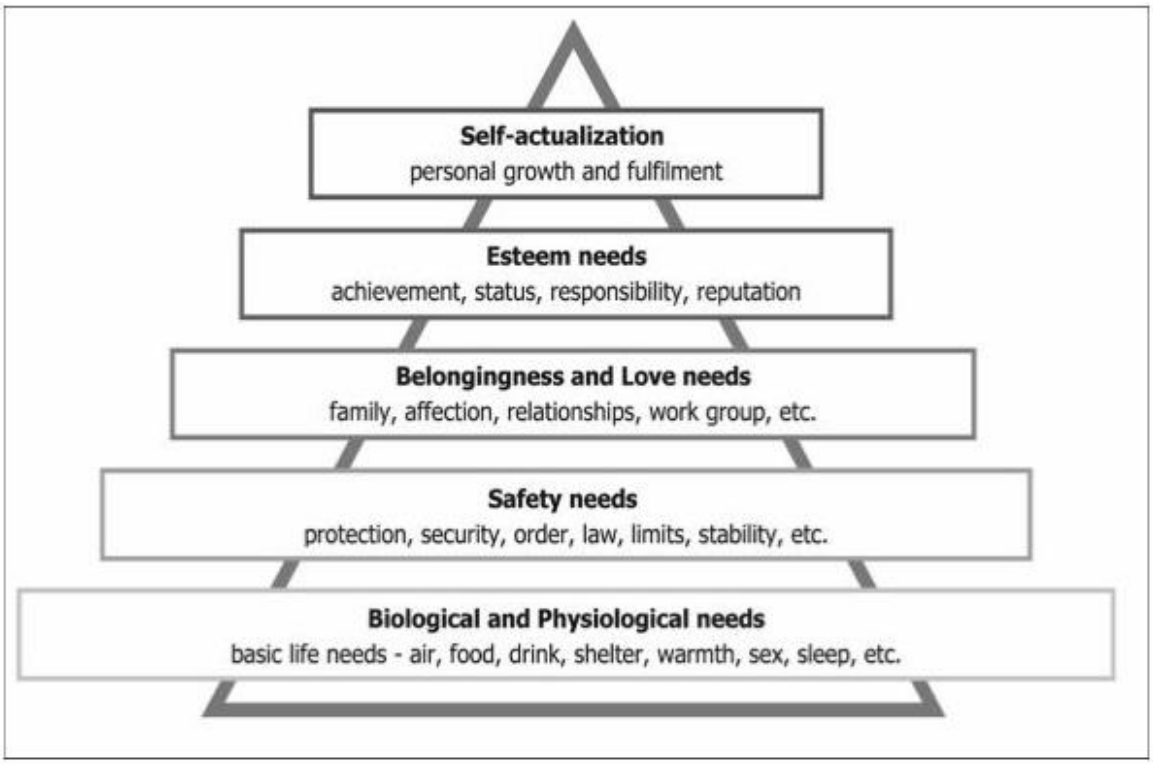


Figure 15: Maslow hierarchy of needs

Source: (Itma, 2018)

3.4.2. Primary Needs

Starting with the primary needs in the first level, which are the biological needs for the human being to survive, this includes the survival of the individual and his extinction. Surviving is related to many biological functions like eating, drinking, wearing clothes, sleeping, and others. In this level, the house is the place for doing these fundamental activities, where the human finds his own space to practice his biological life. The second level is the safety needs, desiring to be free from physical harms. In this level, the human being needs to control his territory and property to feel secure. Housing is considered as a shelter that provides a healthy environment and protects human-beings from various dangers and environmental conditions, such as storms, rain, animals and privacy from other humans. (Itma, 2018)

3.4.3. Safety and Privacy Needs

For performing the primary need everyone needs a shelter where he can perform these activities safely. A shelter is a place where a person lives with his family to make relation so that they can feel a sense of safety. The shelter also protects from the environmental harsh condition.

The human also needs some privacy at an individual level and family level. To meet these needs, he makes rooms inside and outside the house for different genders and age groups. Users can also accomplish privacy inside the courtyard without being exposed to their neighbours. For the privacy of individual spaces, there are balcony or private green spaces. For different age group, there are spaces which are easily accessible for children and old age people. Thus, every person transforms their shelter according to their needs and thus setting of these spaces explain their choices of physical elements of the spaces. (Itma, 2018)

3.4.4. Belonging needs

When a person lives in a shelter through his childhood to adultness, he has some memories related to that place which attach to that person to that place. The shelter is placed where a person lives with his family, workgroup and make some relationship so, there is affection towards that place. Sometimes fitting to a place is highly inclined with cultural issues. Where his forefather used to live at a time and have some specific values. So, people try to conserve that place and sometimes transform according to their needs.

3.4.5. Esteem needs

There are some family requirements related to income. Based on family financial status, a person has some responsibility to achieve some goals for his family and he tries to take a position in society. It is very common for all the species to enhance their presence in front of others in a specific way. Sometimes, the house is a symbol to show an individual's position in society. Reputation is also a parameter which is related to the position of an individual. So the house is just not to full fill the primary needs, it is related to a place which motivates human for personal growth and fulfilment.

3.4.6. Spaces in a house

In a house, there are many spaces according to the user's need. There are some biological needs like sleeping, drinking and eating. There is a need for different spaces to perform these different activities.

Bedroom- A space to sleep and to perform some private activities as well.

Kitchen- A space for cooking.

Dining- A space for eating and sometimes to interact with family members.

Living room- A space for gathering, entertainment and interaction with family and guest.

Balcony- A space which is open to the exterior environment and helps to regulate air in the house. Sometimes a balcony also provides a green space for a house.

Courtyard- A open to sky space which helps to diffuse daylight in the house and help to circulate air in the house.

Religious spaces- There is a space for worship in the house. It is different for different communities.

Terrace- A open to sky space used for the various activities. It is used for drying clothes and sometimes use as children play area.

So, these above spaces are the part of a house which are designed or executed by the user according to their needs. Different people have different sets of thought so the outcome of the physical form of a house is different.

3.4.7. Impact of privacy on form

With these all spaces of houses, the most important factor is privacy. The physical form of all these spaces is designed to maintain the privacy of that space. For different religion and community, the privacy factor is changes according to their customs and habits.

Privacy also affects the nature of the human being. The extrovert people don't have much-closed spaces at their home. They provided some social spaces in surrounding of their so that they can interact with others, on the other hand, the introvert people don't want any disturbance so they generally do not provide many public spaces I their houses. Like in Muslim religion there is s parda system in

houses. They hang curtains on the entrance of houses so that people cannot see inside the houses.

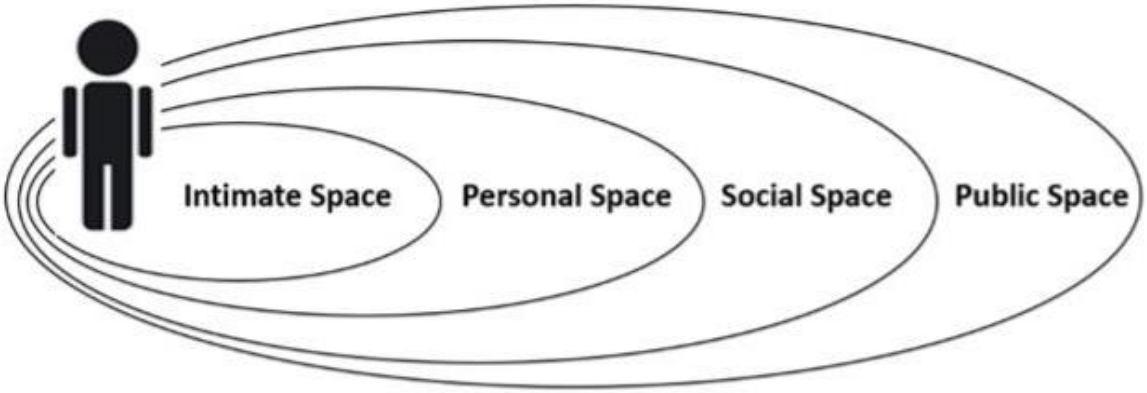


Figure 16: The main four categories of space

Source: (Mahmoud)

According to the above categories of spaces, the privacy changes gender to gender within a house. The key element of achieving privacy is how to create a connection between privacy and social contacts. There are the following privacy parameters Accessibility, visibility, proximity, voice and olfactory, etc. which interfere with human psychology. So, every person tries to achieve all these parameters by providing some open, semi-open and covered spaces within the house. So, the people who belong from different community and religion have to need a different type of spaces to perform various activities. Thus, the form of houses is different for different people. (Mahmoud)

3.4.8. The impact of form on human psychology

Bio geometry is a science that describes human experiences with various geometrical types in order to strike a balance between biological and environmental relations. It is also research to develop a new form of architecture that enhance these relationships. The brain is the main part of the human body which control all part of body and system. Brain collect all information and send messages to the whole system in the form of brainwaves. There is a great influence of the physical world around the user in various types in architectural spaces and building materials, and all these factors have an effect on the user's level of perception, and this is the key influencing factor.

Brainwaves are very accurate electrical signals that reflect changes in the frequency of brain waves under different mental conditions. Research brainwaves play a crucial role in understanding how the human brain functions and the relationship between the nervous system and other parts of the body. Brainwaves are classified into five major types, as follows:

- Delta waves
- Beta waves
- Theta waves
- Gamma waves
- Alpha waves

There is a sorting of brain waves based on the frequency generated in another situation. There is a common pattern of brain waves related to states of consciousness, such as alertness, relaxation, sleep, and deep sleep. There is a relationship between the degree of human consciousness and the waves of the brain. These brainwaves have different frequency limits and different resonance frequency. (Eslam Elbaiuomy, 2017)

Frequency	Unit	Consciousness status
Delta brainwaves (0.5–4 Hz)		
0.5	Hz	Relax—help to soothe headaches
0.5–1.5	Hz	Relieve pain
0.9	Hz	A sense of joy
1.0	Hz	The feeling of well-being—the harmony and balance
2.5	Hz	Relieve pain and reduce anxiety
2.5	Hz	Relieve migraine pain
3.4	Hz	Help achieve restful sleep
3.5	Hz	Autism with the outer perimeter
3.9	Hz	Promote internal awareness
4.0	Hz	Reduce stress
4.0	Hz	Enhance the memory capacity—enhance learning ability
Theta brainwaves (4–8 Hz)		
4.9	Hz	Induces relaxation, meditation and deep sleep
5.35	Hz	Relax and breathe freely and efficiently
5.5	Hz	Internal guidance and intuition
6.5	Hz	Activate creativity
7.5	Hz	Technical and creative thought
7.5	Hz	Ease of overcoming the nagging issues
7.8	Hz	Schumann frequency waves—activity and balance
Alpha brainwaves (8–12 Hz)		
8.0–10.0	Hz	Learning new things depending on the memory
10.0	Hz	Improve the status of general mood
11.0	Hz	Relax status after waking up
12.0	Hz	Moderation and mental stability
Beta brainwaves (12–40 Hz)		
14.0	Hz	Attention—focus on tasks and vitality
12.0–15.0	Hz	Concentration and relaxation
13.0–27.0	Hz	The attention to external stimuli focus
13.0–30.0	Hz	Problem solving and conscious thinking
18.0–27.0	Hz	A sense of euphoria (euphoria)

Figure 17: The relationship between brainwaves and human consciousness.

Source: (Eslam Elbaiuomy, 2017)

There is a description of the basic six geometric shapes (cone, circle, cube, ring, dome and vault) and how these shapes influence a person's level of consciousness. All form with the same volume in the open environment and examined with four different materials to find the changes in brainwaves when

there is a change in forms and materials. There are specific values of brainwaves for a form and value change with the material. When it comes to the change informs the values of brainwaves changes with high magnitude. The different values show the different kind of brainwaves which explain the different types of human consciousness level.

All the brainwaves are important for different biological process and activities. It is very necessary to have all type of experiences for development. So, the architecture spaces design should be the unification of all types of form with different material. In architecture, the material is also an important aspect which also helps to regulate the consciousness level of user. So, the form of a space has an important aspect of spaces design which regulate the nature of the user.

As form change, the behaviour of the user and the user also express their thought and personality through the form of his house. Sometimes there is some cultural aspect also which make a house unique. The environmental condition also helps to give a specific form of house. Like houses in the hilly area have a sloping roof. Sometimes the form of the house is designed by considering the availability of the material. For example, the concrete can be used in parametric forms but stone and mud can be used. The specific user group and community also help to make an identity of houses. So there the form of the house is the unification of all these parameters which reflect the user's personality and behaviour.

Geometric shape/material		Resonance frequency			Brainwave	
		S-parameter (resonance)	Units	Equivalent freq. (Hz)	Wave type	Consciousness status
	Concrete	0.56	MHz	4.0	Delta	Stress reduction
	Steel	0.68	MHz	2.5	Delta	Brain reduction
	Wood	0.73	MHz	1.5	Delta	Brain reduction
	Glass	3.00	Hz	3.0	Delta	Relaxation and comfort sleep
	Concrete	96.12	MHz	23.0	Beta	Attention, focus and activity
	Steel	0.27	MHz	16.5	Beta	Attention, focus and activity
	Wood	93.67	MHz	11.0	Alpha	Relaxation and comfort
	Glass	29.37	MHz	14.0	Alpha	Focus and receive information
	Concrete	75.16	MHz	9.0	Alpha	Learn depending on memorize
	Steel	1.20	Hz	1.2	Delta	Brain reduction
	Wood	28.90	MHz	14.0	Alpha	Focus and receive information
	Glass	11.77	MHz	11.0	Alpha	Relaxation and comfort
	Concrete	4.18	MHz	8.0	Alpha	Learn depending on memorize
	Steel	0.04	MHz	7.8	Theta	Showman waves—activity and balance
	Wood	0.47	MHz	7.0	Theta	Meditation and inner peace
	Glass	27.92	MHz	6.5	Theta	Creativity
	Concrete	12.28	MHz	1.5	Delta	Brain reduction
	Steel	0.04	MHz	7.8	Theta	Showman waves—activity and balance
	Wood	0.47	MHz	7.0	Theta	Meditation and inner peace
	Glass	18.80	Hz	18.8	Beta	Attention, focus and activity
	Concrete	4.5	Hz	4.5	Theta	Stress reduction
	Steel	6.66	Hz	6.66	Theta	Creativity
	Wood	11.74	MHz	11.0	Alpha	Relaxation and comfort
	Glass	27.12	Hz	6.5	Theta	Creativity

Figure 18: The resonance frequency for the investigated geometric forms.

Source: (Eslam Elbaiuomy, 2017)

3.4.9. Impact of Interior architecture design on human psychology

The accomplishment of interior architecture with an awareness of the psychological impact on residents. There is a connection between human behaviour and the physical environment. Based on this relationship user reflects his identity through the architecture and interior architecture design. The interior architecture design consists of various elements like colour, furniture setting, lighting and landscape setting.

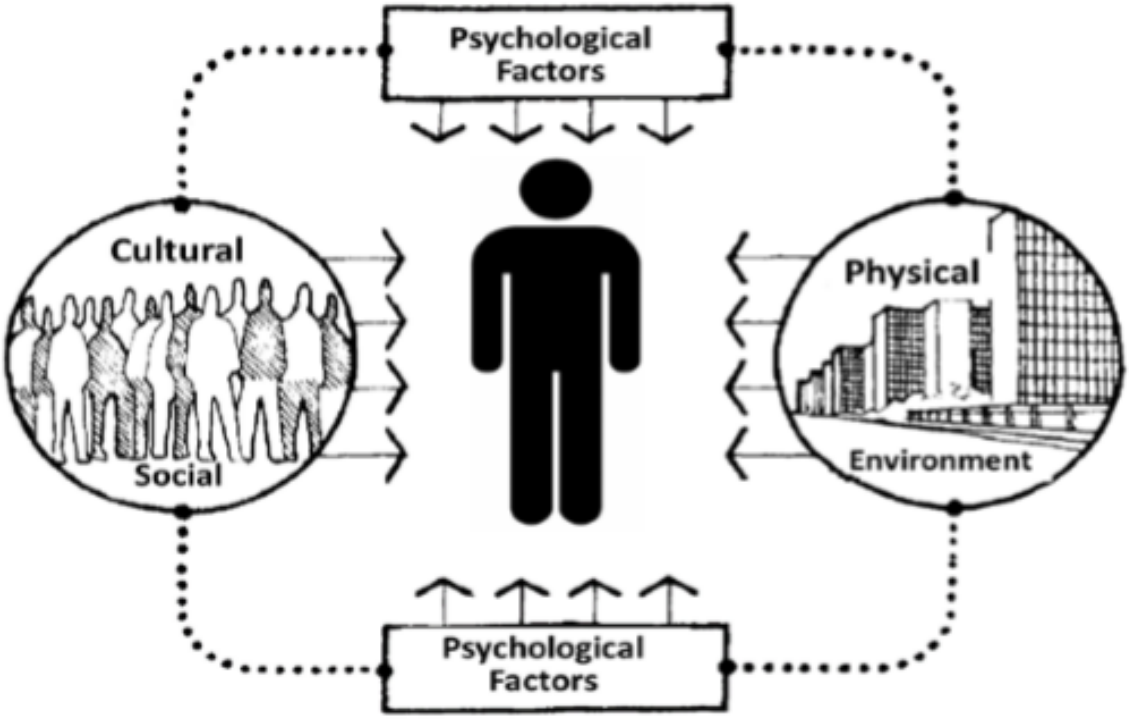


Figure 19: Factors impacts human psychology (Moore 1979)

Source: (Mahmoud)

3.4.9.1. Colour psychology

Color is one of the key influences in the human-made climate. Colors have a significant impact on human psychology. Human Psychological reactions of color include mood shifts and the focus of the human brain. The brain produces a hormone that influences mood, mental awareness, and energy levels when the light is conveyed through human eyes. Some of the colour reactions are temporary and some last for a long time. The different type of person has different choices of colours. An introvert person like neutral colours while an extrovert like warm colours. Sometimes religion or community is also a parameter to choose the colour

for houses. The people who belong from different religion choose a different colour for interiors.

Warm, Cool and Neutral Colour

Warm colours: The warm colours are usually a symbol of the greetings, friendship and togetherness. These colours offered an essence of warm atmosphere. The colours between red and yellow on the colour wheel come in warm colours. The warm colour at a place provides comfortable and pleasant environments.

Cool colour: these are the colours which give the feeling of peace and coolness. Green, blue, violet come under cool colours. these colours offer a sense of relaxing and serenity. But sometimes cool colours became the source of depressive and negative in human psychology.

Neutral colour: these colours are between warm and cool colours and have a less psychological impact on human. Black, white and grey come into this category. These colors tend to be very natural but have been used with limited emotional material in use. Achromatic colors are also considered to be neutral colours, such as brown, beige and tan.

So, the colour on interior architecture design reflects the personality of the user who is living in that space concerning specific group and community. (Kalia, 2013)

Table 3: Psychological and physiological effect of colour

Categories	Findings
Red	Speed up heart and respiration rates and to raise blood pressure. A heightened sense of smell.
Yellow	Less aggressive in impact than red It considers as sunny, cheerful and the happiest of all colours It seems to illuminate the space. At maximum saturation is the most aggressive of the hues.
Green	It is often the choice of persons who are intelligent, social, who are given to voluble habits of speech, and who often have an intense appetite for food, also calming, relaxing, refreshing.

Blue	Calming, restful, and comfortable. Reduce blood pressure, pulse, and respiration rate.
Orange	Colour with happy implication. Colour increases the oxygen through the brain. Attraction and encouragement.
Violet	The colour of sensitivity and artistic expression. A pale tint of violet is defined as playful, magical. Deeper violet is dignified and mystical.
Brown	The more positive Implication relate to the comfort of the house. When it combines with other warm tones, it expresses comfort, otherwise, it will be very depressive if it doesn't Combine with lively tones.
Black	Seriousness, dignity. Dark grey and very dark blue can be close to the black; therefore, such tones can express the qualities of black.
White	Light colours are the symbol of purity, cleanliness.
Grey	Dark grey can be depressive light grey in warm tone versions are useful as a background.

3.4.9.2. Furniture setting

The furniture set is one of the main features of interior design in a house. Before interior design, the main thing is to enlist all requirements of the user. Then there is need of user study related to the user's group. There are different kind of person in society who has a different way of living. Some people have a very conservative approach about life and some are very open. Sometimes it comes from the forefathers that they are extrovert in nature or introverts. Sometimes it is coming from the religion and community that how they live in the house and how they decorate the interior of the house. For example, if a Hindu family living in a house then there will be a puja room in that house. This kind of space comes from a religious point of view. So, the interior spaces are the outcomes of the user's

perception and their culture. In this way, the interior architecture design reflects the personality of the user.

Furniture setting for Extrovert and Introvert:

The furniture style illustrates the actions of the customer. The furniture arrangement on the left shows that the family members of the house are not quite social in nature. They live in their comfort zone and have different views on the interior and exterior environments. While the furniture layout on right explain that the family members are very interactive and they are very comfortable with each other. They have a common viewpoint towards the exterior and interior space. They also have a common comfort zone. So, the furniture layout is one of the main factors which reflect the personality of the user. (Koltun, 2011)

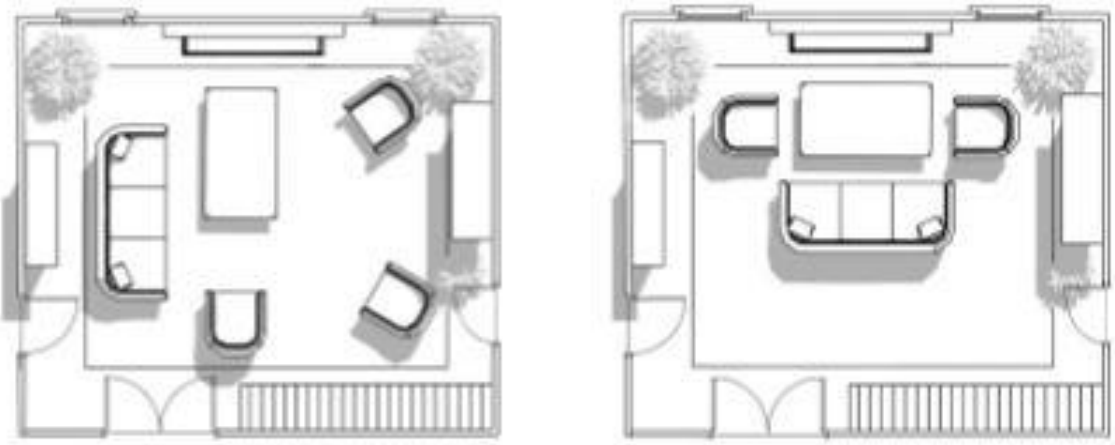


Figure 20: A real-world furniture layout

Source: (Koltun, 2011)

3.4.9.3. Landscape design as a reflection of the personality

The landscape design also explains the personality of the user concerning the religion, community and the nature of a person. People from religious group believe in nature. Like in Hindu religion people worship nature. Like Tulsi and peepal tree example of trees which are worshipped by people. so, the presence of these trees in a house shows that the person belongs from the Hindu community.

The other parameter of garden design which reflects the personality of a person according to the nature of the user. A garden which has open views and has a different kind of trees shows that the user is very interactive. On the other hand, a garden with less variety of trees and plants with the dense a closed view reflects

that user is an introvert type of person. The dense spaces provide him with closed views and a personal space where he can feel alone.

3.5. Social spaces in a house are the reflection of a user's personality

Human is a social animal and their life depends on others. The warmth achieved through human interaction is very important to survive. Social spaces are spaces where people have a conversation. Every house has some social spaces like a balcony, courtyard etc. the physical setting of these spaces reflects the mindset, thoughts and culture of the user. Some people designed the balcony as a private space or some las a public space. In some houses, the courtyard is open to the sky and fully open to the sky but in some, it is covered and not open to all. The form of these spaces is a result of the users need. The extrovert people are mix with neighbours and have large public spaces within the house to have a conversation with people. on the other hand, introvert people don't have social spaces in their house because they do not want to have a conversation with neighbours and they enjoy their loneliness.

3.6. Case studies

3.6.1. Chettinad house

The name Chettiar is derived from the generic term 'Chetty' that denotes business communities or groups of traders. This could have been derived from the Sanskrit word 'Sreshti' which means 'merchant'. They were originally thought to be merchants of gems in a town called Santhyapuri in Naganad, somewhere in Tamil Nadu's north. The Chettiars were salt investors and semi-precious stones. (N, 2015)

Figure 21: View of a Chettinad house

Source: (N, 2015)

House Planning Concept

The idea of the house of Chettinadu originates from the historic center of Kaveripoompatnam. The custom of raising the plinth by two meters from all sides was appropriate to prevent water from entering the house during the floods. The planning concept of the house was based on:

- people's occupation
- Their needs
- Cultural influences
- Climate consideration

The occupation of the people and their desires determined the spaces created and their uses:

- These houses involved in the occupation of banking and trade, because people need space to keep their things. The side rooms, ullarai and veliarai served this purpose.

- The purpose of the undertaking included daily visits by visitors, supporters and businessmen. The planning of the house was also geared towards providing accommodation for the visitors.
- Since menfolk had been out of business for a long time, women had to be provided with a residence that increased security and made them independent. This influenced the introverted essence of the planning process, avoiding numerous external accesses.

  The size of the rooms, such as the Kalyana Kottagai and the Bhojana Hall, has been determined by religious and family celebrations.

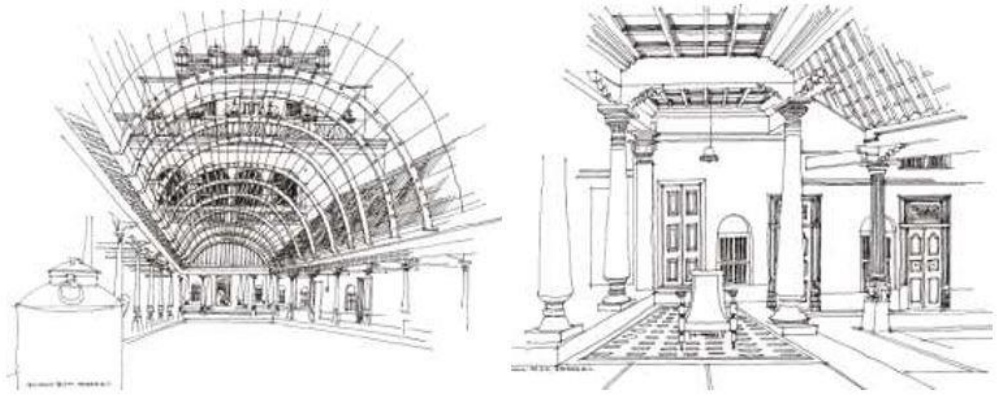


Figure 22: View of courtyard and puja room

Source: (N, 2015)

CULTURAL INFLUENCES:

- In the earliest house, there was a thinnai on both sides of the entrance, in front of the house.
- This thinnai was primarily used for informal meetings by the male members of the houses.
- In later houses, the front thinnai was enclosed for privacy when contact with the neighbours was reduced due to cultural change.

CLIMATIC CONSIDERATION:

- Use of a flat roof surrounded by a balustrade to capture the slightest breeze.
- The structure shielded the rays of the sun and permit the air to enter while keeping the apartments cool and fresh.
- During the hot season, the light coloured chunam (lime plaster) which covered the building was very suitable as a sun radiator.

- The house was turned away from the sun, and the rooms were kept cool by thick walls and the mass of the structure. Adequate ventilation was ensured by the various sections of the structure organized around the open courtyard.
- The dual-roof provide cool effect inside while the chajjas were serving as sun-breakers.

ORIENTATION: The main entrance of the house is in the east. The central courtyard is the main element of the house which help to ventilate the whole house and also a source of diffused light in the house. There is a garden on the west side of the house, which also acts as a major source of fresh air in the house, facilitating ventilation in the kitchen, and the absorbed heat radiates through the courtyard at night. The courtyard acts as a thermostat controlling the house's temperature. In the courtyard, there is negative pressure created by air and there are rooms all around it thus the low pressure leads to bringing more air towards it. Thus, it provides the cooling effect in the house.

NIGHT ANALYSIS: There is negative pressure inside the house during daytime and this escape out the house during the night due to floor tile and the projection of the courtyard.

DAY ANALYSIS: During the day temperature is high and heat is absorbed by the ground because of the opening of the courtyard and the light reflected in all direction which increases the temperature inside.

MATERIAL USED:

- The foundations of the houses are constructed by stone rubble work combined with mud and mortar.
- For flooring, there is the use of tiles. They are the traditional tiles from Athangudi which are manufactured locally. Using paints imported from Italy achieves the hue of the tiles. The tiles are manufactured by the slab of glass and dry cement. There is the use of cement for the flooring of the central courtyard and the mezzanine floor of the house. Some part of the central courtyard is covered by mud tiles.

- The walls are made of bricks and these walls plastered by sand and lime mortar. Lime mortar is act as a bonding agent with the root fibres. Plaster also coated with egg white to give smooth silk walls that are washable.
- The bricks are made of red soil of local area which helps to reduce the temperature inside and create a less warm effect. It provides a comfortable environment inside the house.
- The roof is pitched which are made of country tiles with wooden bars on wooden logs attached to the wall. The ground floor roofing is constructed by the mud mortar, adobe and finished by adding Calicut tiles along the edge.

ORGANISATION AND USAGE OF SPACES:

RECEPTION – Since this is the introductory space of the house, it is designed to express the grand image of the owner. Located in front of the house, it has varying levels and is used not only for visitors but also for relaxation.

PATTAGASALAI – This elevated room is used for both normal-time recreation and sensitive transactions. The holiness is covered by the difference in degree. This also acts as an elevated seating area during ceremonial occasions. This room is intermingled with the central space.

MULTIPURPOSE CENTRAL OPEN SPACE – This space is situated in the middle of the rooms and close to frequently semi-public and commercial spaces, this area is the first stage of private spaces. It responds to the need for the desired introverted planning, although the litheness of this space allows undergoing many changes, creating where essential.

FRONT VERANDA – The men use Front thinnai to hold informal discussions and also to receive guests and visitors. The veranda is also used for business, for example for pawning. Such usage limits visitor circulation within the house.

MUTTARAM AND PATTAGASALAI – One of the key features of the Chettinad houses, which emphasizes the introverted nature of planning, is the muttaram (main courtyard), which is surrounded on the sides by aisles with roofs sloping down to the courtyard. The main courtyard is used for paddy drying and the aisles are used for chatting and sleeping. Pattagasalai (inner thinnai) is used by men for sleeping and family discussion. Pattagasalai (inner thinnai) is used by men for

sleeping and family discussion. The pattagasalai (inner thinnai) is used by men for sleeping and for discussing family matters. The aisles lead to the ullarai and veliarai (secret cellars). During festivities, the muttaram was used as the wedding space in the earlier phases of planning. The aisles surrounding the courtyard were used for seating, while the pattagasalai seated the melakarar (musicians).

KALYANA KOTTAGAI – This is primarily used as the main living space but gets converted into the wedding hall during marriages. The central double-storeyed hall is used as the thirumangalya medai (marriage stage) and seating place for women during muhurtams. The high ceiling and the polished granite columns provide the required grandeur to the place. The surrounding aisles are used for keeping the seervarisai (dowry) and by the melakarar (musician). The area has direct access to the bhojana hall so that the guests could proceed to the dining hall as soon after the muhurtham.

SERVICE AREA – They consist of a double courtyard with four kitchens in the front and four storerooms (2 meters on each side). Corridor spaces around the courtyards are used as preparation spaces on festive occasions. The circulation of cooks is limited to service areas. The courtyards that open to the sky solve the problem of lighting and ventilation and clear the smoke and other pollutants from the kitchen. There are steps to the first floor where the whole plan is being repeated. This area has direct access to the street to be used by the servants and often serves as the quarters of the servants. The insignificance of space is reflected in the lack of craftsmanship of its columns, which is in sharp contrast to the rest of the house.

SERVICE YARD – This consists of a central courtyard divided by a passage around which the thazhvaram service is located. The well (keni) in the courtyard is used by the woman and the servants. At both extremes, there are spaces for storing unimportant materials and vegetables.

3.6.2. The unique feature of a house

CONCRETE FIGURES

There is some concrete statue on the walls and entrance which make them unique. These statues are the cultural aspects of the house. Mainly the front facades are devoted to Lord Shiva, Lord Krishna and Gajaklakshmi. This community used to

follow Hinduism theory. The other part of the house was decorated by the statues of the King and queens and British Soldier, hunters or trees. (N, 2015)

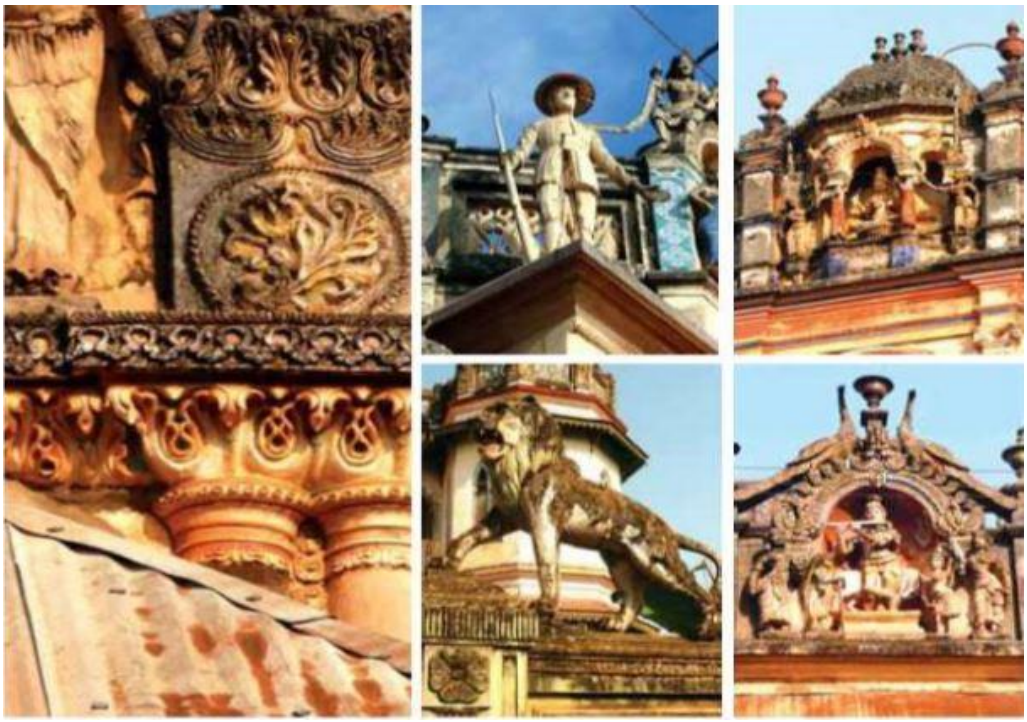


Figure 23: Stone statues

Source: (N, 2015)

BALUSTRADES, PARAPETS AND CORNICES: Balustrades, parapets and cornices are the part of the architectural identity of these houses. CARVED WOODEN FEATURES: The Chettiars used to bring teak back from Burma to their country (nadu) during their economic expansion in East Asia. Before the use of modern materials such as iron in construction, the structures of their homes were made of bricks, stone pillars and teak wooden beams.

Figure 24: left-Baluster, parapets and cornices., right-carved wooden feature

Source: (N, 2015)

3.6.3. Inferences

Chettinad house is the symbol of the chettiar community which was known as trader community. These traditional houses explain the culture of the community and the form of spaces of the houses, decoration of wall, entrance and roof. The statues show that these people use to believe in Hinduism. The courtyard in the house shows that from these communities were interactive and a business person has to be interactive but common spaces also explain that. Thus, the house imitates the behaviour of the user.

3.6.4. Bhonga House, Kutch

Bhonga is a traditional building type in the Kutch district of Gujarat, India, with a very high risk of earthquakes. Bhonga consists of a single cylindrical space. The Bhonga has a conical roof supported by cylindrical walls. The design of this typology is very ancient Due to its protection against natural hazards, as well as its attractive aesthetics, this housing is also known as "Architecture without Architects."

Figure 25: View of a single unit

Source: (Madhusudan Choudhary, 2002)

3.6.5. House planning

Building Configuration: Bhonga houses are circular in plan with a cylindrically shaped wall. There is a conical thatched roof. The inner diameter of the Bhonga is typically between 3m to 6m. A Bhonga has three or fewer openings one door and two windows.

Functional Planning: The key feature of this type of building is a single-family home. There are no elevators and 1-2 fire-proof escape stairs in a typical building of this kind. Bhonga's main door is the only means of escape. There is no wall in the building but the Outerwall. And there's not a lot of privacy in the building. The isolation of the room in the house is achieved by the curtain.

Figure 26: Left-Critical structural detail, Right- Interior view of house

Source: (Madhusudan Choudhary, 2002)

Socio-Economic Aspects: Number of Housing Units and Inhabitants Each building typically has 1 housing unit(s). 1 unit in each building. Each Bhonga is a single room housing unit. Depending on the economic condition of the owner, a housing unit may consist of several Bhongas. The number of inhabitants in a building during the day or business hours is less than 5. The number of inhabitants during the evening and night is 5-10. The people who live in Bhongas belong from the low-income groups.

Patterns of Occupancy: Generally, a single-family stay in a single unit. Sometimes, a family has many Bhongas to accommodate all members. The difference depends on the size and economic condition of the family. There are 5 family member or more live in a Bhonga units.

3.6.6. Inferences

The Bhonga houses are very simple to design houses which reflect the socio-economic condition and their nature of simplicity as well. Most of the people are the labour, and artisans who live in Bhongas. Their nature and behaviour are very simple and which reflect through their interior spaces and common space between

Bhonga units. These common spaces are used for gathering and communal activities. The open interior space shows that they are very interactive.

3.7. **Discussion and conclusion**

Human perception towards space where they live, work and spend time with others is making a place for them and the identity of this place is directly impacted by their culture, believes, needs and their relationship with the others. As a person defines a space and space also define a person. There is a biological relationship between space and person according to which a person tries to make his identity by keeping all environmental aspects. Every person has some culture and habits which are inherited in him. When he comes to a new place, he tries to reflect his culture and set of beliefs through some physical elements or house. Sometimes the religion also is a factor which helps to transform a space and give a unique identity. There is a wide relationship between human psychology, social, culture, physical and environmental factors. The case studies are done based on some parameters which explain that the house is just not a building design it is a reflection of user's perception and their culture. That's why there is a need to understand human psychology and behaviour. So, architecture is just not to make a building, it is making an identity for the client.

CHAPTER 4. DESIGN CASE STUDIES

4.1. Tara Apartments

Tara Apartment is a type of social project for the middle class in the center of Nehru. This building was designed by one of the most prominent Indian architects of the time, Charles Correa, and was completed in 1978. The housing community of Tara has more than 125 units and 375 residents per hectare. Tara pays close attention to the internal activities that are almost going on in the central garden and leaves the interplay of traffic behind a wall parallel to Guru Ravidas Marg Street (South-East).

The main concept of the Tara housing group project is the creative vernacular typology in terms of arranging and accumulating a single flat into unified blocks. By separating the outside world and providing an interior garden, the building preserves the private life of the family. Other than that, only pedestrians are allowed to access the apartment building, and the parking lot is in the back of the apartment. As far as the social housing community is concerned, the area profits immensely from natural resources such as lighting and ventilation, and these features are shared equally by all households. The Indian concept is demonstrated by the use of concrete boards, exposed brick walls, windows, overhangs and rounded edges.

Location: New Delhi, India
Date: 1975-1978
Site: 1.48 ha
Program: Social housing with 160 units of two and three-bedroom flats
Client: Tara Housing Society
Architect: Charles Correa

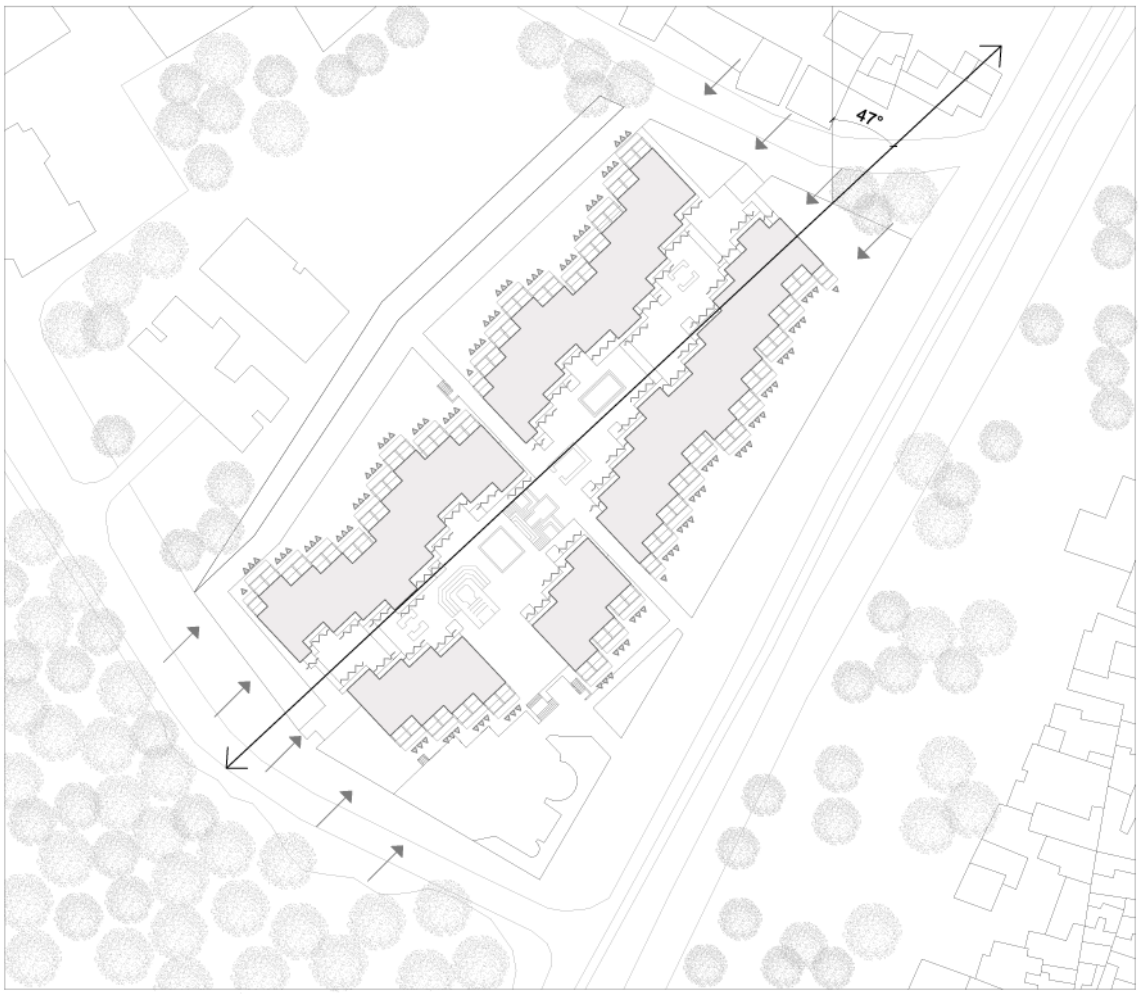


Figure 27: Layout of the Social Housing Program

The building is turning its back on the street to avoid the storm, the dust of high-flow vehicles. Bet as a circle, central garden, large overhangs and sharp edges, all give these buildings a sense of Indian character under the hot sun, full of light without suffering from high temperatures. More than 160 units had to be built at a density of 125 units per hectare. This could have been achieved in a low-rise, high-density design (in which each family has its own garden) except that the Delhi Municipal Code does not allow a building footprint to occupy more than 1/3 of the ground. In order to use the maximum amount of floor space available on the property, the building form must be at least four or more floors.

Figure 28: Site Layout units

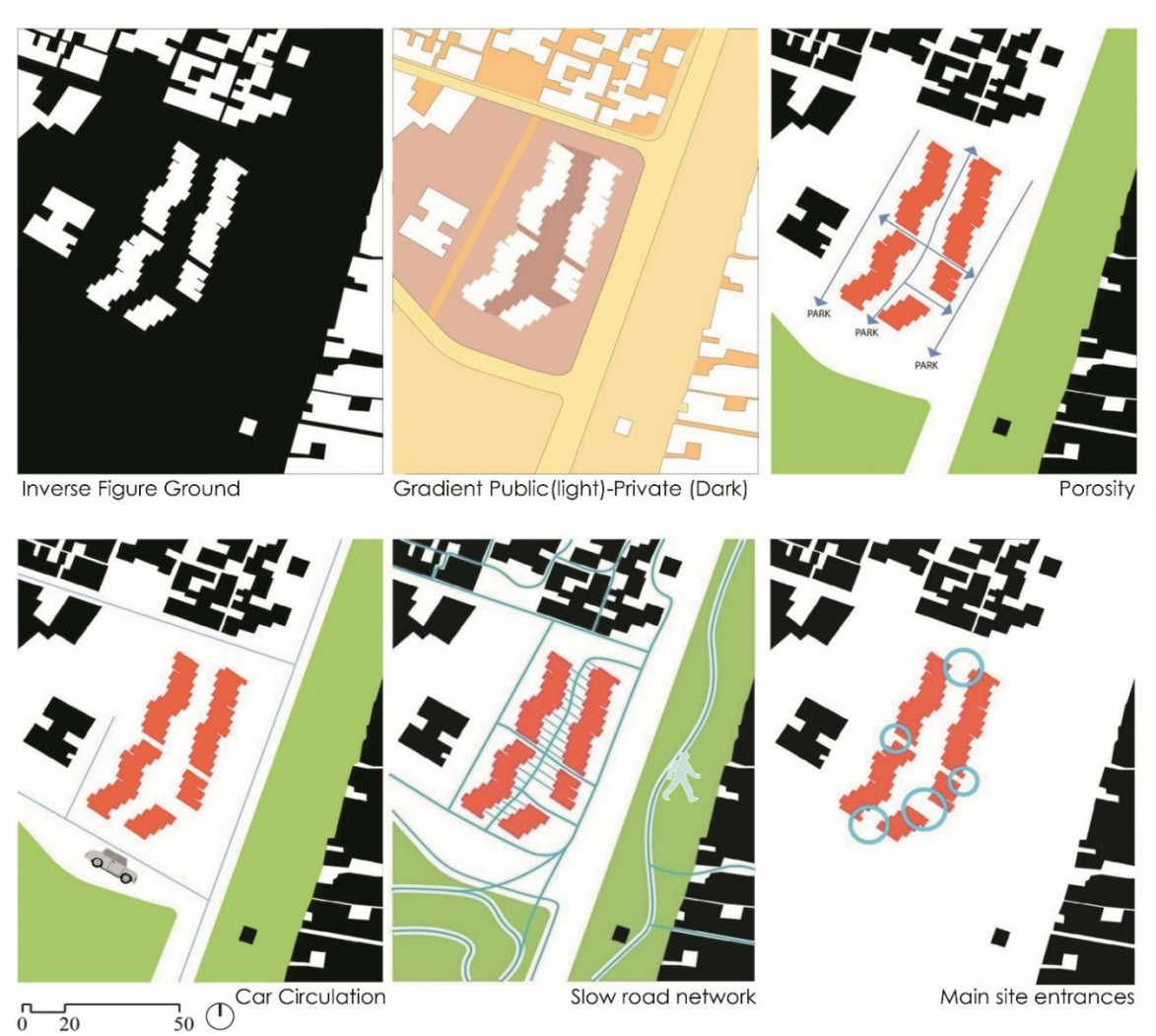
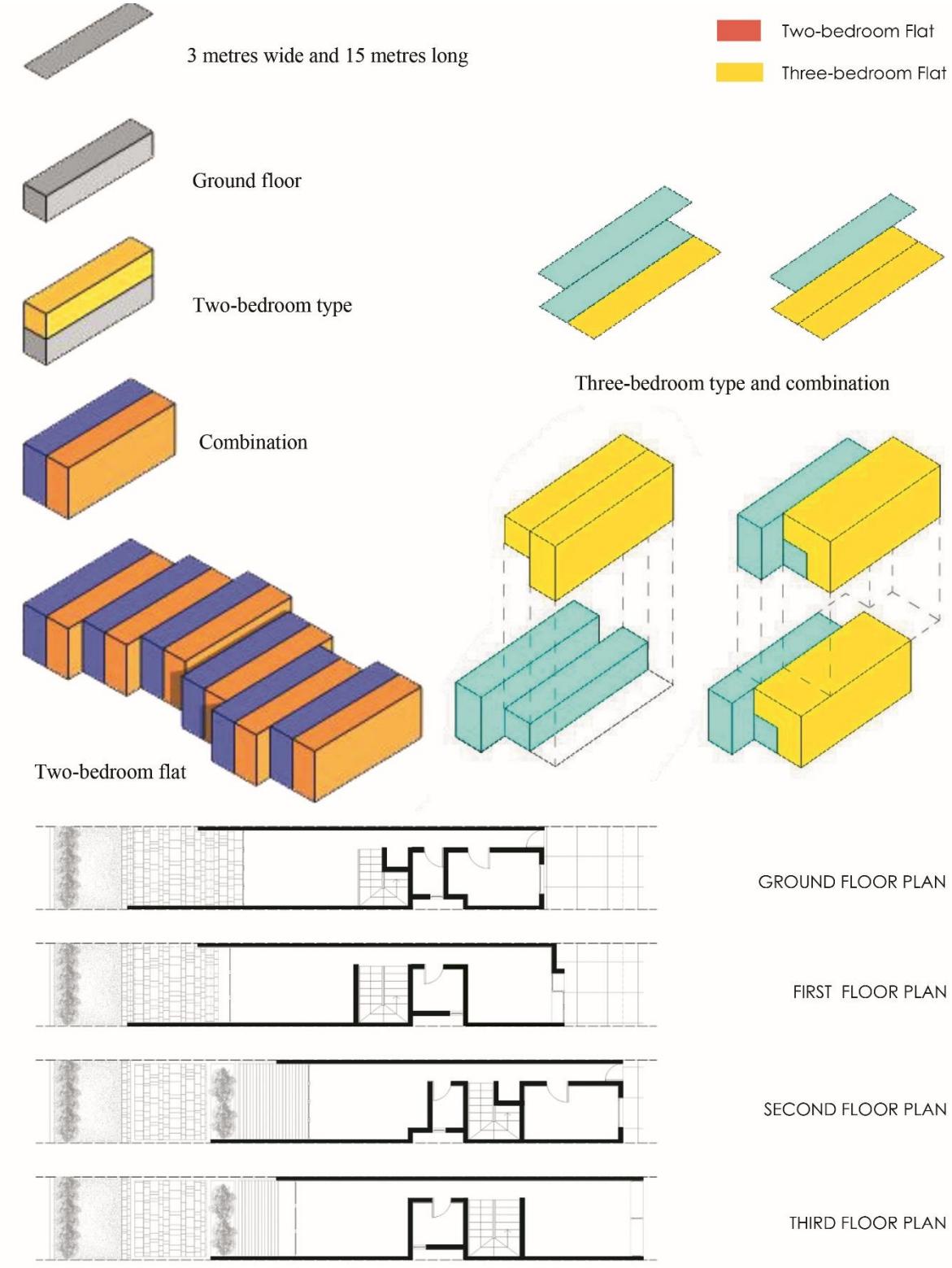


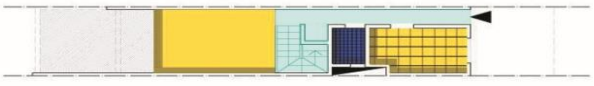
Figure 29: Individual Units

The duplex units can be reached either on the ground floor or on the second floor by an exterior stairway. There are two types of apartments: two-bedroom apartments measuring 84 square meters (3 meters wide, 6 meters high with two floors and 15 meters long, three-bedroom apartments measuring 130 square meters and L-shaped), only 16 three-bedroom apartments have been constructed. Each unit has an open terrace covered by a pergola and wide overhangs. The two sides of the project are linked by stairs.

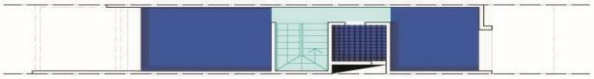
In order to prevent expensive solutions involving elevators, etc., it was decided that two levels of narrow double-storey units would be moved back into the section so that the roof of the lower one would create terraces for those on the upper floor. This design creates a central landscaped area, a kind of humidified zone that provides both ventilation and a wide community space for all families.


3 metres wide and 15 metres long
Two-bedroom Flat
Three-bedroom Flat
Ground floor
Two-bedroom type
Three-bedroom type and combination
Combination
Two-bedroom flat
GROUND FLOOR PLAN
FIRST FLOOR PLAN
SECOND FLOOR PLAN
THIRD FLOOR PLAN

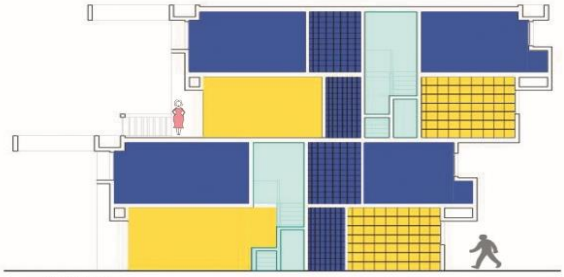
Unit's plan



Ground floor plan

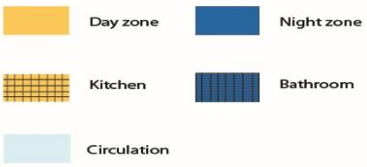


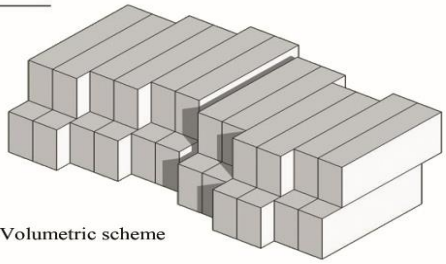
Second floor plan



Section

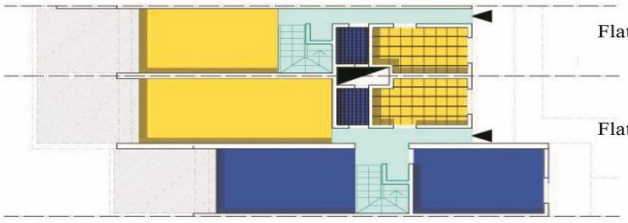
The complex is formed due to the combination between pairs of accommodation units. The second floor which is larger than the ground one with a big overhang that rises further approximately 6 metres gives the mixture between shadow and light. More than that, the duplex above is also push back hence front of the below one is protected too. In that way, the whole central garden is full filled with shadow.





Volumetric scheme

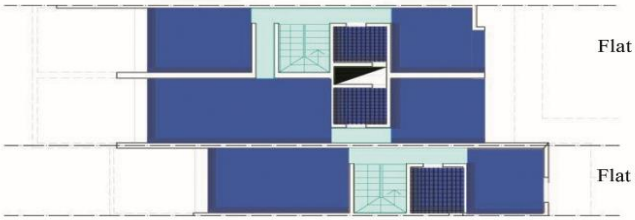
Toatal area of 2 bedroom flat- 90SQM.



Flat A's ground floor plan

Flat B's ground floor plan

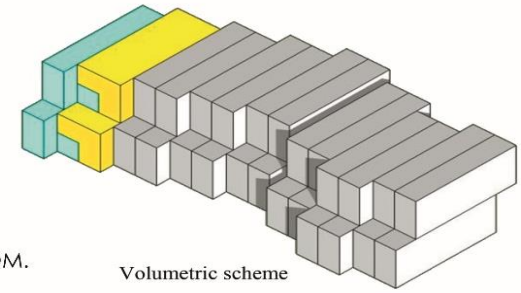
Three-bedroom type



Flat A's second floor plan

Flat two's second floor plan

In the shape of "L", this type seems to be difficult to attach in the middle of a cluster and all of them are located in the outermost.

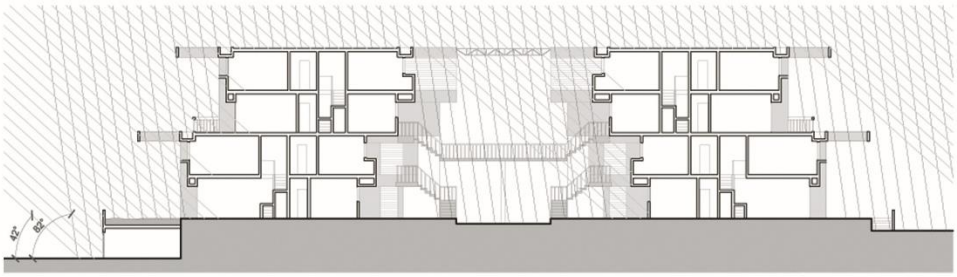


Volumetric scheme

Toatal area of 3 bedroom flat- 135 SQM.

Views

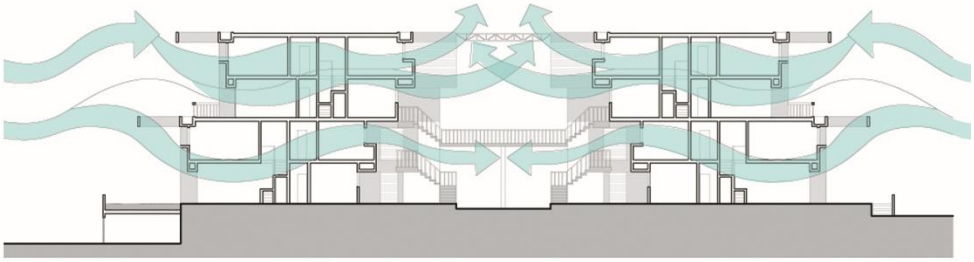
Analysis of solar radiation in winter and summer



Winter sun angle-42'

Summer sun angle-82'

Analysis of the ventilation inside the housing units.



Services on site

- Bike Parking
- Car Parking
- Electric Substation
- Emergency Entrance
- Grey Water tank
- Pump room
- UG Water Tank

4.2. Asian Games Village

Asian Games Village was founded to house game athletes in 1982. In 35 acres, 500 residential units were built as collective housing units. The goal was to create a low-rise, high-density urban pattern based on a sequence of open spaces connected by shaded pathways. Peripheral roads are linked to cul-de-sac parking spaces, which, in effect, give way to individual garages or porches attached to the houses or apartment blocks. It now has 853 houses, of which 793 housetop PSU officials, administrators, civil servants and even ministers of the Union. Originally, the complex had 700 housing units, of which 200 were single houses and 500 were two to four-storey apartments.

Architect- Raj Rewal

Location - New Delhi, India, peripheral (south of the city), Latitude 28 ° 32 ', Longitude 77 ° 13'

Date - 1980 to 1982

Building Type -multifamily housing

Construction System - concrete

Climate - hot

Context - urban

CONSTRUCTION TECHNOLOGY: bearing structure of beams and pillars in reinforced concrete with coating in sandstone pebbles.

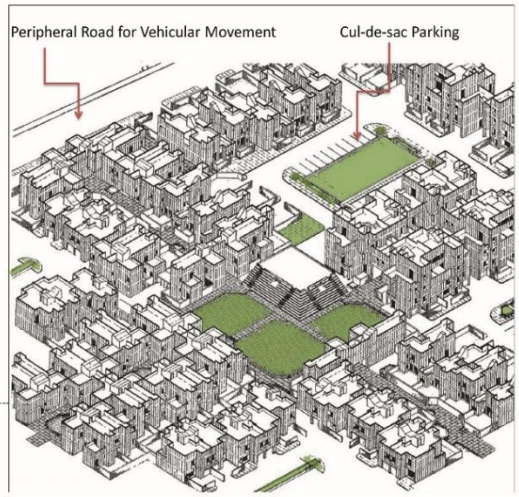
MATERIALS USED: - surface coating in sandstone pebbles, rough finish, natural colour (stone) - metal frames in orange, green, white colour - external paving in local stone blocks.

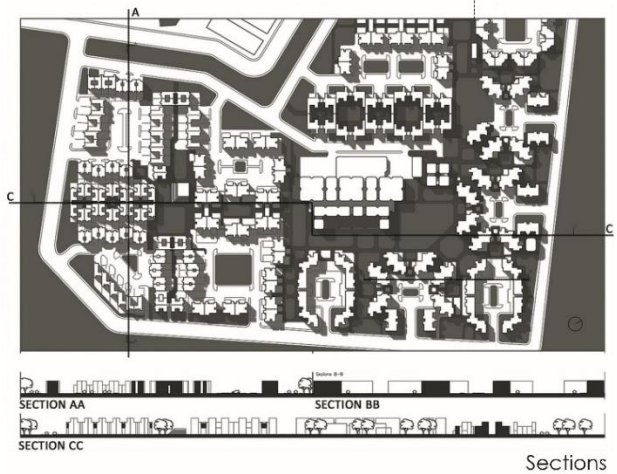
Concept

- The design is based on a sequence of open spaces, combined with narrow pedestrian streets shaded and held alive by a cautious mixture of leisure and public areas.
- The streets are deliberately broken up into visually comprehensible sections, often with gateways, and there are gaps, resting points and shifting views.
- The central spline of the plan is reserved for pedestrian courts and streets in different clusters. Approximately 8 per cent of homes and apartments have access to both pedestrian and parking spaces. A parallel lane leads to the parking area of cul-de-sac.

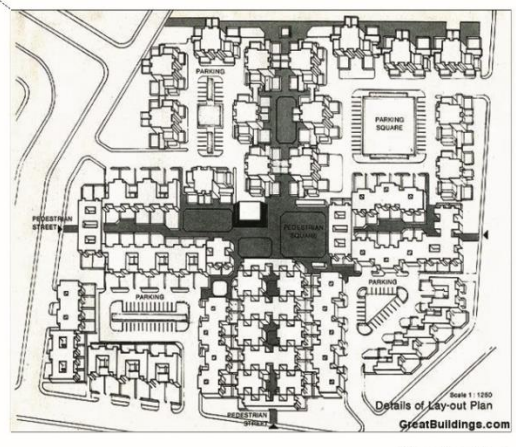
SITE PLAN

Plan showing different types of clusters in cohesion



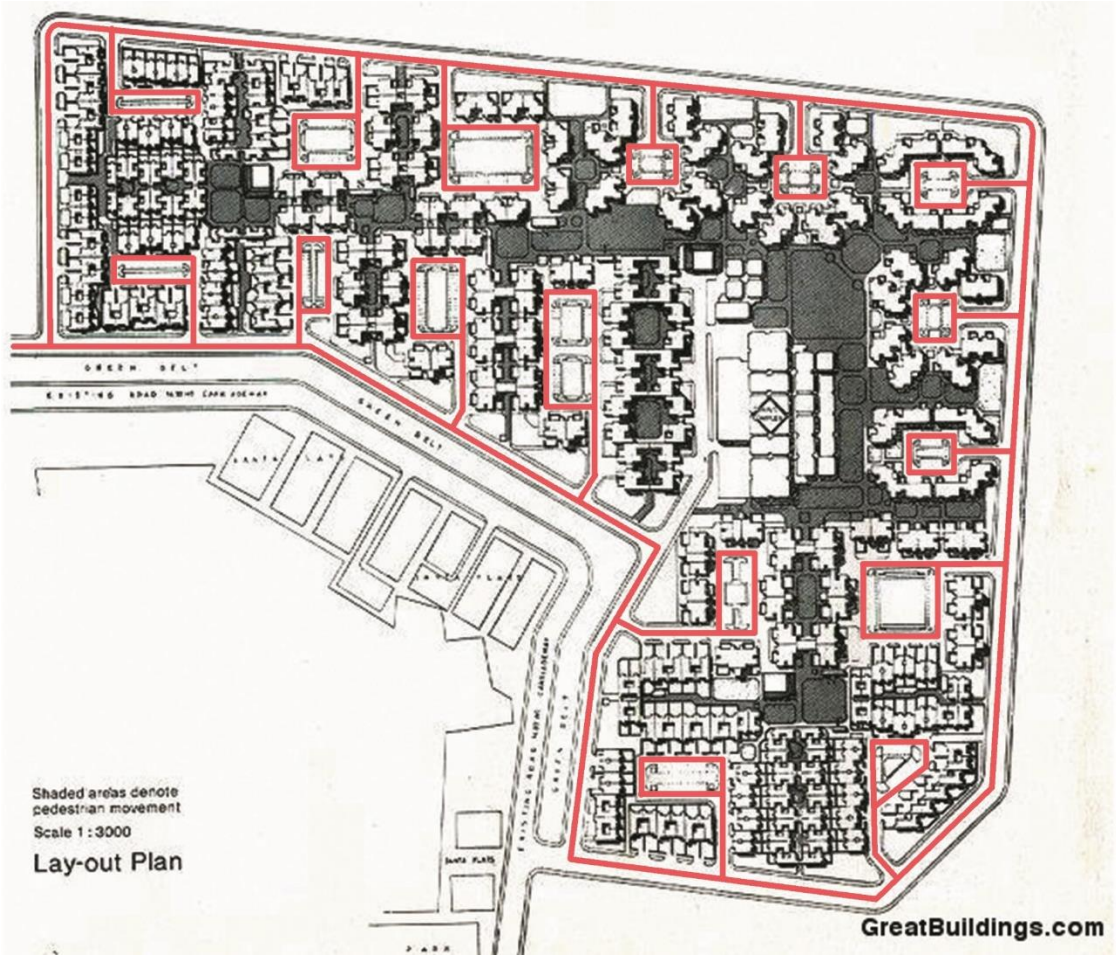


Sections



Cluster Plan

Vehicle and pedestrian movements are separated but closely interlinked for convenience, about 80 per cent of the dwellings have access to both pedestrian and parking areas.



ACCOMMODATION COMPOSITION:

There are 6 types, grouped to mirror the blocks along the two main axes. The exploitation of roofs on which spacious terraces are housed is a common feature of all types. The types differ from each other, both in terms of the design of the individual plan and the size of the accommodation, which varies according to the different user requests.

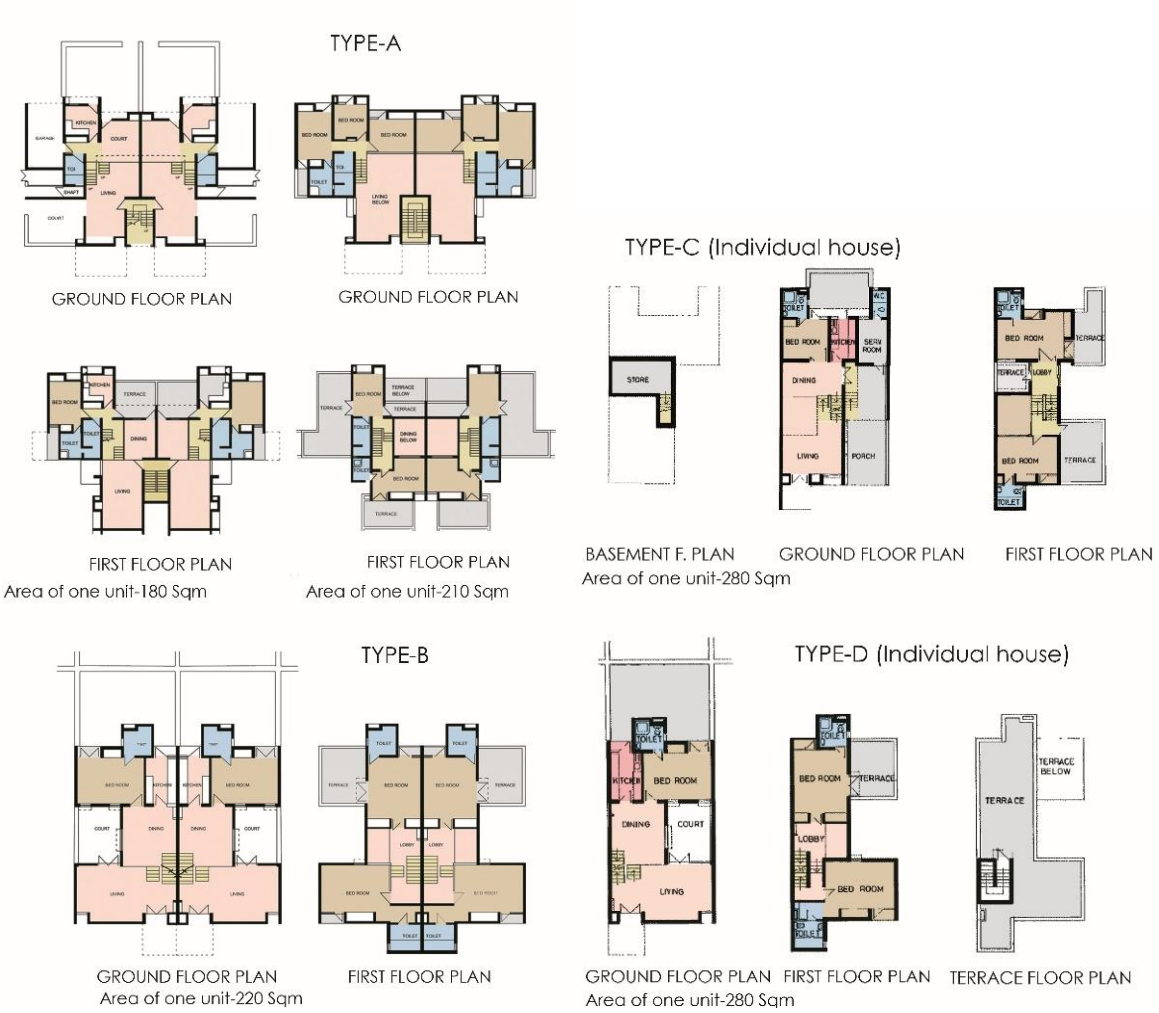
The main type is spread over four floors that enclose two apartments, and consists of the following rooms:

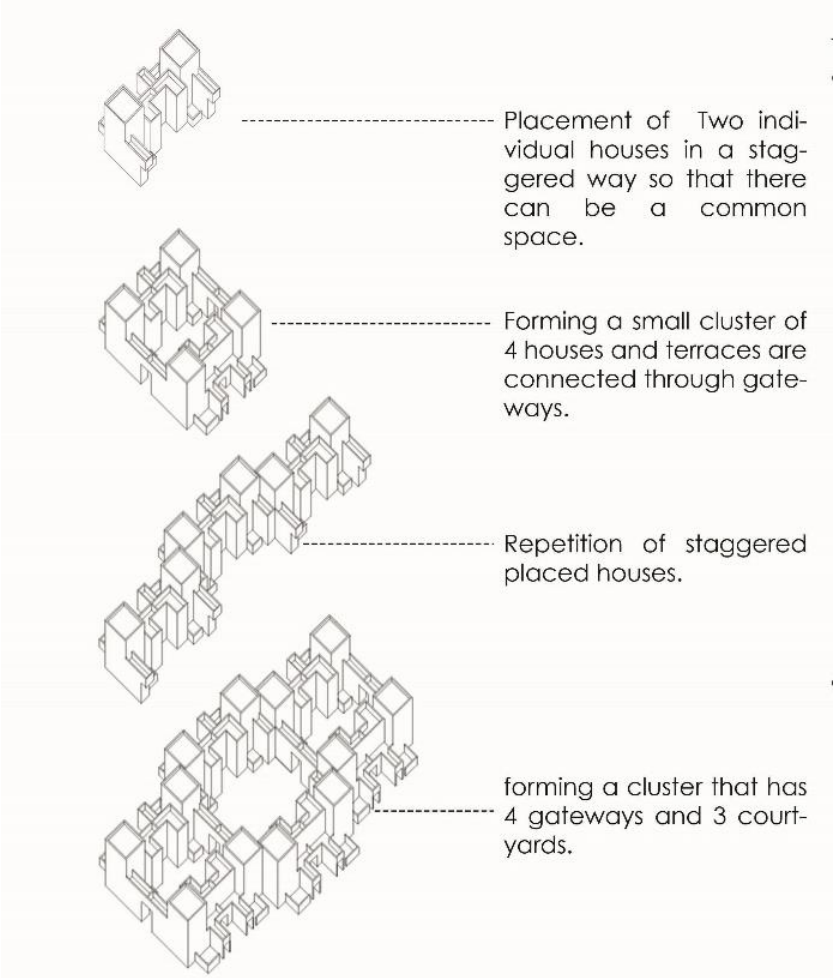
- living area, overlooking 2 fronts
- service and kitchen spaces
- sleeping area, terraces

There are four types of houses, 2 types of group houses and 2 types of individual houses. In every house, open space is provided in the front yard or backyard for

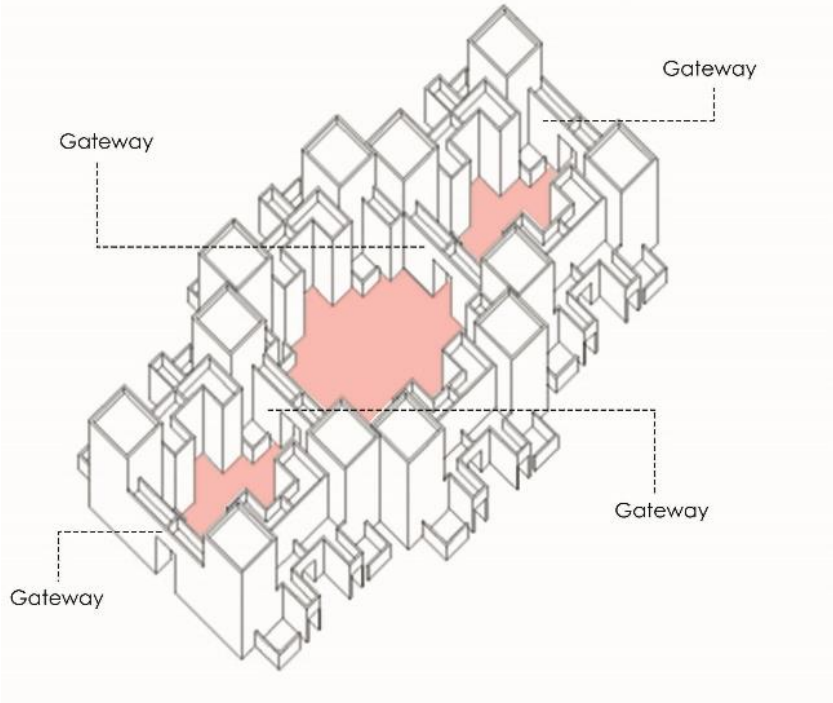
outdoor activities which also helps to invite people for different activities, who are living in the neighbourhood, which is an essential factor to increase social interaction at a place.

TYPES OF UNITS

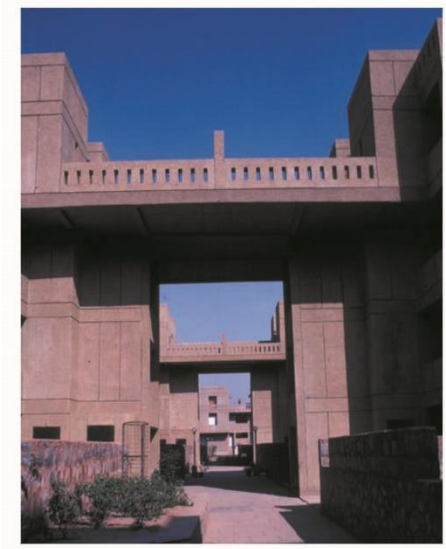


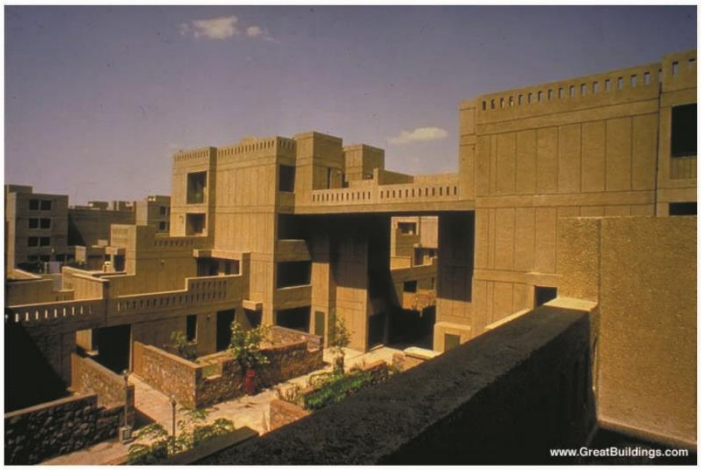


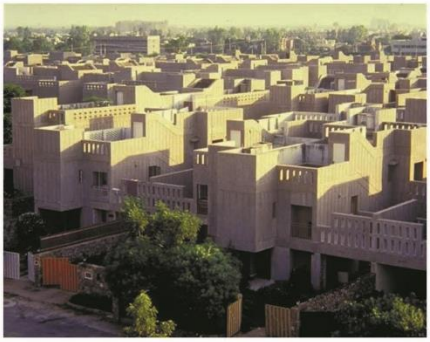
Typical cluster forming gateways in both directions for shaded pedestrian walking and are also used as terrace gadens.



Every cluster is connected with bridges.







CHAPTER 5. CONCLUSION

Providing housing for people is just to provide a physical structure it is a space which fulfils all needs of the user and gives an opportunity user to make their position in society. It is just not connected through physical elements but also has an intangible relationship like memories and belongingness. It is the reflection of a user's personality so there is a need to provide a space with flexible parameters. So before designing a building it is very important to understand the user's need.

To design a well-performed building is directly related to the climate of the site. There are some parameters like the orientation of a building, construction material, height of a building, form of building, the colour of the building, ground coverage area, built-up area and the green area provided around the building or in the building which affects the performance of the building. Sustainability is a wide topic but in short, sustainability is like common sense of using construction resources so there can be minimum harm to nature and less use of extra resource for heating, cooling and ventilation.

CHAPTER 6. PROPOSED DESIGN STRATEGIES

6.1. Climatic strategies

1. Delhi has a composite climate which has a maximum 40-45-degree temperature in summer and 15-20 degree in winter. So, to avoid the maximum solar gain the orientation can be 45 degrees from the north.

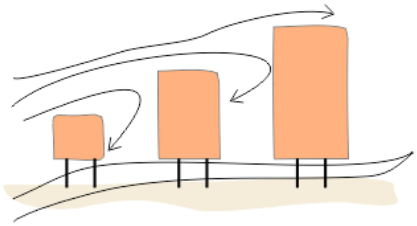
2. The different height of building block is good for wind circulation or ventilation. It also helps to get maximum sun in winter.

3. The landscape helps to reduce the temperature of environments and also helps to clean air.

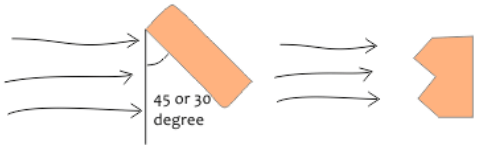
4. Placement of building blocks in such a so that it can avoid the summer sun but allow winter sun in the common area between blocks.

5. Increase the compactness of the building by reducing the surface area of the building.

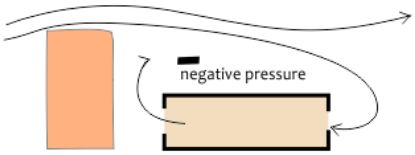
Orient longer facades along the north. This will provide glare free light in summer from north without shading and winter sun penetration from the south.



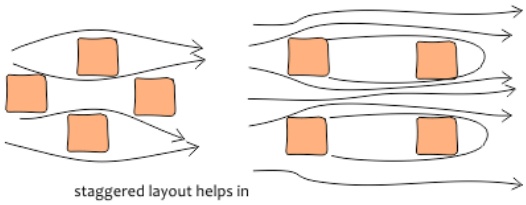
if a site has multiple buildings, they should be arranged in ascending order of their heights and be built on stilts to allow ventilation



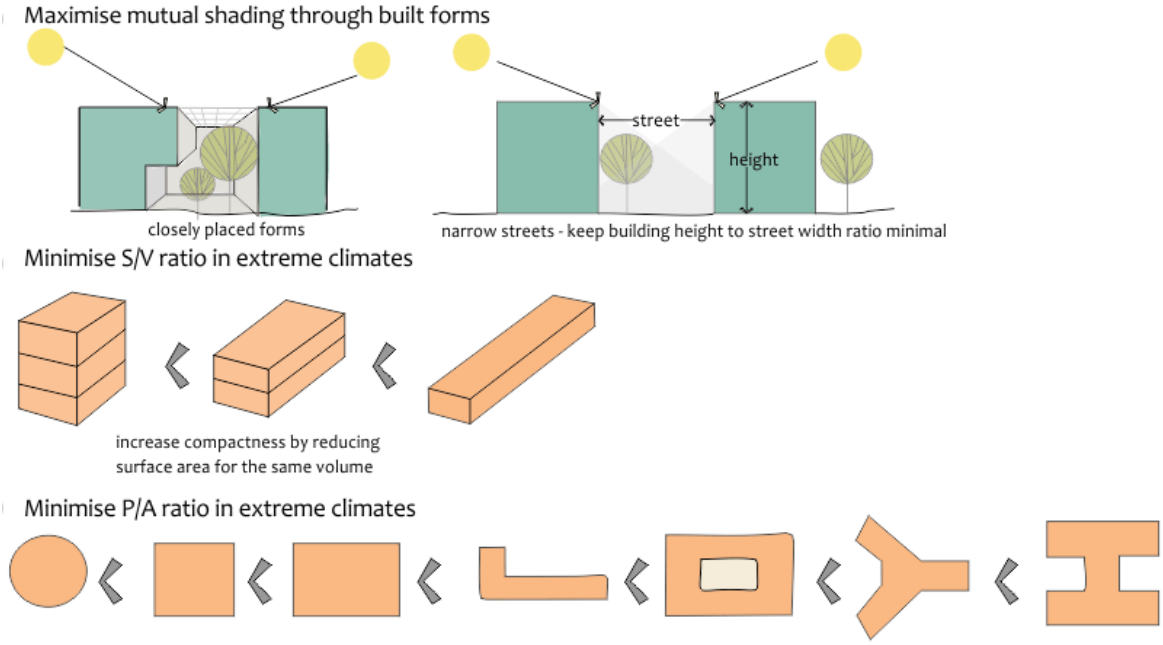
Place buildings at a 30 or 45 degree angle to the direction of wind for enhanced ventilation. Form can be staggered in the wind facing direction also to achieve the same result.



Taller forms in the wind direction of prevailing wind can alter the wind movement pattern for low lying buildings behind them



staggered layout helps in accentuating wind movement



Source: Climate consultant

6.2. Material Selection

The proposed material for the building is a concrete structure with exposed brickwork. The brick is a good insulating material and also has low cost than concrete block. The proposed wall is a cavity wall which helps to reduce the solar gain and avoid interior heating. Cavity wall also serves as sound absorption which avoids the noise produced by vehicles on periphery roads.

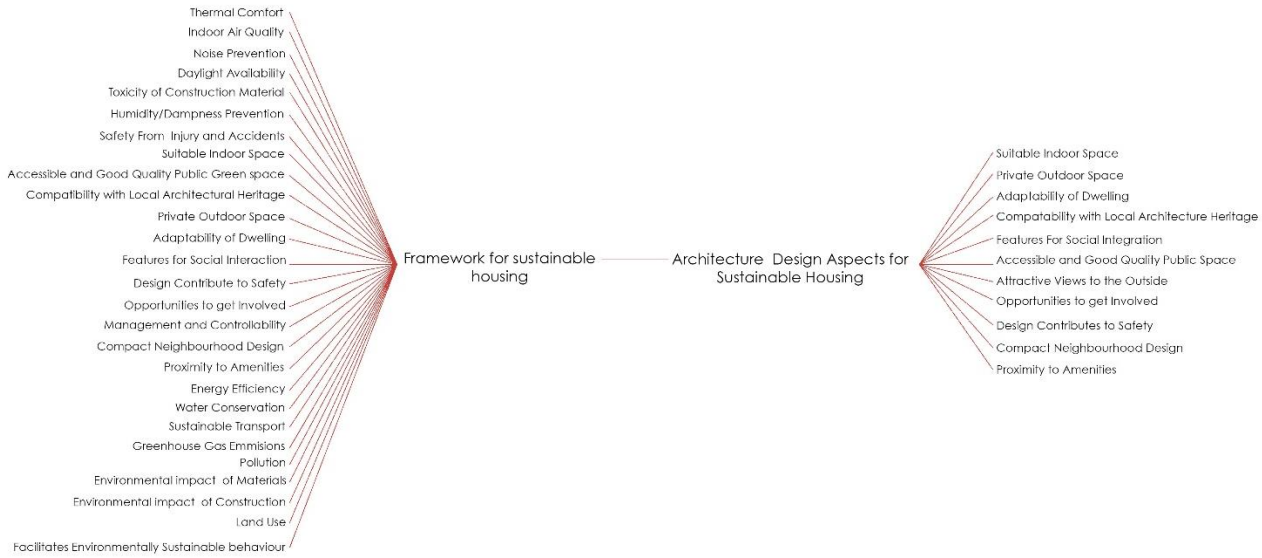
6.3. Open green terraces

Open terraces play a major role to reduce the overall heat gain of absorption of building and work as an insulator against heat and cold. It also helps to reduce the indoor temperature by 6-8 degree and in this way reduce the air conditioning cost.

It is an open space above ground and invites people of the different age group for different activities.

6.4. Framework for Sustainable Housing

There are the parameters of overall sustainable housing design and the architecture design aspects for sustainable housing. The design and location of physical factors for a building can be controlled by design strategies which also connected to the invisible aspects.



CHAPTER 7. PROPOSED DESIGN

Kindly refer annexures (1-23) for final design output.

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