

The Tribal community center for Kota, at Kokkal

A THESIS

Submitted in partial fulfillment of the requirements for the award of
Master of Architecture degree in Sustainable Architecture

By

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SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited With Grade “A++” by NAAC

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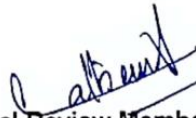
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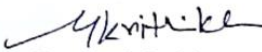
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BONAFIDE CERTIFICATE

This is to certify that Thesis Report is the bonafide work of **ADITHYA DEVI. P (42890001)** who carried out the Thesis entitled "**The Tribal community center for Kota, at Kokkal**" under our supervision from January 2024 to May 2024.


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ABSTRACT

In India there are 449 tribes and different sub tribes and in Tamil Nadu there are about 36 Scheduled Tribe. The Government of India identified 6 tribal communities as PRIMITIVE TRIBAL GROUPS (PTGs) on the basis of a pre-agriculture level of technology, a stagnant or declining population, extremely low literacy and a subsistence level of economy. Most of the tribes live in isolated hilly areas which are often inaccessible and under developed and poorly integrated with rest of the nation.

For the study I have studied on the Tribal communities of The Nilgiris sitting at the intersection of Tamil Nadu, Karnataka, and Kerala. TODA, KOTA, IRULA. Investigated their evolution over time, their current socio-economic structure and how their dwellings have evolved over time.

With the collected information the Kota tribal community

‘Kota’ is one of the 36 subgroups of tribes in the state of Tamil nadu, and mainly living in Nilgiris hills. The kota tribe is also designated as ‘primitive tribes’. The indigenous people are artisans and musicians by nature and their main occupation is making metal tools, wooden implements and pottery. Kota tribes use traditional methods and localized materials building dwellings. Even now, the tribe is socially and economically under developed, hence, the requirement of a ‘Community center’ encompassing skill training center, primary health center, handmade construction center and educational space etc., to develop their socio economic status in par with other common people in the state, considered imperative.

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CHAPER 1

INTRODUCTION

1.1. INTRODUCTION

The Nilgiris sitting at the intersection of Tamil Nadu, Karnataka, and Kerala, is a mountain range that gets its name from the Neelakurinji flower, famous for blooming once in 12 years.

The place is a layered home to dry deciduous forests at its base, dense evergreen forests on the slopes, and a mosaic of stunted forests and grasslands on the top.

At Present, British influence lingers on the high-end peaks in the form of tea-plantation and heat-relieving resorts, despite modern developments, The district claims to have the largest Adivasi population.

Todas,

Irulas,

Kotas,

Kurumba,

Paniyars, and

Kattunayakan.

These tribes live mostly in well-defined but isolated hilly areas. which are often inaccessible and relatively under - developed and poorly integrated with the rest of the nation.

Their fight is a continuous tug-off between survival and revival, getting swayed by the helm of modernization and protecting their ancestral culture.

They have already lost much during colonialism: their homes were turned into cash-crop plantations, and they were forced to work as low-wage workers in tea plantations.

At present the tribal ecosystem in the Nilgiris calls for protection. Apart from survival, these tribals have carried stories, practices, culture, and knowledge of medicinal plants over generations.

Since ages, tribal communities followed distinctive culture and we have a lot to learn from them; and conserving them for our future would be a bliss – both for them and our upcoming generations.

- To investigate on climatic responsive building materials and techniques suitable for the Community centre

1.4. RESEARCH METHODOLOGY

Phases	Tools & Techniques	Methods	Results
1	Climate study Meteorological data and quantitative survey	Climatic data collection from meteorological dep. for Nilgiris Hills	Climatic Analysis
2	Documentation and data collection	Survey and observation of the tribe their socio-economic factors.	Quantitative and qualitative analysis
2	Documentation and analysis of data	Present vernacular architecture of each tribal community in the Nilgiris and building evolution	Architectural typology
3	Systematic Analysis	Using data logger & measuring equipment's	Quantitative Evaluation
3	Systematic Analysis	Investigation on climate responsive construction materials & construction techniques	Qualitative Evaluation
4	Systematic Analysis	Investigation of ways to achieve environmental sustainability & sustainability for built environment through research papers and existing construction knowledge of the tribes	Qualitative and Quantitative Evaluation
5		Result and conclusion from quantitative and qualitative analysis	To propose a sustainable built environment for the tribe which is which reflects their culture and tradition

Tab.1.1 Methodology

1.4.1. INFERENCE - METHODOLOGY

From the literature study it is evident that the following study on the of the tribal community and the evolution of vernacular architecture in the blue mountains can be carried out in both quantitative (HOBO data logger) and qualitative analysis (questionnaires, surveys and observations) for an in depth understanding on the field of subject.

CHAPTER 2

2.1 LITERATURE REVIEW

AUTHOR	TITLE	METHODOLOGY	STUDY AREA	KEY FINDINGS	RESEARCH GAP
R. Shanthi Priya, S. Radhakrishnan	Evaluating the Thermal Performance of Traditional and Modern Toda huts in Nilgiris Hills	Mixed method, Qualitatively research through books, and quantitatively Research using HOBO data logger & Olygay Bioclimatic chart	The traditional and Modern Houses in the Hilly region are examined to understand the Thermal Performance of the house.	- locally available materials has a high thermal capacity which maximising solar heat gain and minimizing heat loss. -The Time lag is an important factor in determining the Thermal Comfort. -Toda houses were thermally comfortable irrespective of their outdoor Climatic conditions than Modern Houses.	-
Saurabh Kumar Mishra,	Learning from vernacular architecture of Toda community	Qualitative research through books and online research	A study of architecture and planning of residential dwellings of the Toda community of Nilgiris	-Spatial layout, single story gives an understanding about the planning and other social factors.	Structural stability during disaster (land slide)

Suchi Priyadarshani			region	-Traditional Construction techniques and locally available materials and built by local community people -Cost effective	
Dr. M. Saraswathy	Anthropological Study On Toda Tribes Of Blue Mountain, Tamil Nadu, India	Qualitative research through interviews and research papers	The cultural heritage of Toda people and recommends extending support to Toda people to maintain their traditional values.	-Todas had converted to Christians and from then on they are called as Christian Todas. -Todas have their own rich culture and traditional practices - Issues faced by the Mundas, Less transportation facility Less exposure, closed mindedness, compared to urban people \-	-
Ramen Lagachu,	Social and Economic Life of Toda Tribe: Their Historical Identity	Qualitative method, research through books and online research	-To study the traditional socio-cultural system of the Toda.	-The traditional patterns of interaction and the changes that have occurred due to various' influencing factors.	-

			- To find out the causes of changes. -The emergence of surplus peasants and servicemen among the tribals provide cash to' the tribals is the result of forces of modernization including the efforts of planned development. -To identify the areas where changes are taking place. - To find out causes of continuity of some aspects of religious life of the Toda.		
Richard. K. Wolf	The Kotas of South India	Qualitative method through observations.	An ethnographic study of many aspects of social and cultural life of Kotas	The kotas are culturally rich and had immense knowledge in playing instruments, as it played an integral part of their day-to-day life	-
AIDCSC	The Kotas of The Nilgiris	Qualitative method	-Introduction about Kota	-Kotas have a distinctive language	-

All India Deprived Community Support Centre (Journal)			-their culture and occupation	- Kotas are involved in various of occupation
Dr. Jakka Parthasarathy	IRULAS OF NILGIRI DISTRICT TAMIL NADU	Anthropological techniques like participant observation, geneaology, closed interview and case study methods.	To understand the cultural and social outlook of the Irulas of Nilgiris	-The irulas are highly religious -They are good with music and dance

Tab.2.1 Literature review

CLIMATE STUDY OF THE BLUE MOUNTAINS

3.1 INTRODUCTION

Ooty, officially known as Udthagamandalam also known as Ootacamund is a town and a municipality in the Nilgiris district of the South Indian state of Tamil Nadu. It is located 86 km (53 mi) north west of Coimbatore, 100 km (65 mi) north west of Tirupur, 128 km (80 mi) south of Mysore and is the headquarters of the Nilgiris district.

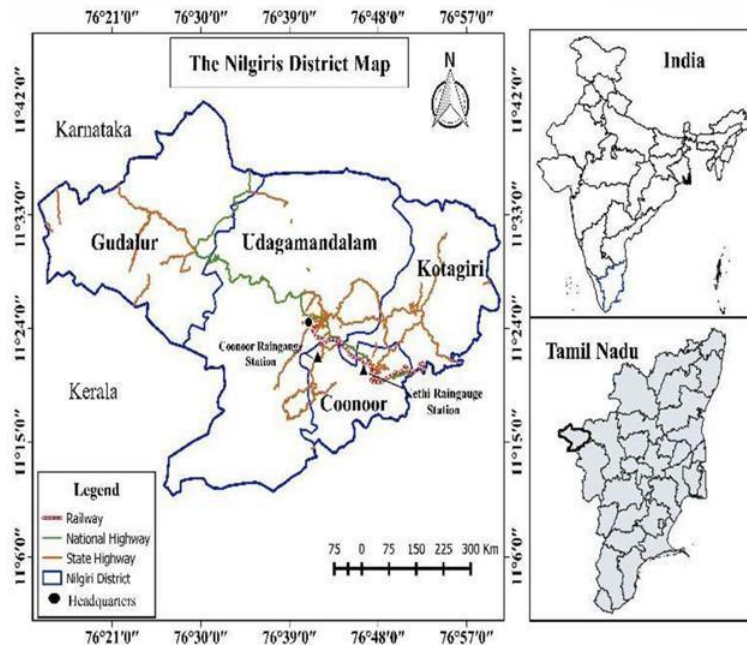


Fig.3.1. Nilgiris District Map

It is a popular hill station located in the Nilgiri Hills.

It is popularly called the "Queen of Hill Stations". It was the summer capital of the Madras Presidency.



Fig3.2 Latitude and Longitude

11.4102° N, 76.6950° E

3.2 TEMPERATURE RANGE

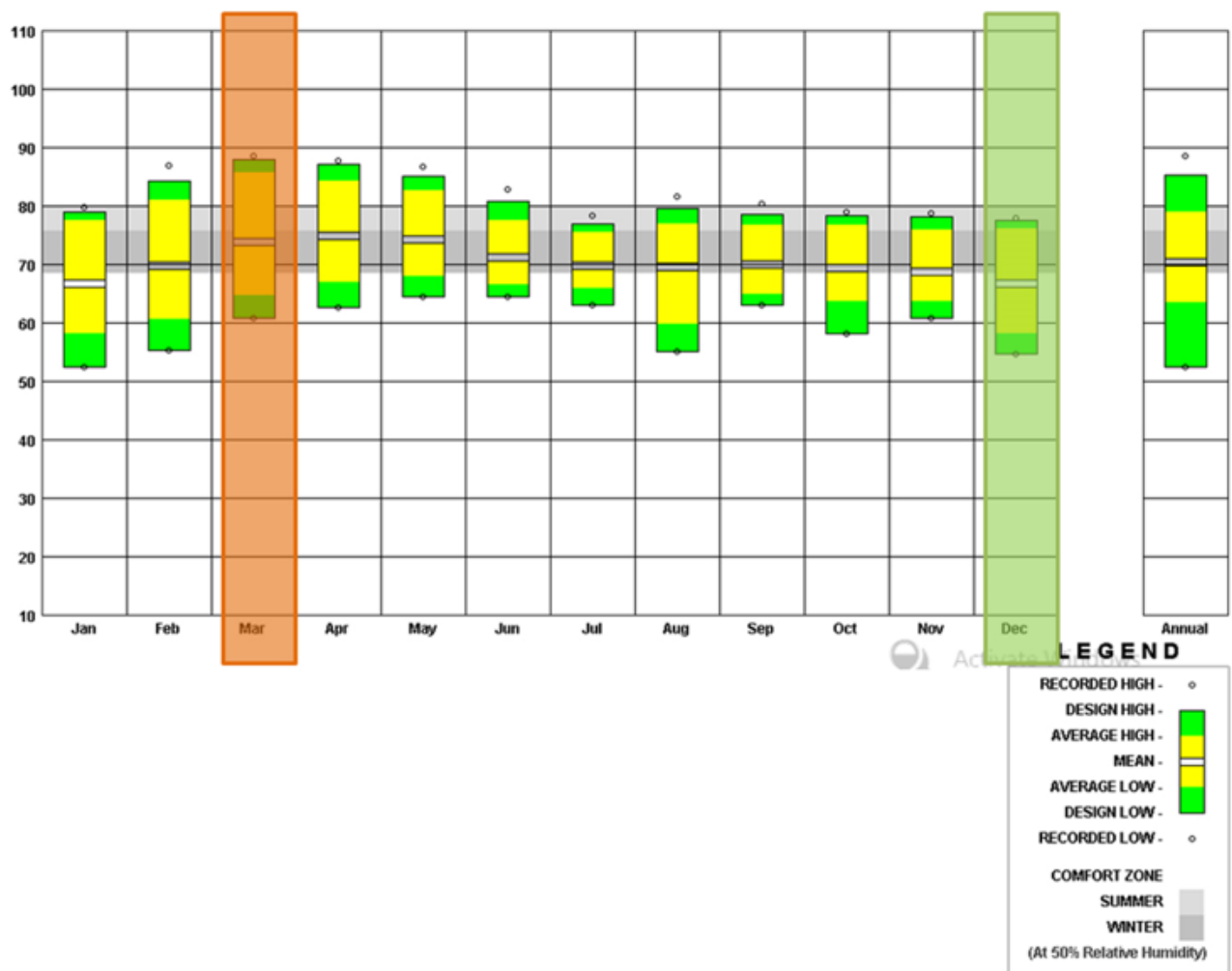


Fig 3.3. Temperature Range

Temperature is high in the month of march – 32°C and low in the month of december.

3.3 RADIATION RANGE

The radiation range graph shows the direct normal irradiation and global horizontal irradiation and the total solar irradiance.

DIRECT NORMAL IRRADIATION

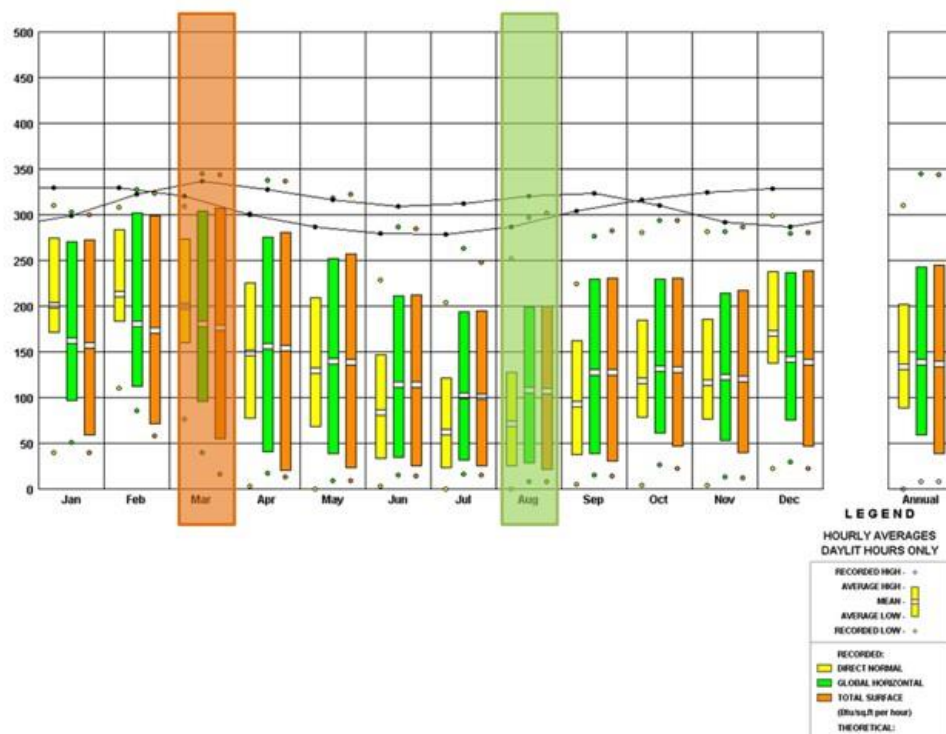
Direct Normal Irradiation (DNI) is the amount of solar radiation received per unit area by a surface that is always held perpendicular (or normal) to the rays that come in a straight line from the direction of the sun at its current position in the sky.

GLOBAL HORIZONTAL IRRADIANCE

Global horizontal irradiance (GHI) represents the irradiance over a horizontal surface. Direct normal irradiance (DNI) is the irradiance that incises directly from the sun on the horizontal plane. Diffuse horizontal irradiance (DHI) remains scattered on the line between the sun and the position of the energy system.

TOTAL SOLAR RADIANCE

Total solar irradiance (TSI) is a measure of the solar power over all wavelengths per unit area incident on the Earth's upper atmosphere. It is measured perpendicular to the incoming sunlight. The solar constant is a conventional measure of mean TSI at a distance of one astronomical unit (AU).



The amount of the sky that is covered by clouds, fog, haze, smoke, or the like, usually expressed in tenths of the total sky.

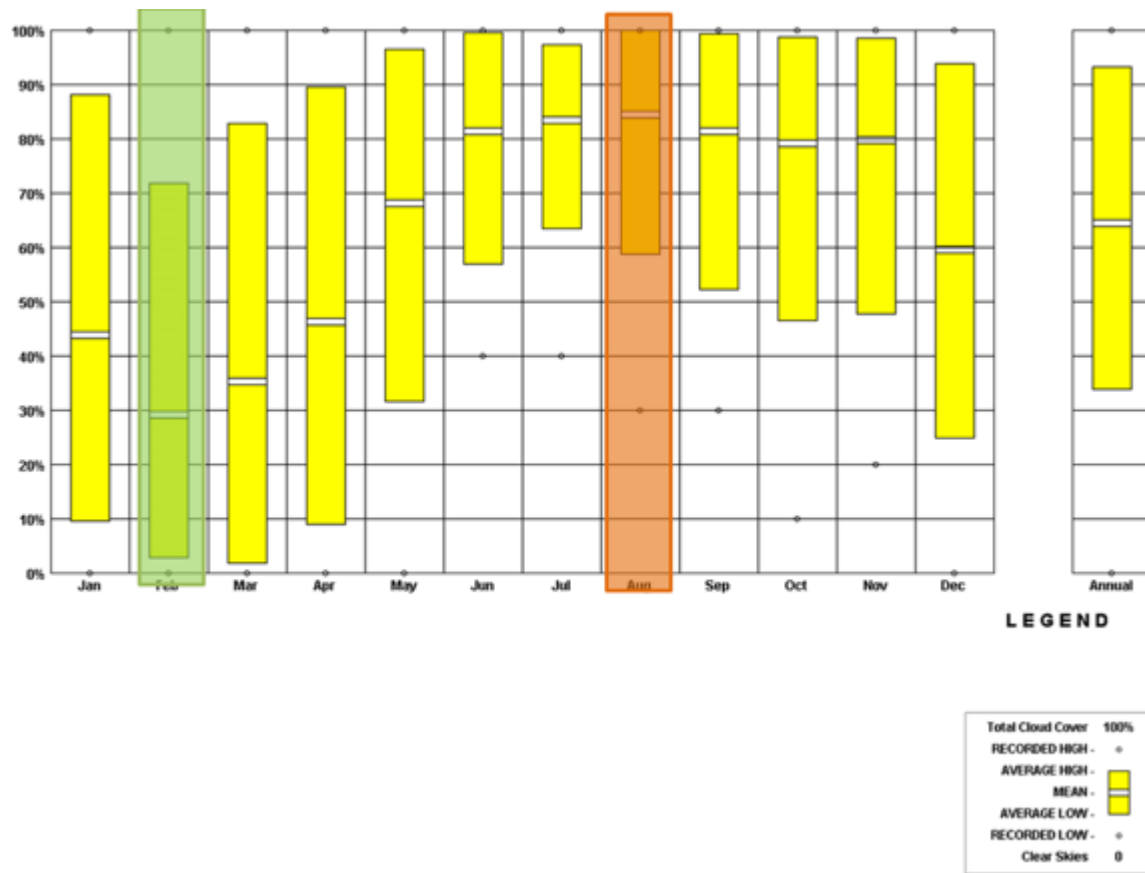


Fig3.5 Sky cover

Sky cover is high in the months of August and low in February which directly impacts on the humidity of the area. Higher the sky cover, higher the humidity.

CHAPTER 4

THE TRIBES OF NILGIRIS

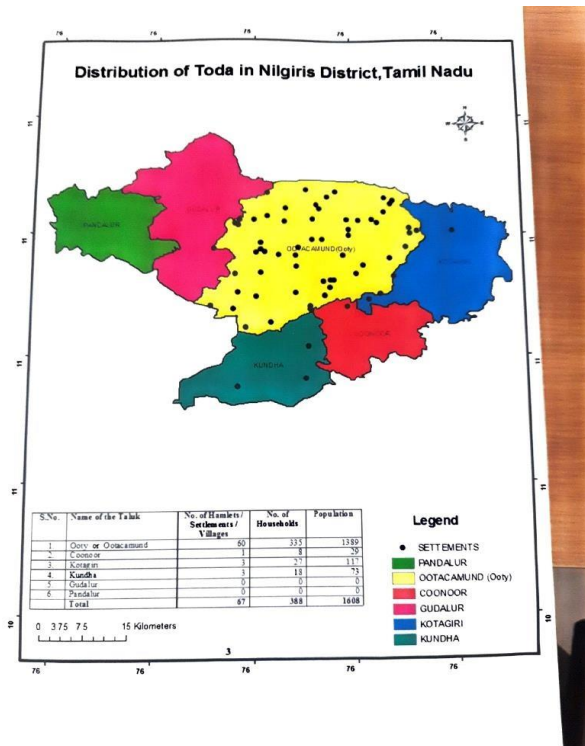


Fig4.1 Distributions of Toda in Nilgiris District

4.1 TODAS

Toda is a tribal community found in mainland of Ooty, Tamil Nadu; they are pastoral nomads who occupy the upper plateau. The distinct tribal culture is evident from the cultural elements of the community reflected through their dwellings, food habits, lifestyle, etc

The close-knit Toda community lives in settlements called 'mund' across the Nilgiris.

Their main occupation is traditional embroidery and agriculture, they use an endangered water buffalo called Asiatic Water Buffalo, whose population is decreasing.

4.1.1. Socio-economic:

As the todas sell their products or exchange it with the neighbouring tribal communities, the Badaga provide them with grains and other farm products and also act as middlemen between the milk – selling Toda and traders from the lowlands.

The Badaga also pay an annual tribute of grains to the Toda. This has always been done in recognition of the supposedly original ownership of the region by the Toda and also in fear of Toda sorcery.

The Kota, is an artisan tribe and supplies the Toda with pottery and ironware and ceremonial objects. In return, the Toda give them milk and milk products and also the flesh of sacrificed buffaloes. The Kota supplies them with all the utensils they need in the domestic work and dairy operations. Socio-economically a symbiotic relationship is followed among the tribes of Nilgiri hills.

The Females of toda tribal community are not permitted to enter the dairy house because of a taboo and are totally engaged in the household. Previously, the males used to cook, but now this task has been transferred to the female

4.1.2. Cultural:

The Todas practice “fraternal polyandry”, wife of a brother is regarded as the wife of all brothers. Once the community used to practice female infanticide. When the new system of law and order was introduced by the British, infanticide became a crime, and the sex-ratio got more or less equalized.

Toda people have an exotic way of dressing, Women and men wrap a white veshti (dhoti) and an embroidered shawl, called putkolli. These shawls feature the distinctive images of kurkur (flower) and tress. It is essential that this material has to be embellished with the combination of three colours, white, black and red as a practice of their custom. The white colour symbolises innocence; red depicts opulence and black represents sadness.

Putkolli are worn by Todas only for ceremonies in recent years, whereas they used it all the time in their ancestral days.

Religion plays a strong role in society. The Todas are found to worship different gods and goddesses along with a large number of spirits. Tiekirzi and The Goddess Tokisy is the most important as she is considered the creator and supporter of the people and their social and ritual institutions. Womenfolk are not allowed within the precincts of the dairy, temple as it is believed that they would corrupt the sanctity of the dairy.

The todas are purely vegetarians and in the dairy work is absolutely laid by the male.



Fig4.2 Todas

4.1.3. Occupation:

The Todas are pastoral tribe of India. All their economic activity is centred around their buffaloes. They rear only buffaloes for milk. They made various products from milk such as ghee, cheese, butter, curd etc. which is either sold or exchanges with neighbouring tribal community.

The Toda tribes of Nilgiris are known for their art of embroidery. They purchase white cloth materials from Erode, and they design these materials with unique embroidery styles to reform it as their traditional shawls (putkollis). The women of toda make putkollis, sweaters and scarfs to sell it to the foreigners that help in generating income revenue. They are also into agriculture.

4.1.4 Settlement and Housing:

Toda families reside in permanent villages commonly known as “Mund” or “Madd”.

The traditional settlements follow concentric patterns with 3-7 Toda houses or “Arsh” houses enclosing the place for worship at the centre. The village is surrounded by agricultural land, a part of it comprises of pasture land for grazing buffalos.

A Mund consists of mainly a temple place, Arsh houses, dairy house, and agricultural land arranged in concentric circles

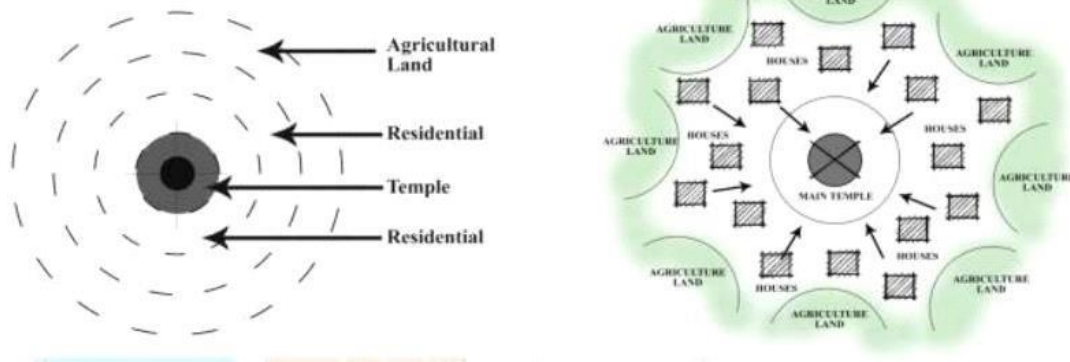


Fig 4.3 Form of the village layout of Todas

The organic pathways descending according to the natural terrain creates are used for access.

Todas have the custom to evacuate their houses or sometimes, the entire hamlet for a certain period in case of death of humans or cattle caused by a disease. It is believed that residing in the same Mund can infect other people and cattle as well.

4.1.5. Spatial layout:

The houses of Todas mainly consists of single rooms. Some of the houses are formed by the junction of two and also sometimes three single units in a single line. However, the single units are not connected internally and only share a common wall.

The internal space, mostly a rectangle has segregated spaces based on functional use. The functional segregation of spaces depicts the importance given to the elderly in the community by providing a dedicated sleeping place. Other members of the house rest in the common space used for activities like eating otherwise.

Most of the social interactions in the tribal communities happen outdoors, lessening the functional requirement of common spaces indoors.

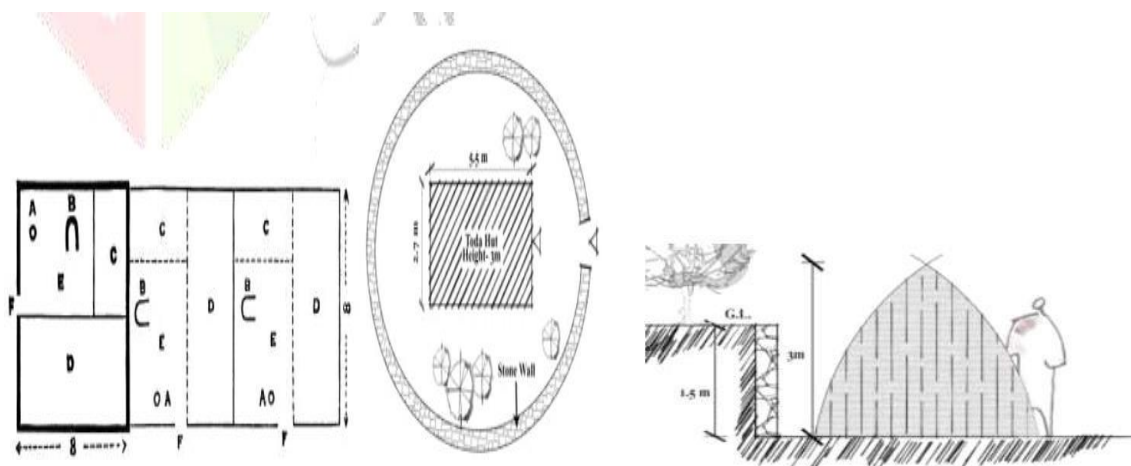


Fig 4.4 layout of an arsh house of Todas

The Arsh houses are basically rectangular shape in plan with 5.5 meters in length and 2.7m in width. The height of the house is around 3m.

The house is constructed on the flat land and surrounded by the stone walls of height ranging from 0.9m to 1.5m. The structure sometimes is placed at a lower level from the original ground level.

The stone fence, circular in plan has a small opening for exit and entry protecting the dwelling from the attack of wild animals.

There are no windows in the house which help the inhabitants to protect from cold weather in the region, The entrance to the house is generally around 0.9m in height. the door opening is in the middle and are placed towards the leeward side, usually facing south or south-east.

The roof of the structure is a barrel-vault touching the ground from both sides. The roof is projected around 0.9m beyond the walls, forming a verandah mostly facing East.

This verandah is at the entrance of the house with raised platform made up of clay where the primitive family sit, perform domestic chores, and interact with each other.

4.1.6. Construction Techniques:

The construction of the Arsh houses, is done with extensive use of the local materials available in the region.

The roofs are thatched roof made up of local grass and bamboo, fastened with split rattan. The roofs are either constructed in curvilinear form or bough to an angle at the top, with the help of wooden ridge-pole.

The two walls at the end are generally made up of very stout planking. In some of the cases stones (mainly granite) are also used for the construction of walls.

The side walls are made by bringing the roof down to the ground, in which the end of the curved bamboo rafters are all embedded.

Flat stones are used to fill the gap between the ground and the roof, to prevent the water to penetrate inside the dwellings. Clay mixed with cow-dung fills the holes and gaps between the planks.

There are no attached doors to the walls, a flat stones and solid slab of wood is used to close the doorway during nights. Sticks made up of local trees were used to hold the door slab.



Fig 4.5 Todas in Tharanadu mundu, Ooty

4.1.7. Inference:

The Toda tribal community is rich in heritage and culture. Todas as a community has evolved as more compared to other tribal community in terms of quality of living and socially.

Can firmly say that the Todas have climbed the social ladder by education, and Todas have become Doctors and lawyers, and an egalitarian thinking also found in their society.

The traditional housing pattern of todas are built using natural locally available materials.

4.2 Kotas

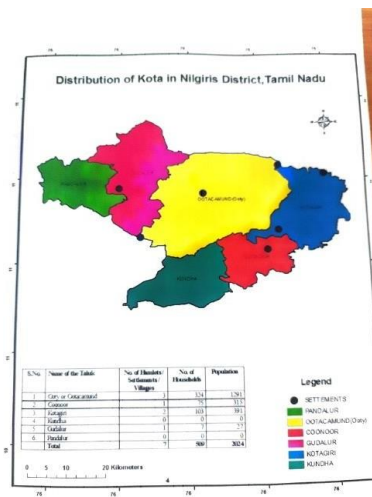


Fig 4.6 Distributions of kota in Nilgiris District, Tamilnadu

Kota tribes of Tamil Nadu are believed to have moved to the Nilgiri hills after the Toda tribe. They had earlier been living in Karnataka in a mountain known as Kollimalai in Mysore after which they named the first village "Kollimalai" (near Ketti village) which they built in the Nilgiris.

4.2.1. Socio- economic:

The Kotas supply the band for the Toda tribal people and Badaga festivals and funerals. The Todas pay the Kota musicians flesh of buffaloes and rice. They have availed themselves of educational facilities and have improved their socio-economic status and no longer depend on the traditional services provided to make a living.

4.2.2. Occupation:

Kotas are artisans good at pottery and carpentry, and are mainly blacksmiths – makers of agricultural equipment and weapons for wars. Once Kotas participants in an elaborate system of interchange of goods and services.

The Kotas now participate in a modern rural and urban cash economy. They work also in traditional occupations as agriculturalists, cultivating potatoes, carrots and other vegetables as well as tea and educated beyond the 10th standard nowadays and are employed in diverse professions, including those of medicine, law, engineering, and in various forms government service, including the postal service and the military.

4.2.3 Cultural:

The Kota tribal language known as "Ko-v Ma-nt" is a very old and rude dialect of Kannada language. The origin of the name "Kota" is derived from the Dravidian root word "Ko" meaning Mountain. The Kota village is known as Kokkal in the Kota Language.

Each village had three clans of similar name. Each clan settled in a street called Keri. Kotagiri is the traditional home for the "Kotas". "Kota - Giri" means "Mountain of the Kotas."

The Kota Tribe have no caste but are divided into Keris or streets –

"Kilker", "Naduker", "Pibberker", "Aker", "KorekerVor "Gager".

People belonging to the same keris do not intermarry as they are supposed to belong to the same family. The Kotas prefer to marry within their own village.

Kota traditional garment is known as "varad," a white bedspread cloth, is thrown around the body by men and women. Male dress consists of single piece of white coarse cloth called kir.Kadk, traditional earring ornament are used both by men and women

Women used to play a bamboo jew's harp (pīl), but almost nobody knows how to play it anymore. The pīl and the bugīr were cremated with the woman or man, respectively, who played it during her or his lifetime.

Kotas devote the majority of their ceremonial time to rituals for the gods and for the dead. , "The Kambattarayya festival" or the "God ceremony." Kamaṭṇ or Kambatten is the name of the Kota "father god." The God ceremony is celebrated in most villages for 10-12 days in December-January. Its precise date depends on the sighting of the new moon.

4.2.4 Settlement and Housing:

The Kota Village consists of a row of few thatched huts. The Kota houses called 'pai' were traditionally thatched huts, with mud and brick walls. The houses of the Kotas have a unique linear pattern with two or three localities called Keri with two or three streets which form the integral part of the village.

The house of Kota Tribe is divided into a living and sleeping apartments. The house consists of a front room, containing a raised platform on the left for sitting and sleeping and a hole in the floor for pounding.

A kitchen, located to the right of the front room and containing a wood stove along the wall opposite the arched entrance, and a back room for bathing. The walls have special crevices for oil lamps and wood and other objects are often stored in rafters above the kitchen.



Fig 4.7 Kotas at Kokkal, Ooty

4.2.5 Inference

The Kota tribal community live a simple living, and live in houses which are more than 100 years old, made of brick and finished with mud plaster. They are not as well off as the Toda, but they do have basic facility and amenities like transportation, drainage, water supply and electricity

The Kotas have kept their tradition intact and still practice pottery and the art of blacksmith.

Housing pattern of the Kotas are in a linear way and are located at different street levels consisting of each division of the Kotas

4.3 Irular

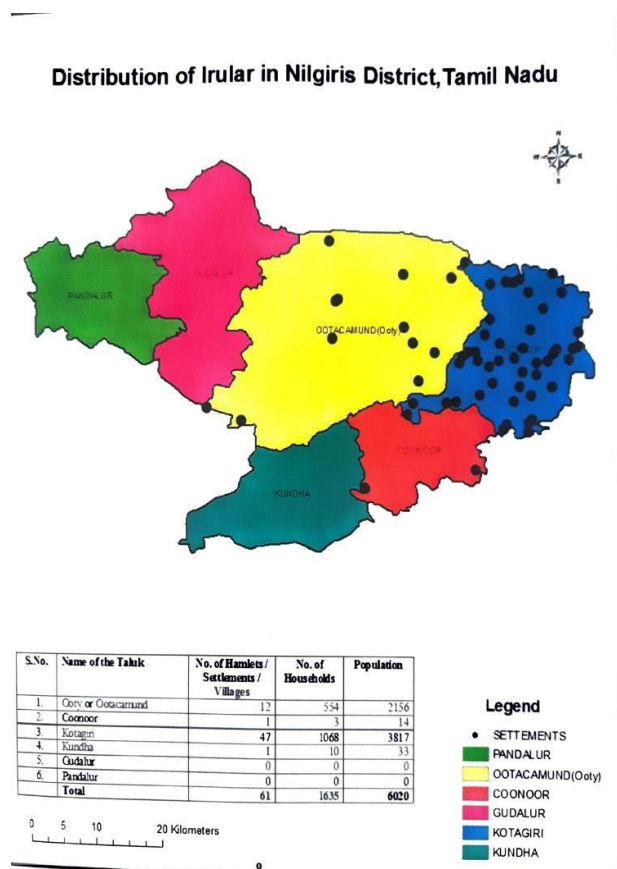


Fig 4.8 Distribution of Irular in Nilgiris District

Irulas, are Dravidian tribe of South India. Due to the relatively secluded lifestyle and The Irula community still remains backward.

The native Irula word means darkness or black (irul), in reference to the dark jungles in which they live. They collect minor forest produce and are specialists in traditional herbal medicine. Professionally, they are snake and rat catchers.

4.3.1 Socio- Economic:

As one of the settlements of Irula community located in Mudumalai Wildlife sanctuary that is geographically inaccessible and service deficient region. Man–animal conflict is also a threat to their life and crops.

Animal intervention in the habitats of the tribal settlements one of the important problems in this community during harvesting seasons.

People of Irula community have started migrating to cities in search of jobs which may cause cultural declination. The lack of opportunity in the area and slow raise in their economic level within the specific locality have increased the tribal migration towards cities.

In recent years some of them have started adopting modern agriculture practice, like use of chemical fertilizers & pesticide to increase yield of crops. Records from this region have shown tribal population suffering from medical illness like hypertension, diabetes, arthritis, anaemia, skin infection, and vision problems. These problems are severe in place where the Irular are isolated. Other problems faced by the tribes are reduced birth rates, and high infant mortality rate.

These problems in Irulas community directly affect their existence and migration can change their indigenous nature.

Thus, the traditional-cultural values are endemic and it needs to be preserved before it gets extinct from this community

4.3.2 Culture:

The Irula have their own dialect – Proto- mixed with many words from Kannada, Tamil and Malayalam languages

Their art of music is decimating these days. In comparison, they played eight different musical instruments some 20 years before. Now the knowledge of only four remains. Instruments are there, but the art is gone.

The belief system of Irula have memorial temples depicting structure as spirit houses, adjacent to their dwelling unit.

The Irula have rich oral literature consisting of riddles, tales, and songs. They dance separately or in groups

4.3.3 Occupation:

Irula community live on agriculture, work as labourer in tea estate, collect forest product. They also catch snake & rat for livelihood. They also migrate to plain lands to work as labourers in agricultural field or any other job.

Irulas tribes of the Masanagudi region are marginal farmers, holding 0.5–2.5-acre land, cultivating, ragi, millet, potato, garlic and few varieties of legumes and vegetables.

4.3.4 Settlement and housing:

In the Taluks of Coonoor, Kotagiri, Ooty and Kundah A typical traditional Irula house is one room rectangular or square shaped structure with low roof.

A traditional house of Irula are Stout wooden pole shaped like a fork on the open end are erected on four sides at a depth of 2- 3' (feet) horizontal sticks are laid on four sides which serves as beams over which closely laid smaller sticks arc joined vertically to form a roofing frame which converge to a height of 12' (feet) in the case of double sloped and 10' (feet) in the case of single sloped.

Split bamboo are closely knot on four side with small entrance opening and the walls are plastered with mud and the flooring made with mud and finished with red soil mixed with cow dung. Further the walls and flooring are polished with diluted cow dung mixture. They use waterstone which can be held in palm to further smoothen the surface.

And the polishing is done periodically when polish peels off or if the flooring cracks.

the roofing is done by thatching of long dried grass, known as the koraipull which is found abundant in the surrounding forest area.

The house one room with a thin mud wall partition for kitchen. Slightly raised platform opposite to the cooking place to keep the utensils, a simple indigenous shelf are fixed to keep smaller vessels.

The traditional construction is done by the family member with locally procured materials

At present they work for daily wages and are suffering financially. The government has provided them with a small 10' X 16' a room like concrete housing with a kitchen and without toilet, as the space is not sufficient, they have constructed their own structure with traditional construction method and their being wattle and daub with mud flooring.



Fig 4.9 Irulas at Mettugal, Kotagiri

4.3.5 Inference:

From the literature study we can observe that as the Irula tribal communities live secluded from the developed spaces, there is no proper transportation, which leads them to less opportunity and less standard of lively hood compared to the other Kota and Toda.

As they have sensitivity towards nature, it is important that even if development scheme is proposed, that it should be impar with the surrounding environment.

The traditional housing is constructed by their own community people.

Using Wattle and daub (mud and bamboo).

CHAPTER 5

Live Case studies

5.1 A live study of the tribal communities

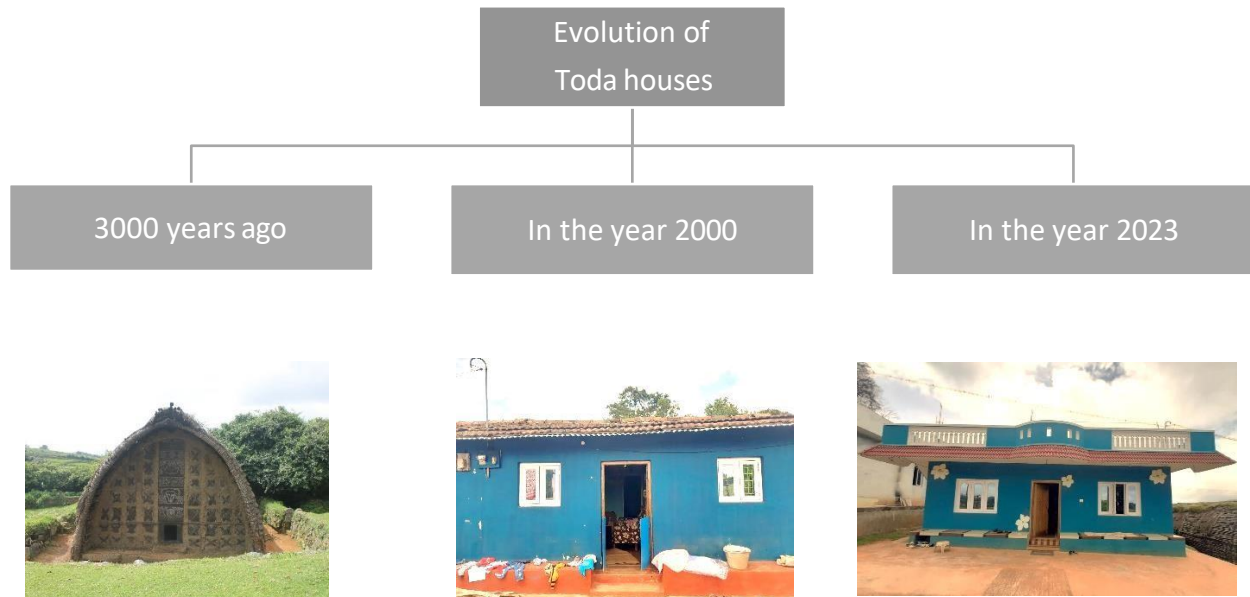


Fig 5.1 Evolution of Toda houses

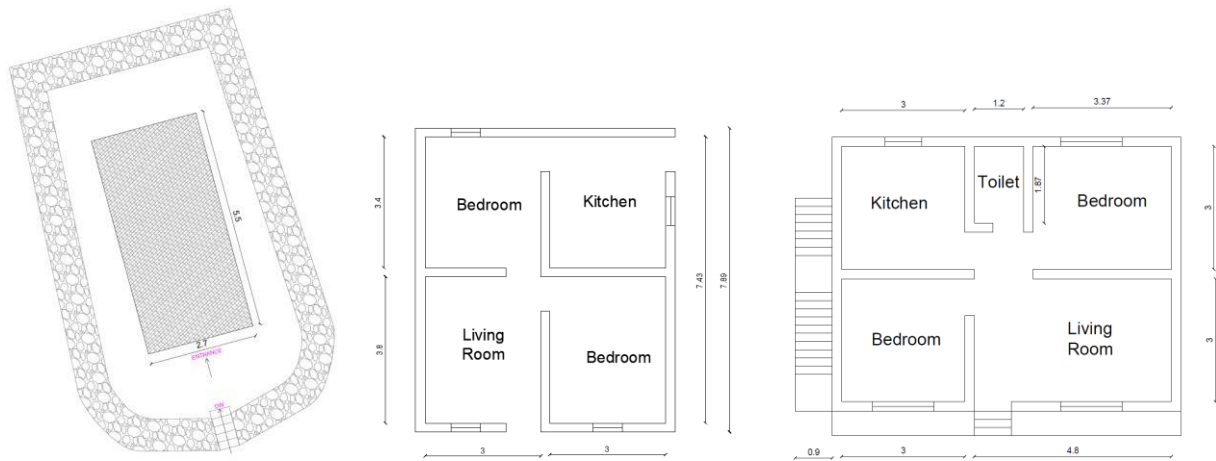


Fig 5.2 plane of toda houses

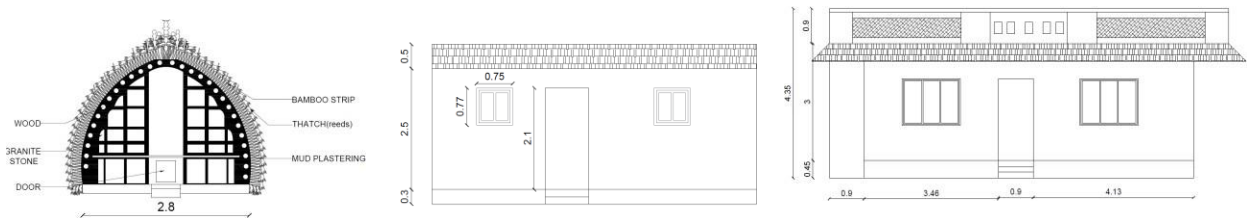


Fig 5.3 Elevation of toda houses

Year & Typology	Materials	Techniques
3500 Years - "Arsh"	Walls –stone/ bamboo & local grass Roof – Tall Grass & bamboo Floor – Mud plastered	Roof made up of local grass and bamboo, fastened with split rattan. The roofs are either constructed in curvilinear form or brought to an angle at the top, with the help of wooden ridge-pole.
2000 -Concrete house	Wall – Brick plastered, finished with paint Roof – Mangalore tiles Floor – concrete flooring	Concrete construction
2018 – Concrete house (G+1)	Wall – Brick plastered, finished with paint Roof – flat roof with tile Floor – Tiles	Concrete construction

Tab 5.1 Material and constructions techniques of Toda



Fig 5.4 Traditional Arsh house

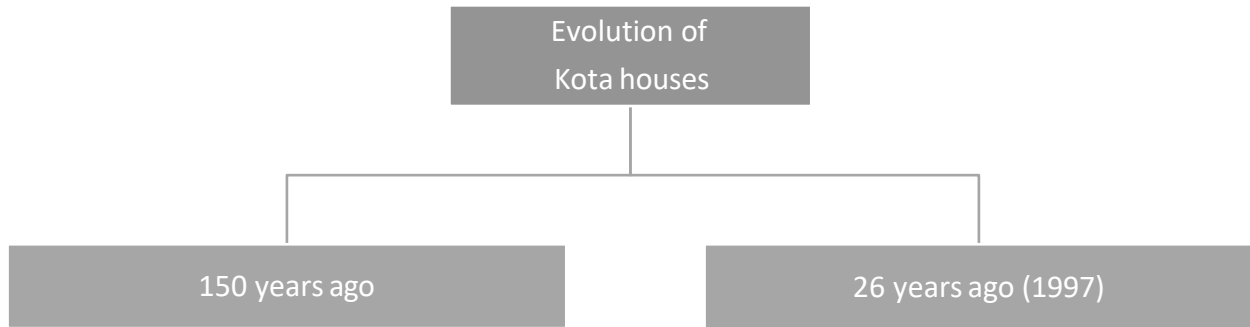


Fig 5.5 Traditional kota house



Fig 5.6 New kota house

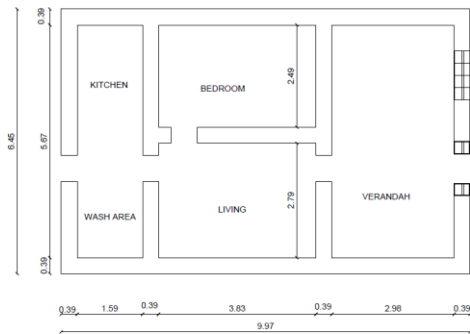


Fig 5.7 Traditional house plan

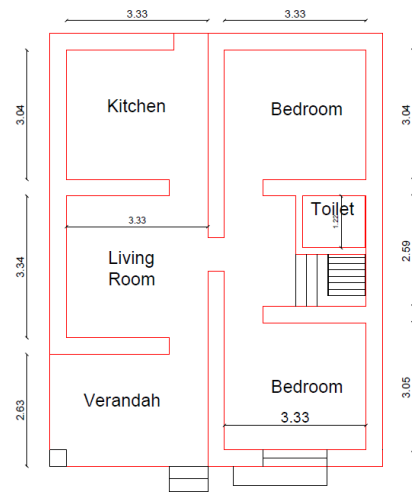


Fig 5.8 New house plan

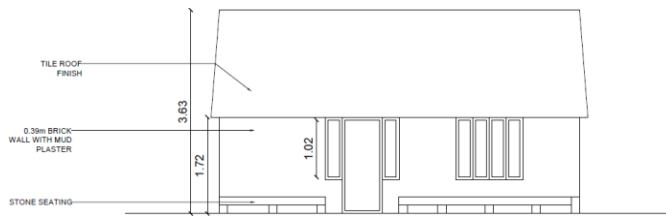


Fig 5.9 Elevation of traditional kota house



fig 5.10 Elevation of new Kota house

Year & Typology	Materials	Techniques
>150 Years – Traditional housing	Walls – Brick / Mud plaster Roof – Mangalore tile roof Floor – Mud plastered / Cow dung	The Thinnai (seating area) is made with mud and finished with smooth cow dung consistency and stones are placed at the edges.
26 Years 1997 -Concrete house (G+1)	Wall – Brick plastered, finished with paint Roof – Concrete slab Floor – Oxide flooring	Concrete structure. Flooring is finished with red cement oxide.

Tab5.2 Material and constructions techniques of Kota



5.11 Images from kota settlement





5.12 images from Irulas settlement

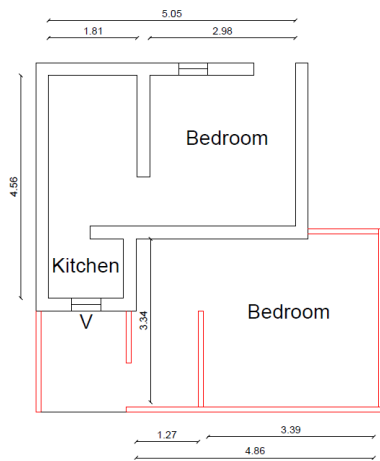


Fig 5.13 plan of old irula house

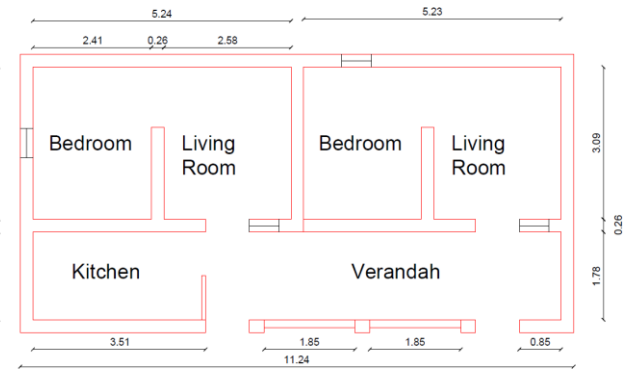


Fig 5.14 plan of new irula house

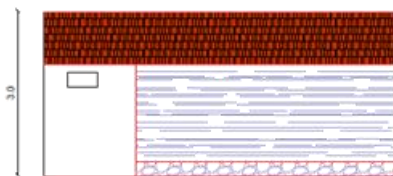


Fig 5.15 Elevation old Irula house

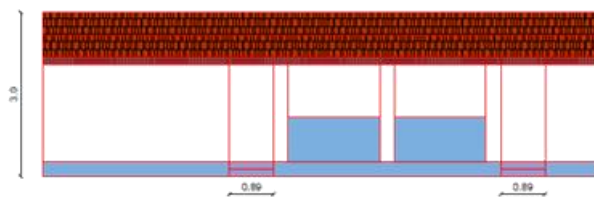


Fig 5.16 Elevation new Irula house

Year	Materials	Techniques
66 Years – Concrete houses attached with traditional Wattle and Daub construction	Walls –Split Bamboo/ Mud plaster Roof – Mangalore tile roof Floor – Mud plastered / Cow dung & reed soil	Split bamboo is closely knot on four side with small entrance opening and the walls are plastered with mud flooring made with mud and finished with red soil mixed with cow dung. Further the walls and flooring are polished with diluted cow dung mixture. They use waterstone which can be held in palm to further smoothen the surface.
Built in 1996 -Concrete house	Wall – Brick plastered, finished with paint Roof – Mangalore tiles Floor – Cement flooring	Concrete structure. People who can afford, build a parapet wall to partially enclose the veranda
Since 2016	Wall – brick plastered and finished with paint Roof- Mangalore tile + flat concrete roof Floor – Cement flooring	In addition to the house they have built their own seating with mud with cow dung

Tab.5.3 Material and constructions techniques of Irula

5.2 Qualitative- Narratives & Observations

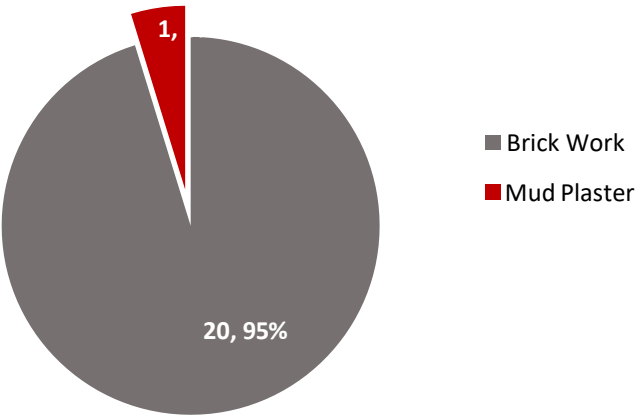
- Predominant architecture style
- Traditional techniques used in the present & past
- Passive strategies used
- How long did it take to construct the house
- Difficulties & constraints during the time of construction
- Where do majority of people work
- No of traditional houses and no of houses evolved over the years
- Nearest facilities (health care/ shop/bus stop/ police station)
- Traditional practices of the community?

5.3 Inference from questionnaire live site visits

Todas

- From visiting Tharanadu mund, at Ooty, it was very evident that the tribal community has evolved drastically over time and has climbed the socially ladder, as they have access to the neighbouring places through local transportation.
- The kids avail education from the nearby schools, and people from the community has also become doctors and lawyers which shows their growth in their social status.
- The toda still follow their tradition and culture, fraternal polyandry is not being followed anymore and also as time changes the women in the community are being given equal share of property from the parental side.
- When coming to the traditional housing method and settlement pattern, the scenario has completely changed, as the community becomes economically better and as they are more exposed to the other neighbouring cities and places, they have willingly shifted to concrete houses, which was funded by different gov schemes.
- There was only one Arsh in the mund, and as the local materials aren't easily available and as it has to be procured from the forest it becomes difficult for procuring and construction, and the young generation feels that the conventional housing is more comfortable in terms of utility, large spaces.
- But, to contradiction the elders feel the traditional Arsh kept them more thermally comfortable, warmer and more kept them healthy without catching cold and fever.
- The elderly women of the mund sit under the warm afternoon sun and to do embroidery, It becomes a social gathering activity during the day.

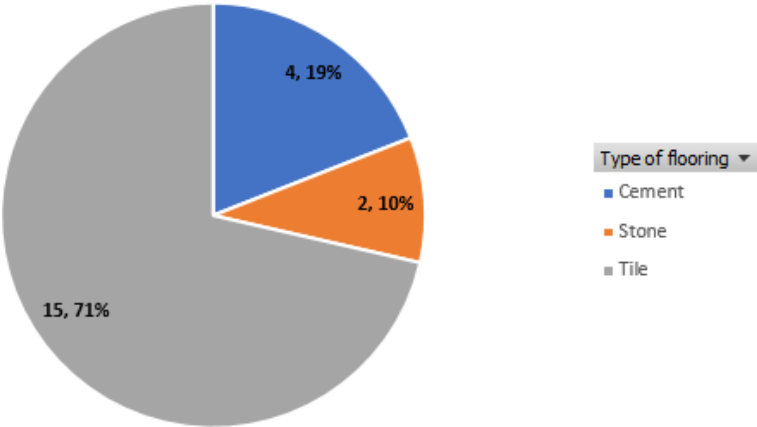
Finishing Material



Tribal Community	Toda
------------------	------

Row Labels	Count of Finishing Material
Brick Work	20
Mud Plaster	1
Grand Total	21

Flooring Material



Tribal Community	Toda
------------------	------

Row Labels	Count of Type of flooring
Cement	4
Stone	2
Tile	15
Grand Total	21

Tab5.4 Flooring material of Toda tribal community

5.4 Kota - Kokkal

Kota at kokkal, at kotagiri are potters by profession and live harmonious life. Though they aren't economically well off like the Todas, but definitely their livelihoods have improved, though they live in secluded part of the hills, Kokkal still have transportation facility 3-4 times a day and also a primary school in the village.

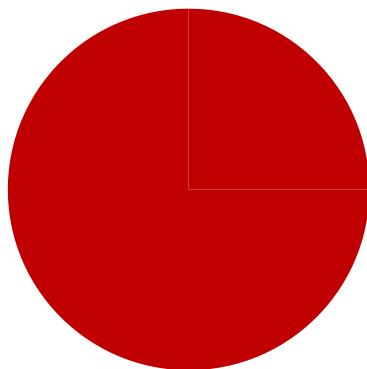
Though they don't have caste system but they live in different streets, which divide them.

- Kilker,
- Naduker,
- Pibberker,
- Aker,
- KorekerVor
- Gager.

Almost all their houses except a few, are tradition houses, built by their own community people, brick with mud plaster and mud flooring, houses have thinnai in the entrance, finished with mud cow dung. These traditional houses are more than 100 years old. The houses are East facing.

The elders in the tribal community stated that they would want to shift to convention type of house as these traditional houses as these local materials used for construction like the mud plaster cracks would need to polished again quite frequently and the wooden rafters break over time, they feel that a conventional house would be long lasting and owning concrete house is seen as a luxury and status symbol by the tribal community in the village.

Finishing Material

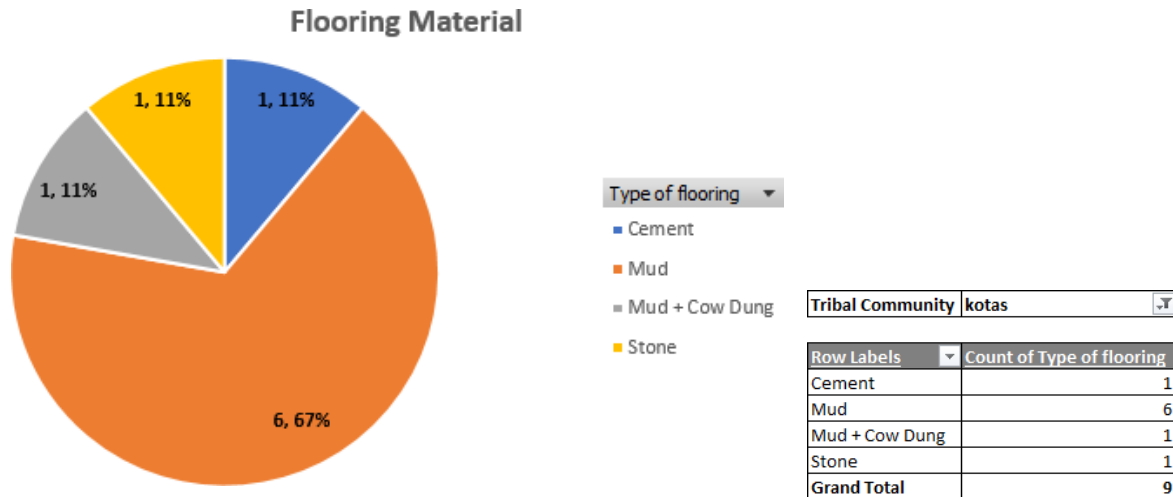


■ Mud Plaster

Tribal Community	kotas
------------------	-------

Row Labels	Count of Finishing Material
Mud Plaster	9
Grand Total	9

Tab5.5 Finishing material of Kota tribal community



Tab5.6 Finishing material of Kota tribal community

5.5.Irulas - Mettugal

When visiting Irulas tribal community residing at Mettugal it was completely contradiction scenario compared to the other two tribal community. They were a small group of tribal community who were displaced to this particular location by the government post-independence as part of tribal development program.

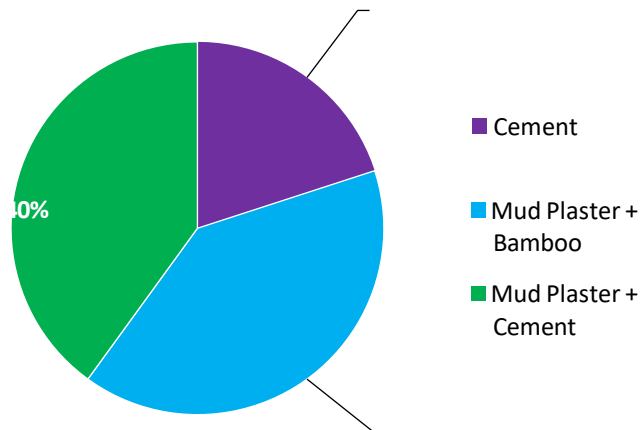
The Irulas feel that they have been secluded by the government and the society as they live almost around 60kms from Ooty and have no local transportation facility they live far from the current advancement.

The row houses were built by the government, a single room living and small partition and kitchen the toilet is kept separately by the locals and as the house is small they have constructed their own traditional method of wattle and daub construction as an attachment at the back side of the house.



Fig5.17 Images of irulas cattle house

Finishing Material

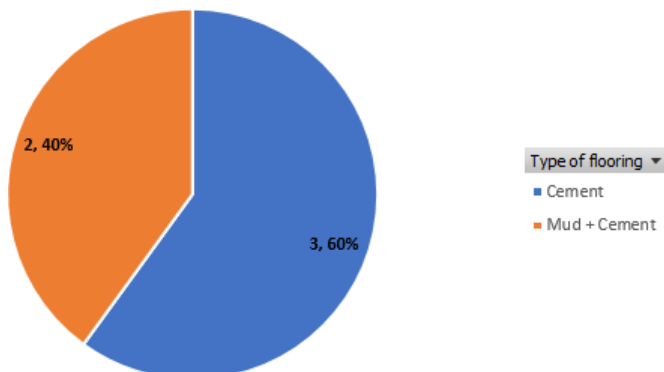


Tribal Community	Irulas
------------------	--------

Row Labels	Count of Finishing Material
Cement	1
Mud Plaster + Bamboo	2
Mud Plaster + Cement	2
Grand Total	5

Tab5.7 Finishing material of Irulas tribal community

Flooring Material



Tribal Community	Irulas
------------------	--------

Row Labels	Count of Type of flooring
Cement	3
Mud + Cement	2
Grand Total	5

Tab5.8 Finishing material of irulas tribal community

- The Kota Tribal community at Kokkal who are potters by profession are slowly leaving behind their traditional occupation and working for daily wages at nearby villages, as skilled artisans are reducing in no.
- As Nilgiris is a huge tourist destination which can help the backward tribal communities benefit, which would generate revenue and uplift their economic status.
- Proposing a space integrating open learning centre and cultural experience centre will benefit both elder and their child of the community
- Why Kota?



Fig 5.18 Images of kota settlement

5.6 Upliftment of the community

Economical

- Increase revenue through
 - - Cultural experience centre
 - - Accommodation
 - - Production of building materials
 - - Café & Restaurants
 - - Kiosk
 - - Fertilisers

- **SOCIAL**

- - Inflow of tourists
- - Collaborating with both Gov. & non Gov. organisations

- **CULTURAL**

- - Teaching their traditional pottery
- - Incorporating their traditional building materials for construction

- pottery training & workshops.
 - Production of terracotta tiles for construction of the community centre
 - Distribution & sale for other sites
 - Accommodation for travellers

- Restaurants & Café
- Primary Health Centre
- Using community people for construction
- Fertilisers from solid waste
- Interaction with tourists & learning and creating awareness through the specialists
- Revised scheme of Development of Particularly vulnerable tribal groups (PVTGs) (Socio-Economic Development)
- Nilgiri Adivasi Welfare Association (NAWA) (Health sector)
- Retaining their identity by passing on the tradition within their community and also teaching it for outsiders.
- Using Kota's traditional building materials for construction

Chapter 6

Literature Case studies

6.1 Women's Opportunity Center, Kayonza, Rwanda

Introduction Commissioned by Women for Women International, Women's opportunity center designed by Sharon Davis Design

Site: 2 *hectare*

Built up Area: 2200 *sqm*

The project was built in order to provide opportunities for women that would not only provide learning but would also empower them as a community.

6.1.1 Climate of Rwanda

Mean annual temperature 19.1°C,
average monthly temperatures- 19.5°C (September) 18.5°C (July).

Annual precipitation is 1,170.2 mm.

significant rainfall occurring from September to May.

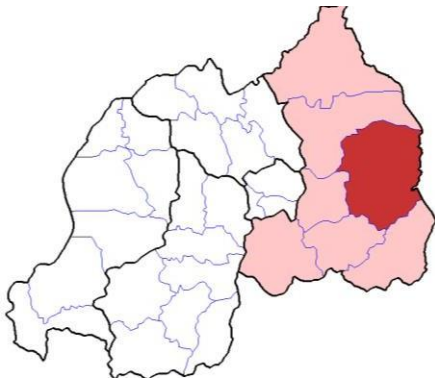


Fig 6.1 Rwanda

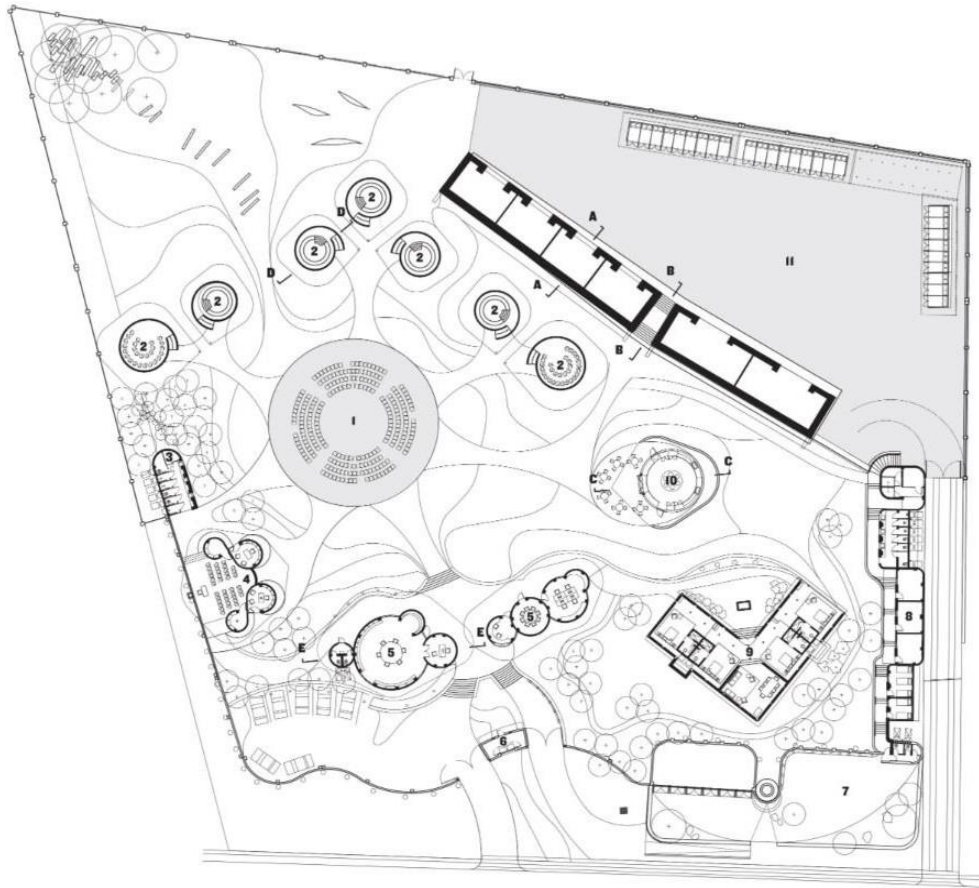


Fig6.2 Site plan of Rwanda Womens opportunity center

KEY

1. Gathering Space
2. Classrooms
3. WCs
4. Partner rooms
5. Administration
6. Guard house/ entrance
1. Rent-able/ market
2. Staff lodging
3. Guest lodging
4. Kitchen
5. Farm



Fig 6.3 Site development of Rwanda Womens opportunity center

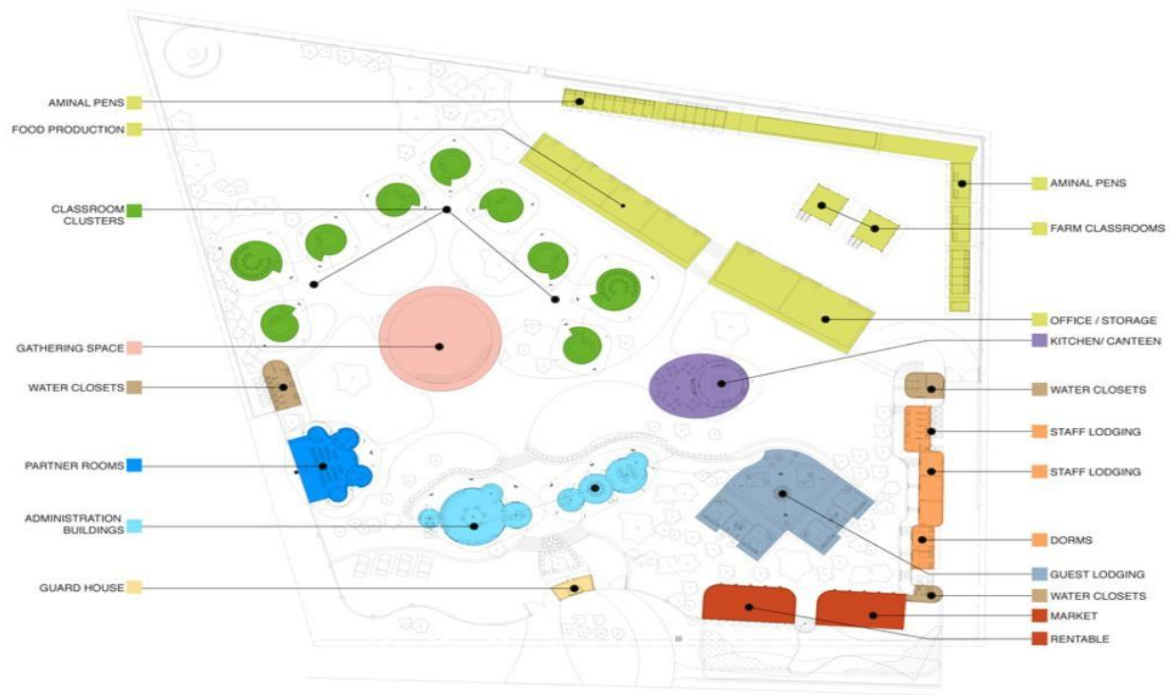


Fig 64 spatial plan of Rwanda Womens opportunity center

6.1.2 Objective behind design



Empowering community



create economic opportunities



Rebuild social

Infrastructure



Fig 6.5 Class rooms



Fig 6.6 Market



Fig 6.7 Kitchen

6.1.3 Design Principle

The center's circular structures are modeled after the historic King's Palace in southern Rwanda. Our design draws on the touch of this vernacular Rwandan construction method with rounded, perforated brick walls.



Fig 6.8 Kings palace in southern Rwanda



Fig 6.9 community center of Rwanda

spaces

Class rooms

Guest lodging

Admin building

Farm / Farm storage

Market

Kitchen

Partner room

6.1.4 Materials

Bricks were made on site. 45,000 claybricks needed for construction- using materials found on site and new materials. Durable manual press method was adapted from local building techniques. Corrugated metal sheets are also locally available in rwanda, which is used for roofing



Fig 6.10 Process of making clay bricks



Fig 6.11 classroom

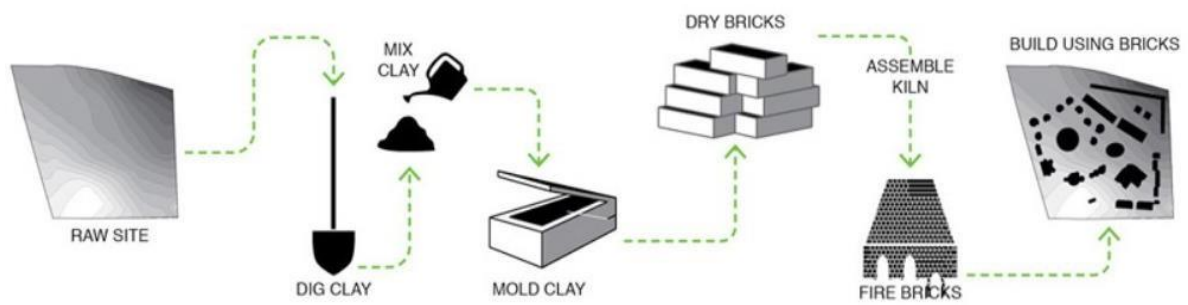


Fig 6.12 onsite clay making

6.1.5 BRICK COURSE AND DESIGN – CLASS ROOMS

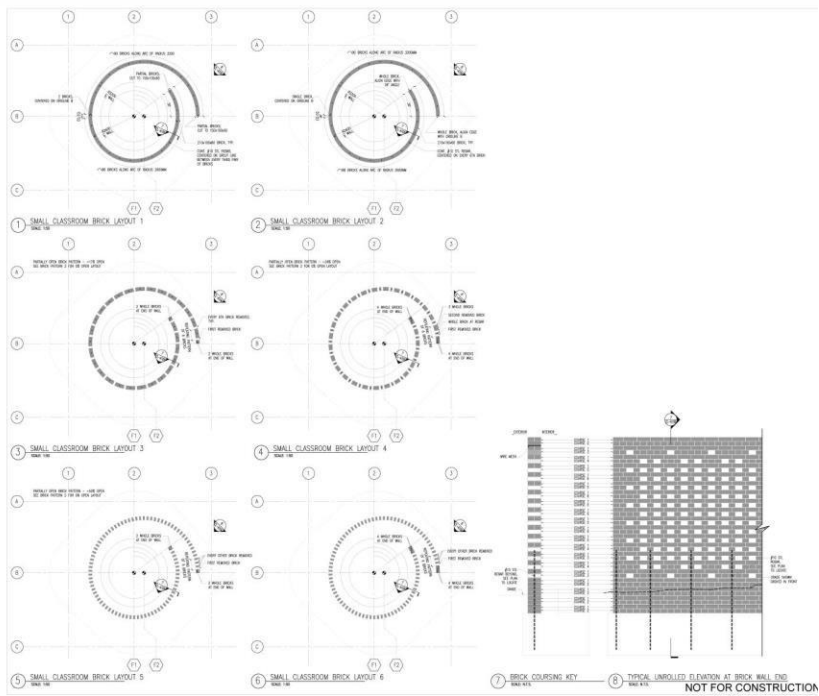


Fig6.13 room plan

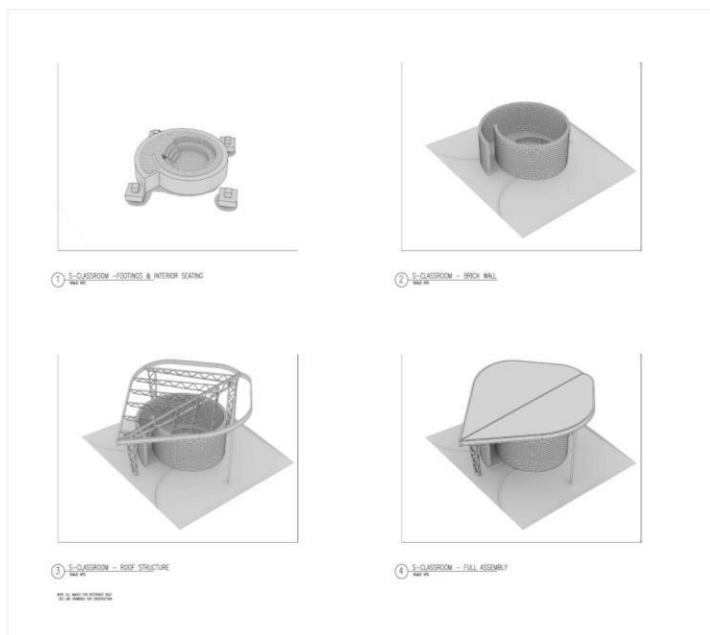


Fig 6.14 Roof structures

6.1.6 Farm/ Farm stroage

- Fields to learn and practice Farming
- The project also includes a demonstration farm that helps women produce and market their own goods.
- This Commercial Integrated Farming Initiative teaches women to produce income from the land through organic techniques geared toward commercial production.
- Through compact, easily maintained animal pens— cooled by green roofs and retained earth walls
- women learn to raise pigs, cows, goats, and rabbits, along with food storage and processing methods.

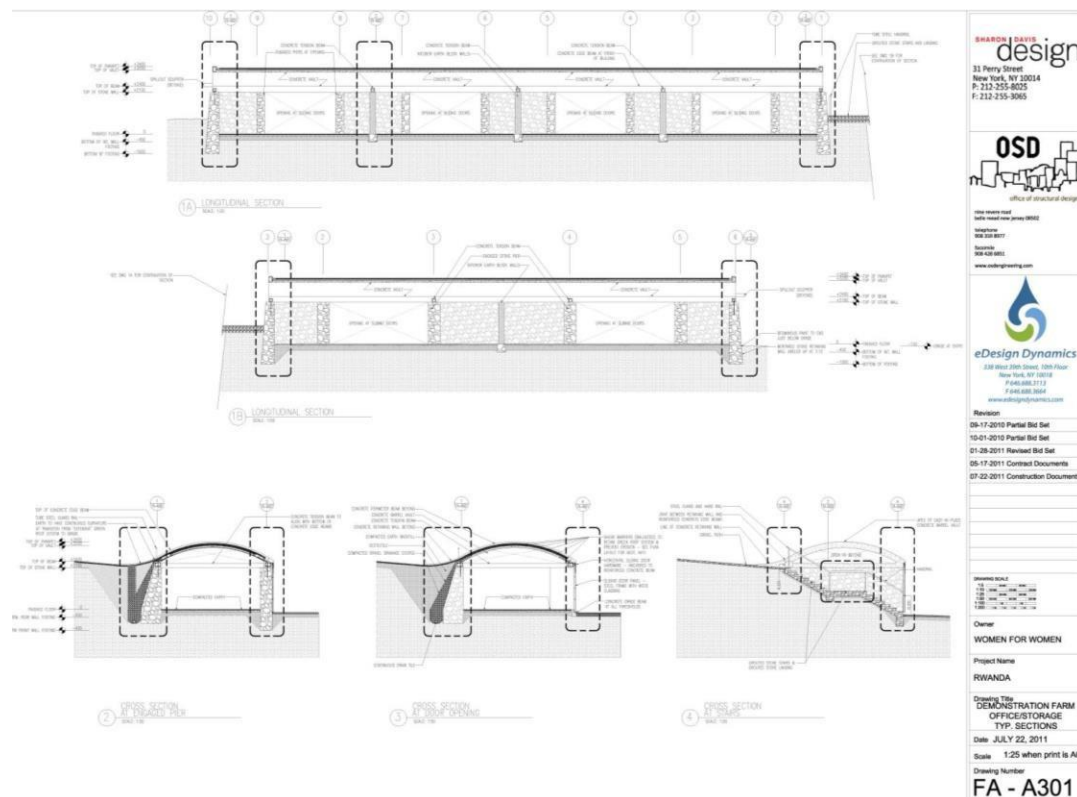


Fig 6.15 Farm storage plan



Fig 6.16 Farm storage

6.1.7 Market

- Set around an inviting plaza easily reached by motorists and public transit, a market showcases the center's economic potential.
- Here, women sell food, textiles, baskets, and other products produced on site,
- as well as potable water harvested from the center's rooftops.
- Market spaces can be rented to generate additional income, building a self-sufficient community network in Kayonza.



Fig 6.17 Market Area

6.1.8 Sustainability

Rain water harvesting

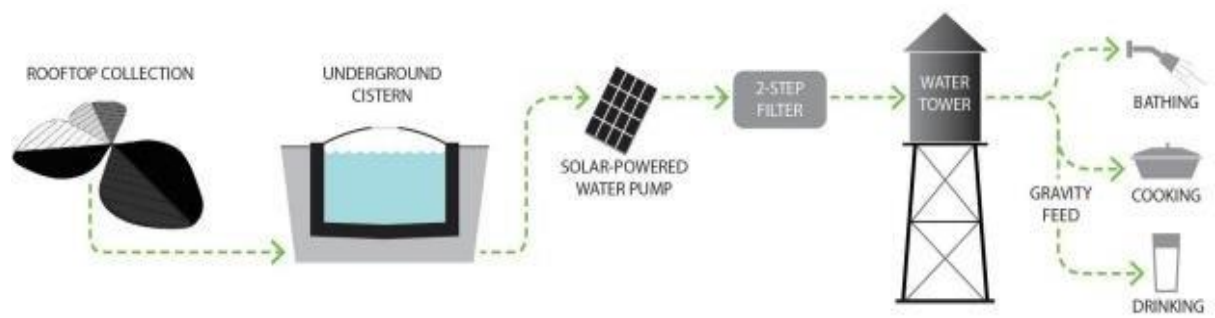


Fig.6.18 Rain water harvesting system

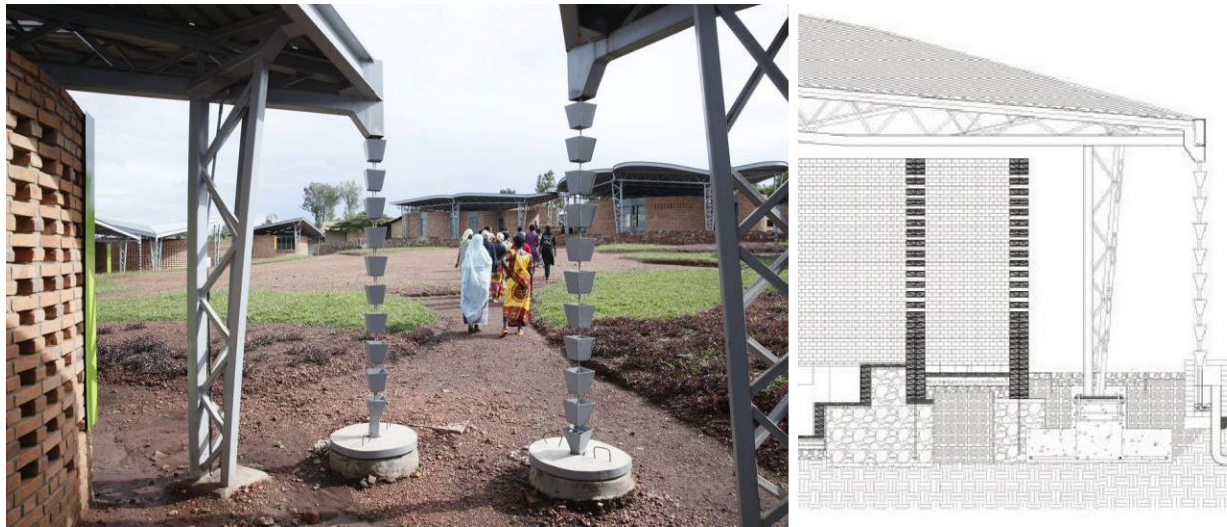


Fig. 6.19 Rainwater harvesting

- Corrugated metal rooftops will harvest rainwater into a cistern before it evaporates.
- covers act as collectors sending the collected water reservoirs located underground to keep it cool and protect from light.
- Later this water is filtered through a filter that work with solar energy

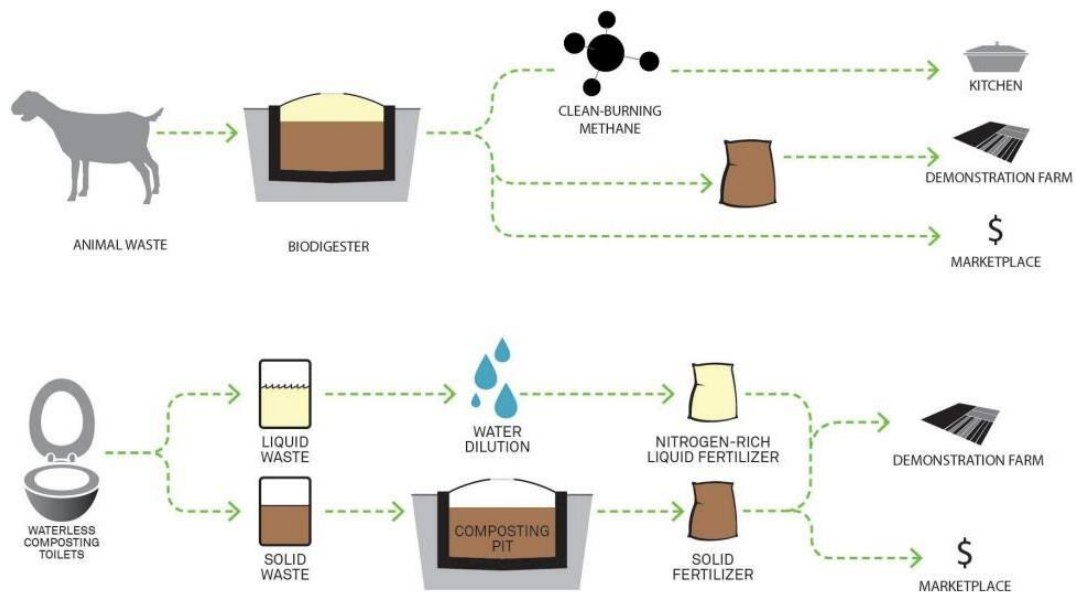


Fig.6.20 Production of Fertilizer



Fig.6.21 Composting Pit

- Hygienic composting toilets that reduce water use while capturing nitrogen-rich solid and liquid waste.
- This system naturally produces fertilizer that can nourish the farm
- Can be sold as part of the site's revenue-generating strategies.

6.1.9 Passive strategies



Fig.6.22 Brick jali

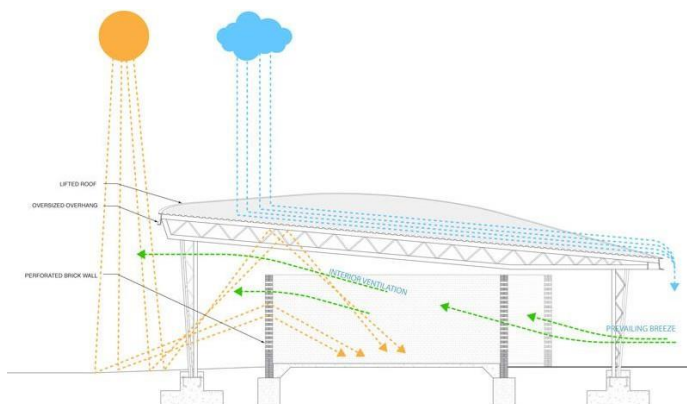


Fig. 6.23 passive cooling

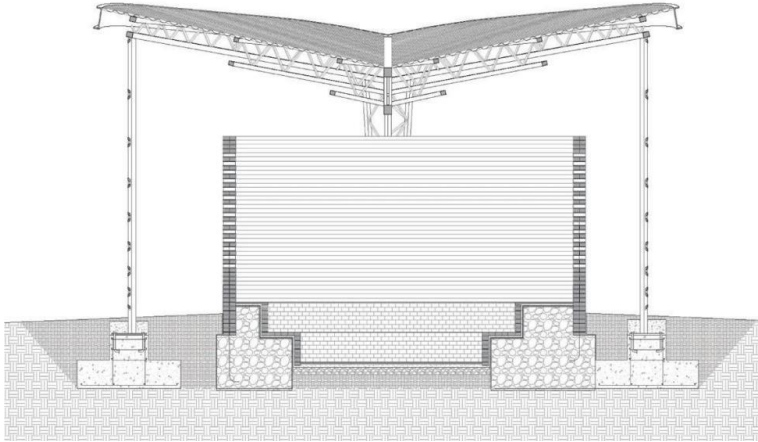


Fig.6.24 Solar shading

- perforated brick walls that allow for passive cooling and solar shading.
- Also maintaining a sense of privacy.

6.1.10 Inference

- Plantation farms to teach women the basics of farming
- The basic concepts of business, hygiene and balanced diet These considerations eventually help women grow and make their own living
- The involvement of the women during the construction of the project, and teaching them brick making includes them into the project, which helps the space feeling more inclusive.
- The center's circular structures which was a part of an indigenous tradition that the region revies their traditional architecture.



Fig.6.25 Market area

6.2 Kaza Eco-Community Centre, Himachal Pradesh, India

6.2.1 Introduction

Location -Spiti Valley, Himachal Pradesh, India,

ground floor - community center

dental and optical clinic,

room for vernacular craft,

small library,

kitchen and a cafe.

The first floor –

guest accommodations for villagers travelling to Kaza from remote outlying regions,

an important aspect for a charity which practices medicine in this remote valley, where pregnant women can walk kilometers in order to see a doctor.

Designed by the Auroville Earth Institute

Land plot area :883,00 sq.m

Built-up area :315,00 sq.m

space :500,60 sq.m



Fig. 6.26 Kaza eco community center

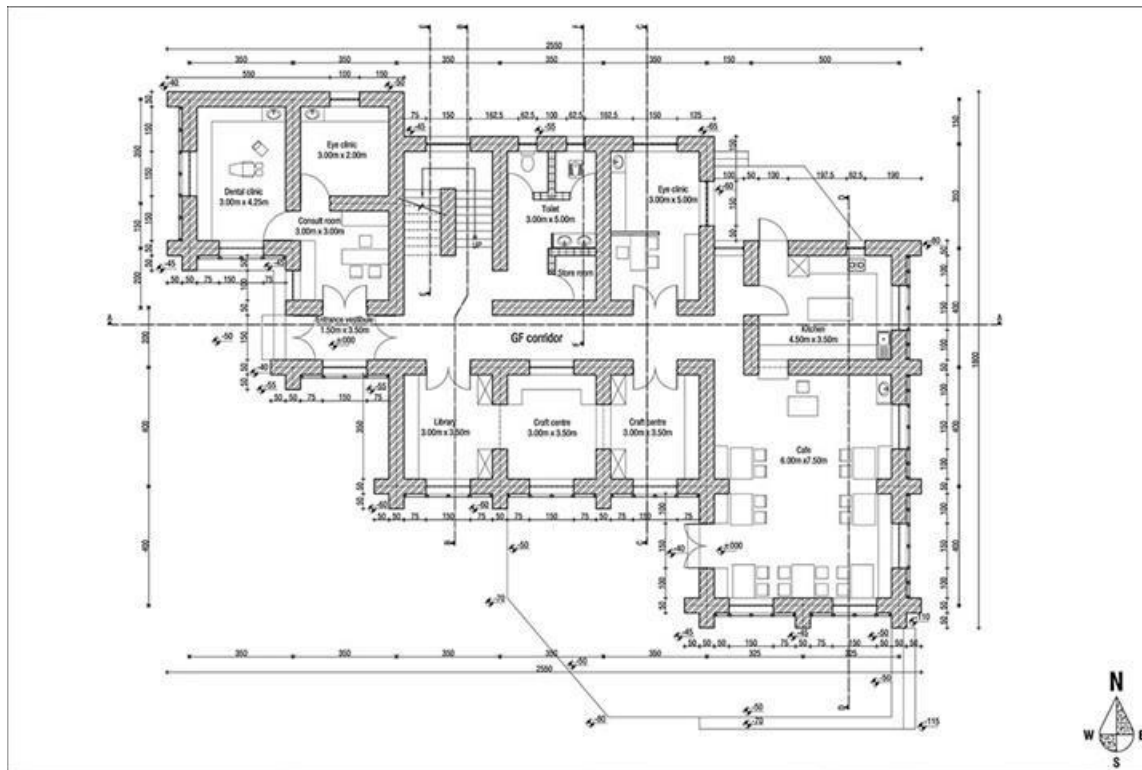


Fig.6.27 Ground floor plan

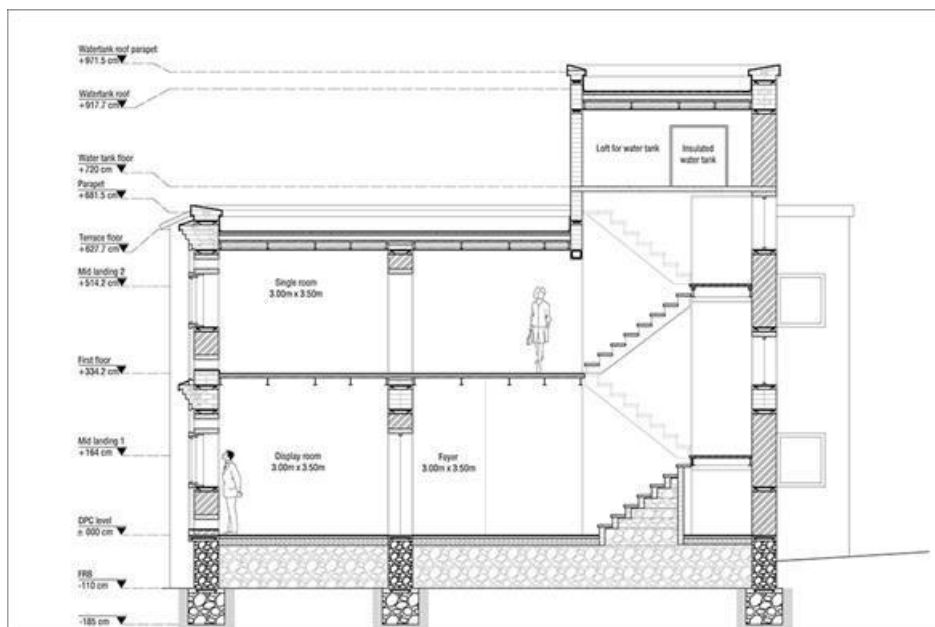


Fig.6.28 Section A-A'

6.3 Technical Innovation For Climate Change Resilience

6.3.1 The Kaza Eco-Community Centre

- Aims to promote renewed use of traditional Tibetan building techniques and materials in the valley,
- Introducing a number of modestly innovative features to improve the seismic resistance, thermal comfort and energy efficiency of buildings in this context.
- The building, which consists of a stone masonry foundation, CSEB elements, and raw rammed earth walls, has been designed especially for the harsh winter climate of Spiti.



Fig. 6.29 Finishing of walls



Fig. 6.30 Reinforcing the corner



Fig.6.31 Traditional Ramming technique



Fig.6.32 Rammed Earth Walls

6.3.2 Seismic resistance

- Butress walls have been added for stability, with an innovative formwork system allowing for T, X and L-shaped rammed earth wall intersections.

- CSEB block system and traditional bamboo reinforcement embedded into the rammed earth walls and buttresses at critical corners of the building – a hybrid of traditional and contemporary innovations.

6.3.3 Thermal comfort and energy efficiency

- the spaces in between the buttress systems have been employed for passive thermal building regulation.
- The center has introduced "trombe" walls with a special ventilation system for passive solar heating in winter.
- Trombe walls operate on the principle of convection in buildings, taking advantage of the high degree of solar radiation available in the valley at 1,500 m altitude.



Fig.6.33 CSEB U-Blocks



Fig.6.34 Close –up of Trombe wall

6.3.4 Climate change adaptation

- Traditional roofing systems - timber for the structure on which are laid a mat of branches and a layer of raw rammed earth to give thermal mass/ insulation.
- Traditional waterproofing- various layers of earth mixed with dung, clay and layers of birch tree bark

Initially, the structure of the roof of the community center and the waterproofing was planned to be done with the improved technique implemented for the roofs on Nako Temples

However, due to the unavailability of logs (even sawn timber), branches and bark from birch trees, the design was modified unfortunately with I steel beams and the insulation with wood chips.

- A 20 cm layer of earth was still used to increase the thermal mass/ insulation and
- the waterproofing was done with a cement plaster painted with bitumen.

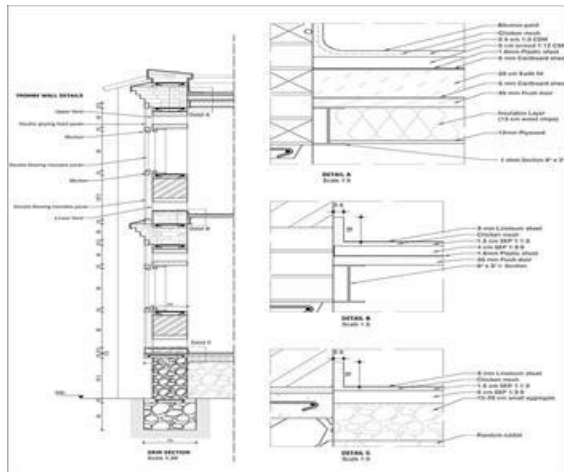


Fig 6.35 Section of Building Skin

6.3.5 MATERIALS

The construction of this building optimized the use of low carbon construction materials including:

Stone masonry foundations

Raw rammed earth walls

Compressed Stabilized Earth Block (CSEB) elements

Bamboo reinforcement

It incorporates passive heating techniques such as:

Trombe wall

Rammed earth for thermal mass





Fig.6.36 Construction of community center

6.3.6 Envelope performance

Wall Structure:

- A 40-50cm thick rammed earth wall of relatively low density with a high degree of entrained air.
- This makes the traditional rammed earth a highly effective thermal mass wall system.

Trombe Walls:

- Trombe walls have been installed on the East, West and South façades, to make the building independent for its winter heating requirements.

A trombe wall is a glass façade installed a few inches from a thick mass wall, which, facing the direction of maximum solar exposure, absorbs solar radiation and transmits heat by convection and radiation into the building.

6.3.7 The rammed earth structure

- has two vent openings at the top and the bottom of each trombe wall.
- Solar radiation penetrates the façade, heats up the rammed earth wall and the air in the interstitial cavity, which then rises and enters through the upper ventilator to heat the room. Cool interior air is drawn out through the lower ventilator, creating a natural convection cycle to heat interior spaces.
- The ventilators have specially designed louvers that can be closed during the night to prevent the reverse process,
- secondary louver which can be opened in the summer season to prevent excessive heat from entering the building.

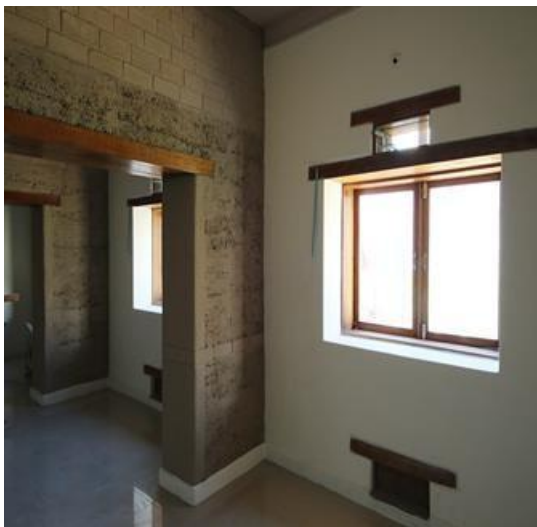


Fig. 6.37 Rammed earth structure

6.4 M. A. C. Community Centre (music and art centre), Thiruvannamalai

6.4.1 Introduction

Centre takes care of children giving them a home, education
designed by [Made in Earth](#)

Built up Area: [1080](#) m²

The project was built in order to provide opportunities for women
that would not only provide learning but would also empower them as a community

Climate of Thiruvannamali

Mean annual temperature 27.4 °C

average monthly temperatures- high 34°C to low 23°C

Annual precipitation is 815 mm



Fig.6.38 M.A.C community center



Fig.6.39 gathering at community center

Spaces

Ground Floor

Office

Inner court

Pavilion

Stage

First Floor

Inner floor level pavilion

6.4.2 Material

Concrete are economical and workable material that satisfies structural, budgetary, and labour requirements.

- The design began as a study, looking at the available materials and local skill labour
- Small concrete blocks of different thicknesses were prefabricated near the site
- Used as a masonry unit between poured columns creating a semi-permeable wall.



Fig.6.40 Circular structure of the community center
the gradually sloping wall turns into a projecting roof plane

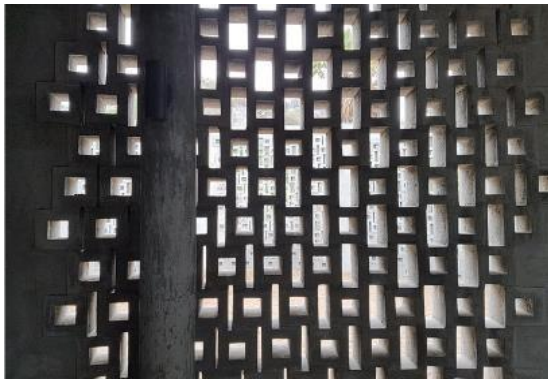


Fig.6.41 Placement of the blocks
each block can be stacked uniquely
forming walls with variously sized openings

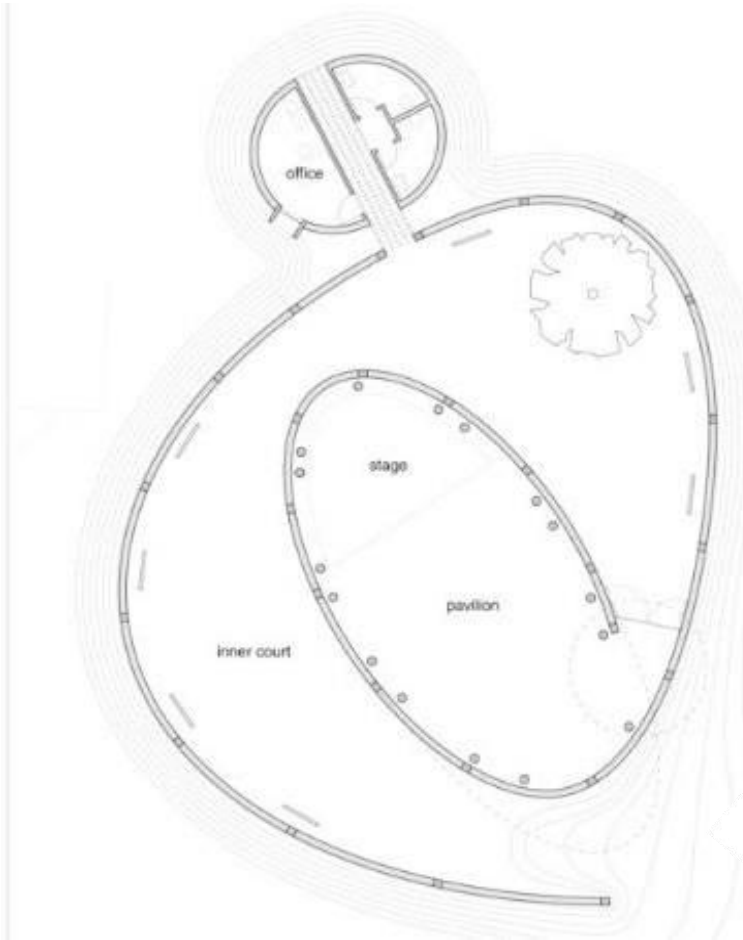


Fig. 6.42 concrete floor in the center space
a concrete floor in the centre space maintains a
a lower budget and provides the proper
groundwork for a multiple of activities

6.4.3 Planning

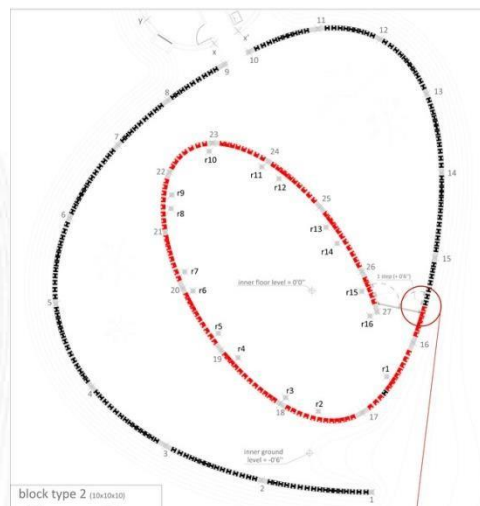
- footprint consists of a serpentine wall gradually growing out of the ground and coiling back into itself to cradle a large multi-functional space.
- the traditional jaali screen walls the construction strategy ensures constant ventilation through the space helping to cool the interior on hot days.

- also serves to filter the intense direct sunlight
- a large sloping roof is elevated above the top of the wall, shading the entrance to the building as well as the interior room.



Ground floor

Fig.6.43 Ground floor plan



First floor

Fig.6.44 First floor plan



Fig.6.55 Construction of the community center

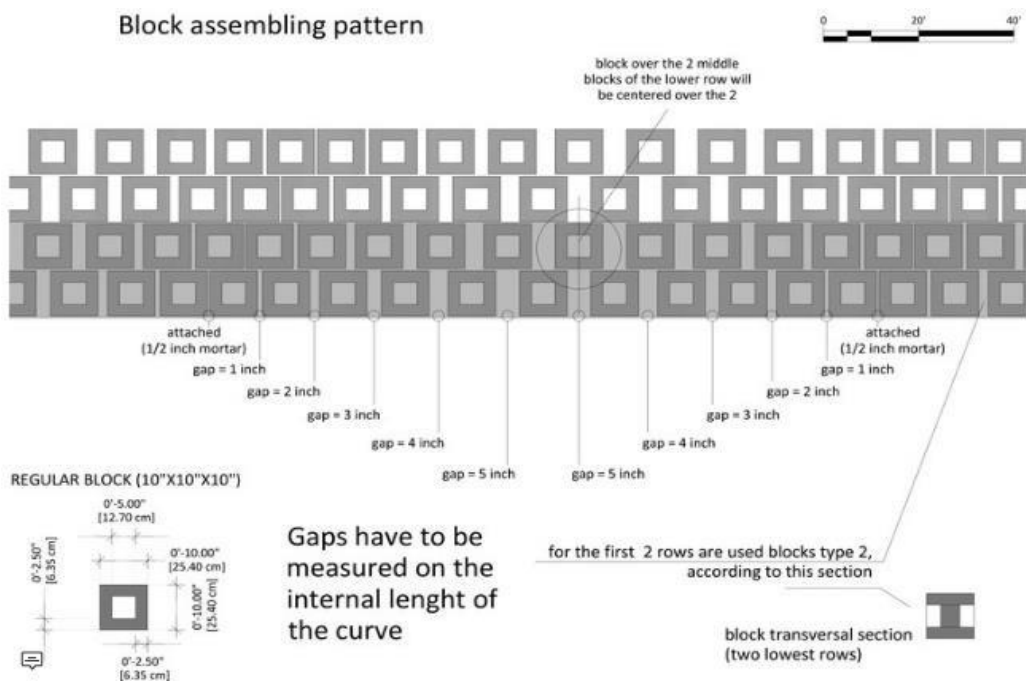


Fig.6.56Block assembling pattern

6.5 Tribal Museum, Ooty

6.5.1 Introduction

Location – M.Palada

The main aim of establishing the museum is to preserve the cultural heritage of the Tribals.

G+1 Structure

collected from about 36 different tribal ethnic Communities of the state of Tamil Nadu and also tribal photography of other States of India and Union territory of Andaman and Nicobar islands etc., were exhibited in the Tribal Museum



Fig.6.57 Tribal Museum

Climate of Ooty

It has subtropical highland climate

Mean annual temperature 15 to 30 °C

average monthly temperatures-

18°C , 13°C (January)

Annual precipitation is 259.4mm

significant rainfall occurring Junly

Amenities inside the museum

Information & Photo gallery

Conference hall

Tribal Hut display (model)

Tribal info display

Tribal product to shop



Fig 6.58 Tribal products selling area

Though Tribal museum being one of the important places to sell tribal handmade products.

When visited there were hardly any products for sale.

This shows the lack of production of goods



Fig.6.59 Information gallery



Fig.6.60 Conference Room

6.6 Inference from case studies

INFERENCE FROM CASE STUDIES					
Parameters	Women's Opportunity Center, Kayanza, Rwanda		M. A. C. Community Centre (music and art centre), Thiruvannamalai	Tribal Museum, Ooty	Inference
Social	- Clay brick is made at site by the local people - The buildings are constructed by the locals - It has a rented out markets, helps in generating revenue		- Centre takes care of children giving them a home, education till they reach an age when they get a job - Allowing public to access to teach the kids and for other events builds their social interaction	-	- Involvement of local people gives a sense of inclusiveness - Increases job opportunity for the locals - Common spaces Increases social interactions in the community
Economical	- Using local materials which reduces the usage of materials and cuts on cost - The rent out market helps in generating revenue for the over all community		Using concrete as common material which is locally and easily available cost down the cost	Museum generates income to the gov as well as for tribe where they sell their products	- Material usage plays an important role in minimizing the cost - As well as building construction by the local people brings in income for them. - Having a place to sell the communities goods brings in revenue for over all development
Materials	- Usage of local materials - clay bricks made on site - corrugated metal sheet- locally available - Constructed by local people 		- Concrete perforated blocks - Concrete flooring - Built by unskilled local labors 	- Conventional building - Brick and cement plastered - Glass for windows and in facades 	- using local materials for available in and around the site and scraps from nearby construction used for construction - It is Economical, cost cutting and reviving the traditional usage of local material - Reduce, Reuse and Recycle of resources - Involving the local people for construction- sense of inclusiveness - Usage of glass helps to keep the building warm

Tab.6.1 Inference from case studies

INFERENCE FROM CASE STUDIES					
Parameters	Women's Opportunity Center, Kayanza, Rwanda		M. A. C. Community Centre (music and art centre), Thiruvannamalai	Tribal Museum, Ooty	Inference
Form	Spiral shaped classrooms built with perforated clay blocks 		footprint consists of a serpentine wall gradually growing out of the ground and coiling back into itself to cradle a large multi-functional space. 	- Rectangular form - With domes - Big glass windows 	- In Places like Ooty, rectangular shaped building diverges the wind, helping to keep the space warm - In other places it is important to have ample amount of in flow of natural ventilation for comfort.
Passive Techniques	- jaalis provides natural ventilation - Provides solar shading 		- jaali wall ensures constant ventilation helping to cool the interior on hot days. - serves to filter the intense direct sunlight 	As ooty is a cold place large Glass facaded and windows were placed at the South to keep the museum warm 	- Jaalis are a passive cooling technique - They reduce cost and minimize the material usage - Usage of large window openings at South brings southern sun rays, helping to keep the building well lit and warm in cold weather.
Other Sustainability Features	- Rainwater harvesting - Solar pannels - Decomposing pit - Fertilizers		-	Solar panels	- Rainwater harvestings helps in conservation aswell as in usage in future - Fertilizers are used for farming as well sold for revenue.

CHAPTER 7

SITE ANALYSIS

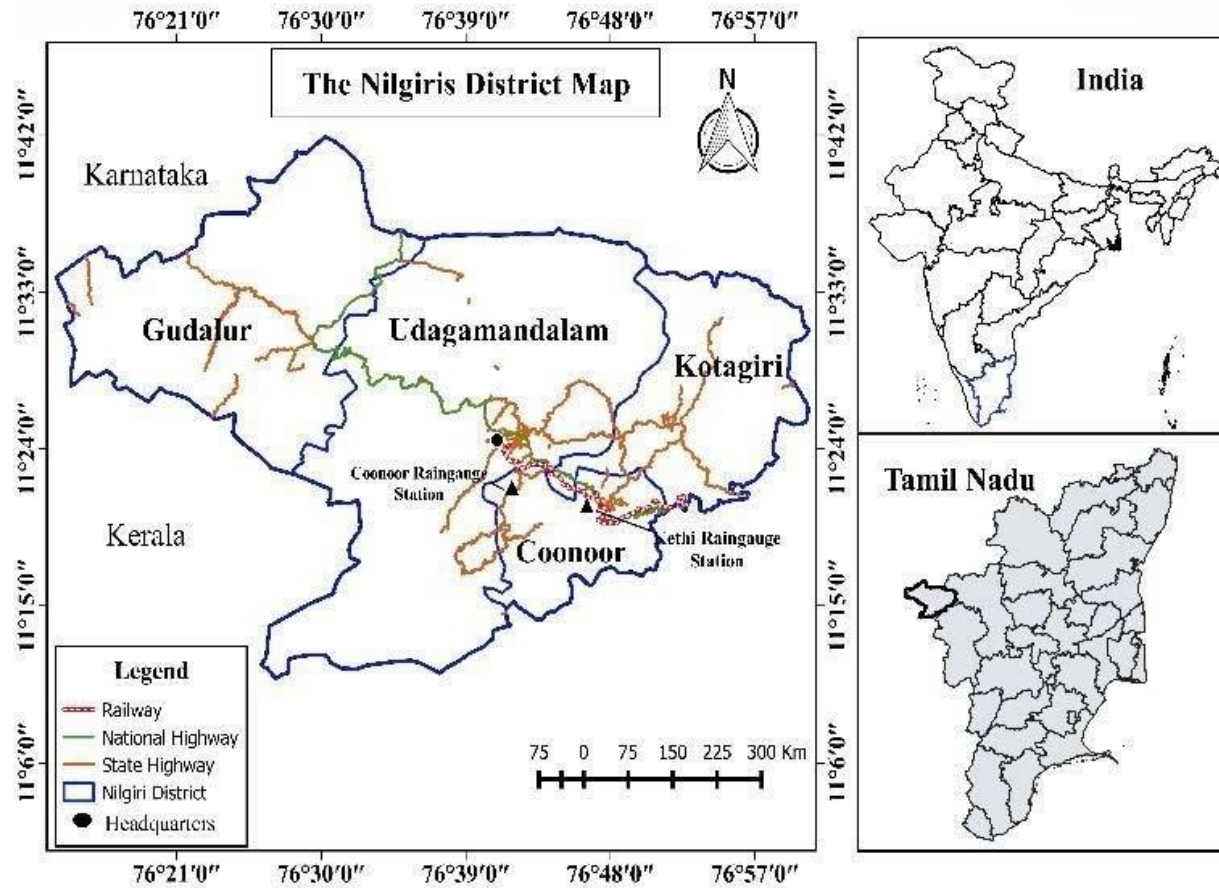


Fig.7.1 Nilgiris - Sitemap

Site context

Location – Kokkal

Village - Sholur

Town – Udhamandalam

District – Nilgiris

State - Tamil Nadu

SITE ANALYSIS

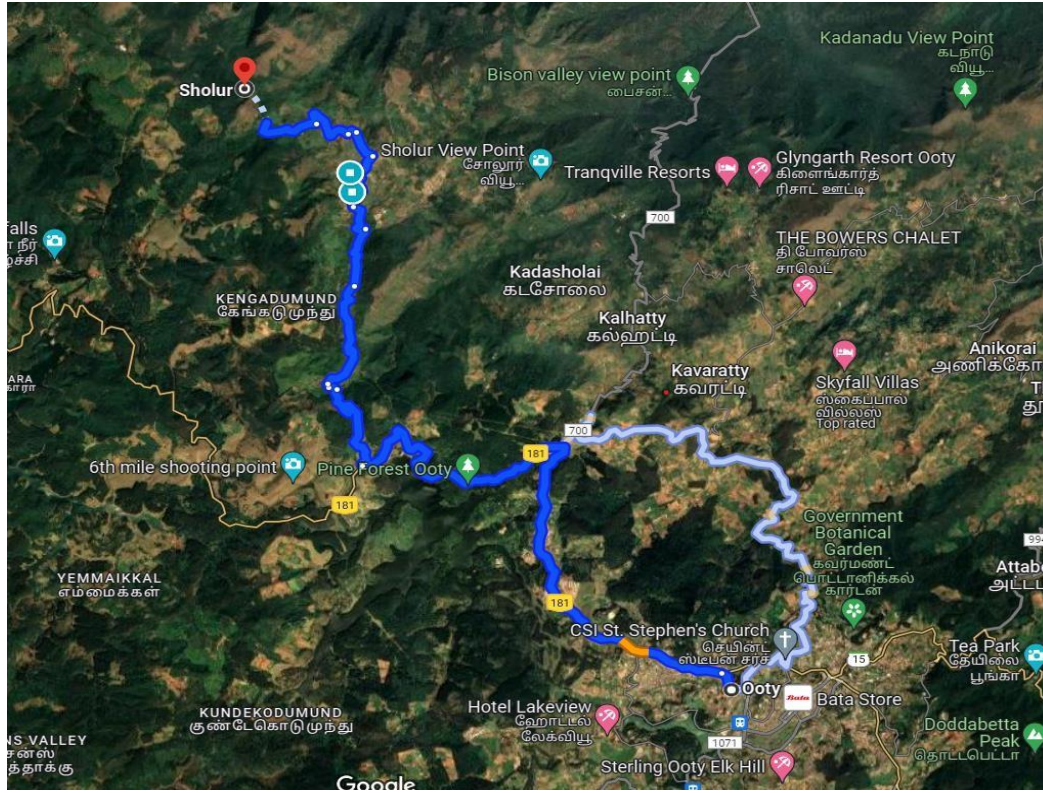


Fig.7.2 Distance from Ooty to sholur



7.3 Kota community residential area



Fig.7.4Chosen site at Kokkal



Fig.7.5Kota settlement at kokkal



Fig.7.6 Gov. HSC school



Fig7.7 Sholur junction



Fig7.8 Kokkal bus stop

Location & Proximity

- Distance from Ooty to Kokkal – 20.1 kms
- Distance from Sholur junction to site – 6.4 kms
- Site from Kota settlement – 460 m
- Distance from Sholur main road to site – 110 m

Transportation –

- Gov buses from Ooty to Kokkal bus stop

10 am/ 12.45 pm/ 2.30 pm/ 4.45 pm/ 7.15 pm

- Train – mettupalayam 71kms / Ooty 21.9 kms

Amenities -

- Nursey school – 200m
- Elementary to Hsc – 1km

KEY

● Gov. HSC School

● Kokkal Bus stop

— Road connecting kota settlement and site

— Site boundary

Demography

According to 2024 censuses of Kota tribal community at Kokkal

Total Families – 130

Total Population – 500

- Male – 253
- Female- 247
- 0-5 years - 25
- >50 years – 10

Economy

The tribal community's traditional occupation is pottery, but slowly the tribes are moving towards daily wages for living at farms.

Due to lack of funds to make pottery and mainly a to sell their products on regular basis

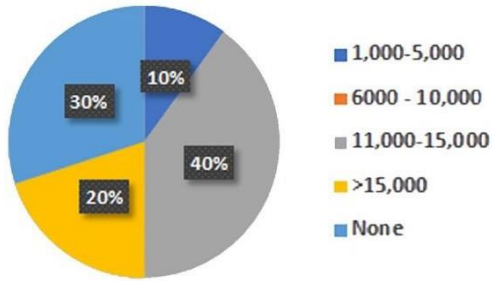


Fig.7.9 people of Kota community



Fig.7.10 Pottery and Atrisan work of Kothas

Income of Kota



Literacy rate of Kota

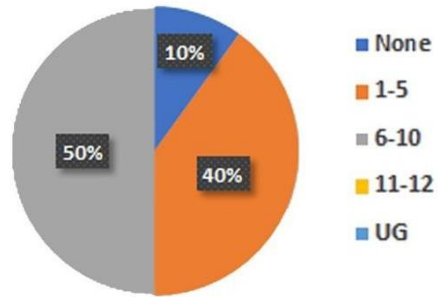


Fig 7.11 Income and literacy rate of Kota

7.1 Site & Zoning-Set backs



Fig.7.12 Proposed site

Udagamandalam Modified Master Plan, DTCP

Multi use Zone

[Welfare centers, libraries, petty shops, admin office, bank, hotels

- Setback req. – 3m (front)
1.75m (all other sides)
- Min plot extend – 200sq.m
- Max. Plot coverage – 50%

Commercial

- Kiosk, Bank, Petty shop – 50sq.m (min)
- Setback – 1.75m (front)
Nil (Side & Rear)

Educational (Public uses)

- Setbacks- 3m (all sides)
- Max height - 7m
- Min. plot extent - 1000 sq.m
- Topmost floor shall be slopped gabled roof.

Tamil Nadu Hilly Areas Special Building Rules, 1981

Rural development & local administration

Height of the Building

- Height shall not exceed 1 ½ times the width of street from the access

Foundation

- >15m ht. built directly on rock or pile foundation
- G & G+1 – shallow foundation (Isolated footing)

Roof

- Rain water Drain through down pipe system



Fig.7.13 Total site area



Fig.7.14 Site Elevation Profile



Length of the site is 200.53 m

Width varies from 18m to 85m

In the Site elevation profile, There is a gradual slope of 26m

7.2 Natural Physical feature

Soil type –

The soil type is **brown, deep brown red soil** this extends to a depth of 0.30 to 1 m.

The subsoil which is porous extends from 3 m to 4 m.

The landscape is not marked by any rock out crop.

Flora and Fauna –

Silver oak, tea, peach, cedar, eucalyptus, segai tree. There are no trees/ vegetation within the site

Water table-

Ground water level – 10' to 20'

Wells, ponds can be created , borewells are not permitted



Red soil



Tea plantation in South, West side of the site



Tea plantation



Silver oak



Segai

7.3 Natural Physical feature – seismic zone

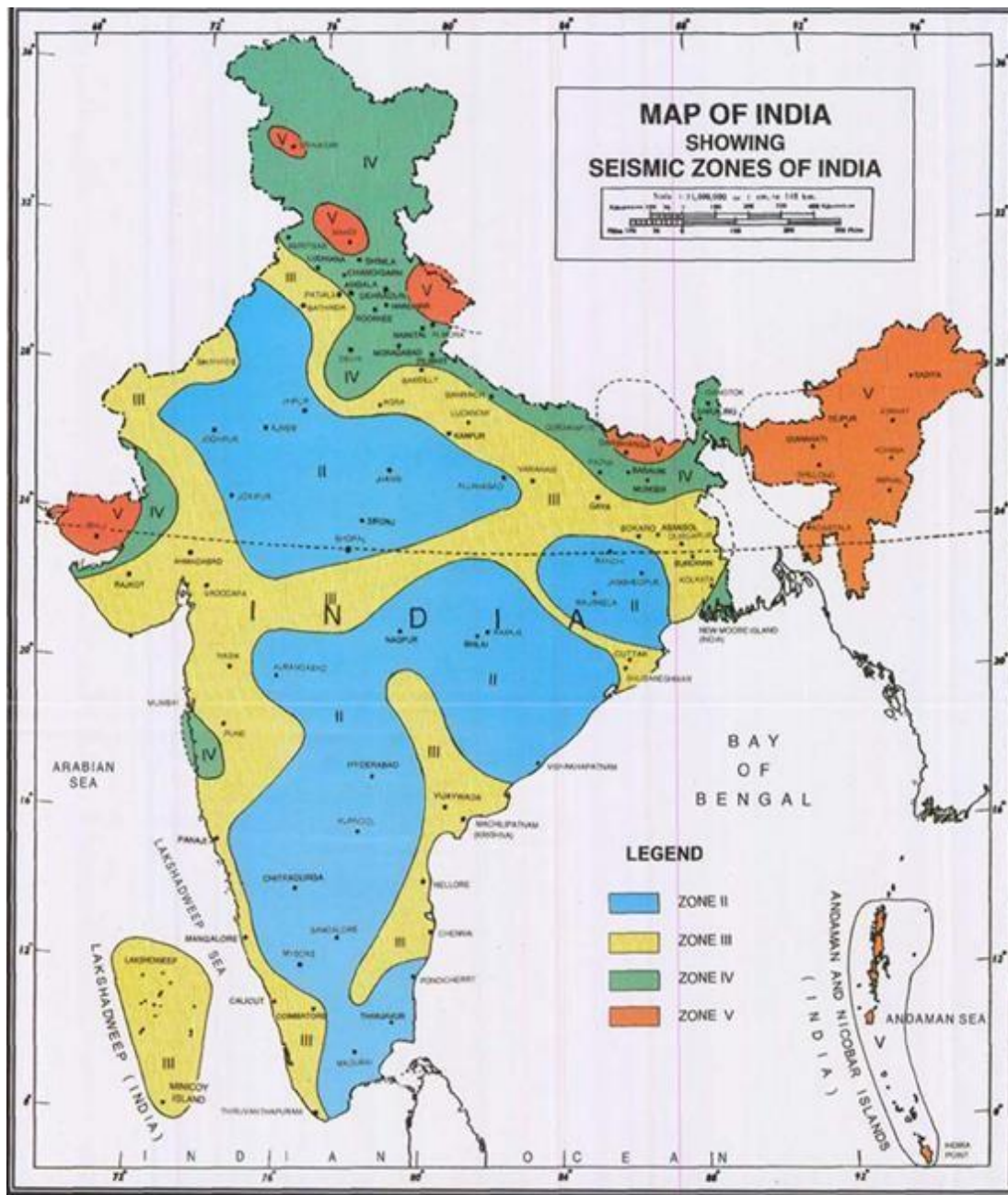
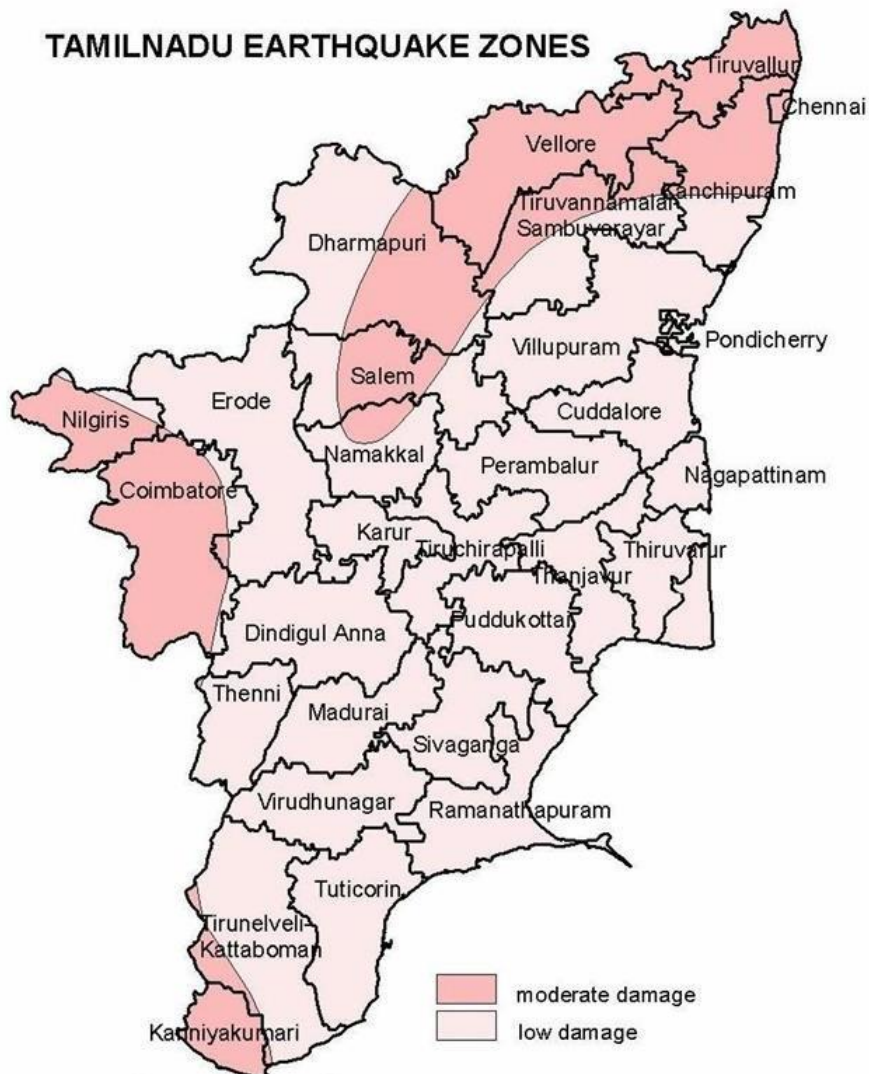


Fig.7.15 Indian Map



Tamilnadu earthquake zones

Tamil Nadu falls under zone II and III in Seismic zone of India.

Our site at Nilgiris district would have moderate damage according to Tamil Nadu Common Development Promotion Rules 2018, Seismic mapping.



Paver block 3m Road



Sholur Junction Bus stop



Concrete 4m Roads



Electrical Poles

Fig 7.16 Site surrounding



Fencing around the site

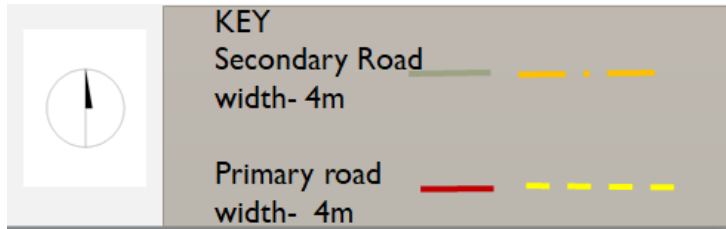
Circulation

Site from Kota settlement – 460 m

Distance from Ooty to Kokkal – 20.1 kms



proposed site



4m Primary Road



3m Secondary Road

7.5 Climate Study

Climate Study

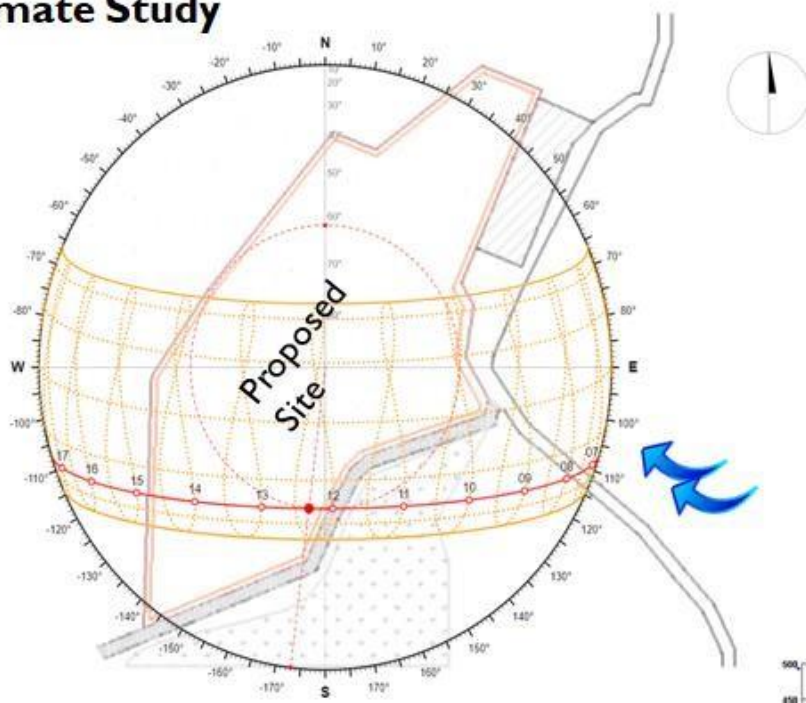


Fig.7.17 Sunpath

Nilgiris

The Nilgiris sitting at the intersection of Tamil Nadu, Karnataka, and Kerala.

Location - 130 km Latitude: 11°12 N to 11°37 N by 185 km Longitude : 76°30 E to 76°55 E.

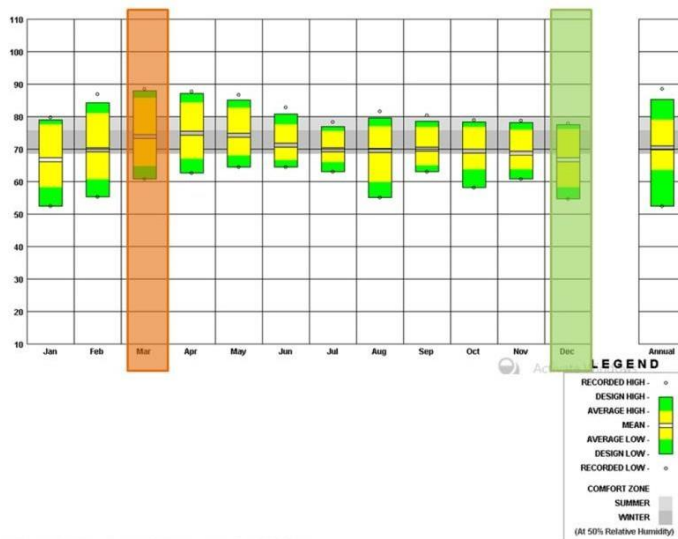
The area has lots of rugged mountains, and the most famous ones are the Nilgiri Hills, often called the Blue Mountains.

The highest peak in this district is Doddabetta, and it's about 2,637 meters (8,650 feet) above sea level.

Because of its high elevation, has a Cold climate

It gets rain during the southwest and northeast monsoon seasons.
(heavy down pour OCT- NOV)

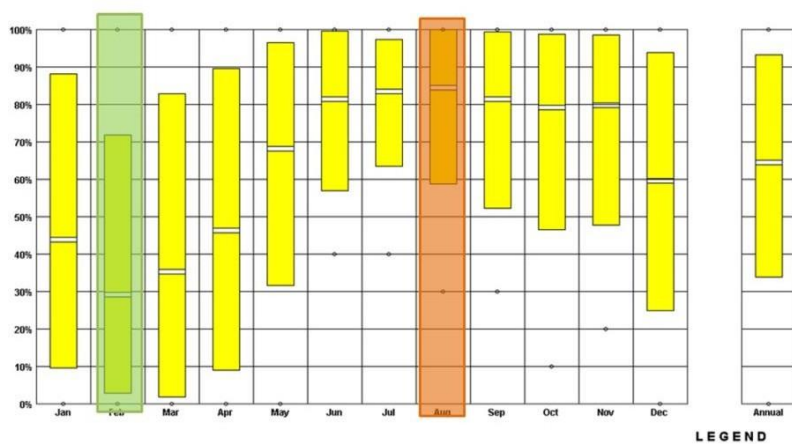
SW Monsoon not very strong



TEMPERATURE RANGE

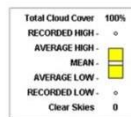
Temperature is **high** in the month of **march 32 deg.C**
low in the month of **december**.

Temperature range

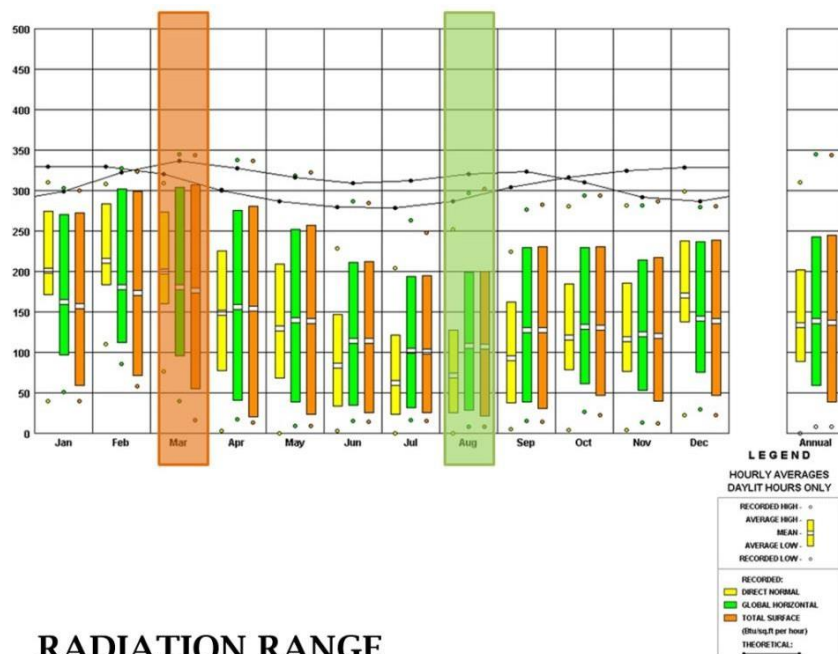


SKY RANGE

Sky cover is high in the months of June and August
less in the month of Feb.



Sky range



RADIATION RANGE

Fig 7.18 Climate data

RADIATION RANGE



Global horizontal is **high** in the month of **march** and **low** in the month of **august**.

As a result the temperature during the month of march is high.

Radiation and temperature are directly proportional to each other .

MONTH	MINIMUM TEMPERATURE(°C)	MAXIMUM TEMPERATURE(°C)	RH VALUE	WIND SPEED(Km/hr)
January	17	24	50	5
February	19	29	50	5
march	20	31	60	6
April	21	32	70	6
May	26	30	70	7
June	25	26	75	7
July	20	25	60	7
August	20	25	65	7
September	20	26	70	6
October	20	26	70	6
November	19	26	60	5
December	18	26	60	5

Tab7.1 Radiation range

Positive Aspects

The site is surrounded by lush green tea estate and mountains. Which gives a good view all around the site



Mountain view in the N

Spaces	Area	No.	Total
Admin / Reception space	11.2 sq.m	1	11.2 sq.m
Gallery	30 sq.m	1	30 sq.m
AV Room	30 sq.m	1	30 sq.m
Training hall	336 sq.m	1	336 sq.m
Terracotta building materials manufacturing	350 sq.m	1	350 sq.m
Conference hall	18.5 sq.m	1	18.5 sq.m
Guest house + toilet bath	14.3 sq.m	2	28.6.sq.m
Dorm (4 bunks) + 4 toilet and bath	27.8 sq.m	1	27.8 sq.m
Kitchen	9.2 sq.m	1	9.2 sq.m
canteen	100 sq.m	1	100 sq.m
Kiosk	50 sq.m	2	100 sq.m
Public toilets	3 sq. m	2	6 sq.m
Kiln		1	
Total			1,130.1 sq.m (12,

Tab7.2Area statement

7.6 Area statement

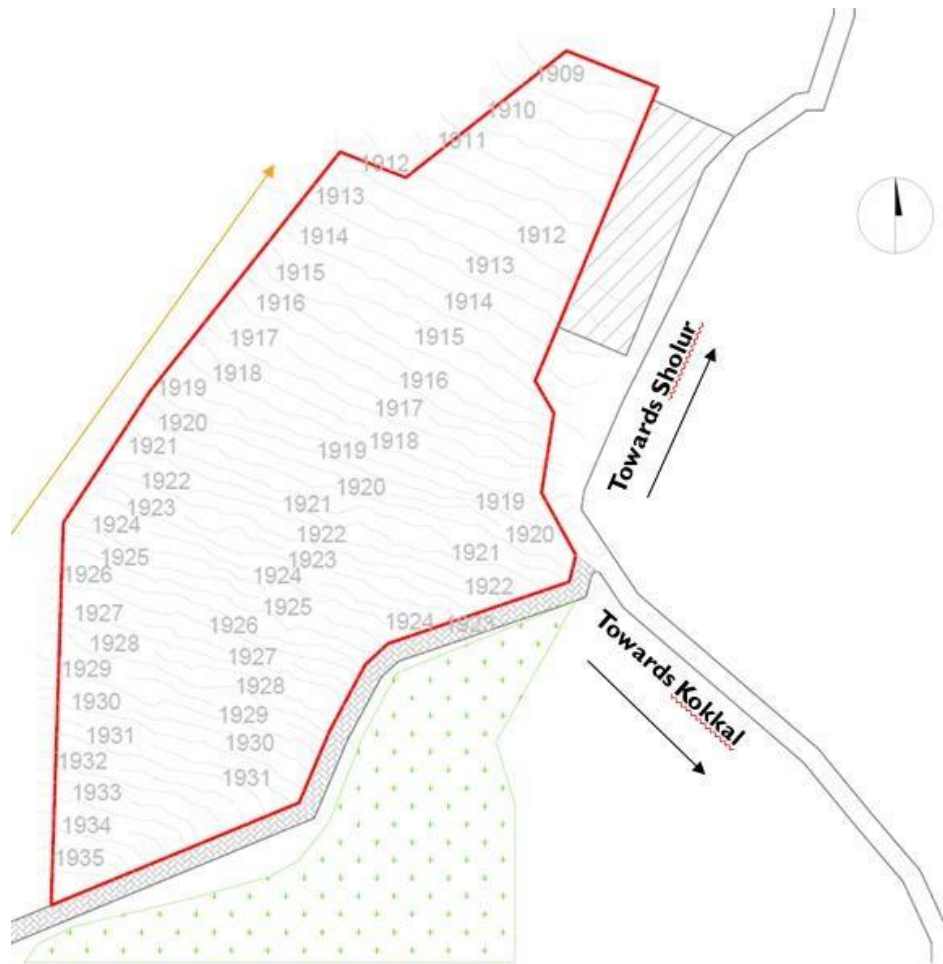
Pottery work space has been given for 60 potters.

Terracotta building material manufacturing unit for 60 locals

Classes for people within the tribal community would be held as 2 batches

Also for tourists to experience pottery making.

Expecting Footfall – 200 (max.)



Proposed site

In the Site elevation profile, There is a gradual slope of 26m

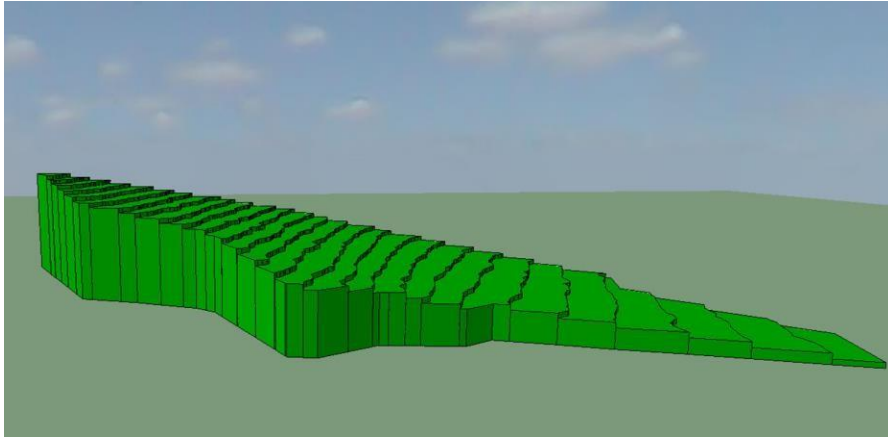


Fig 7.19 3DSite elevation profile

7.6.1 Option 1 Zoning – Solar radiation

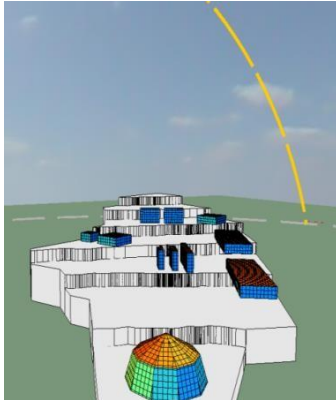


Fig7.20 Option 1 Zoning

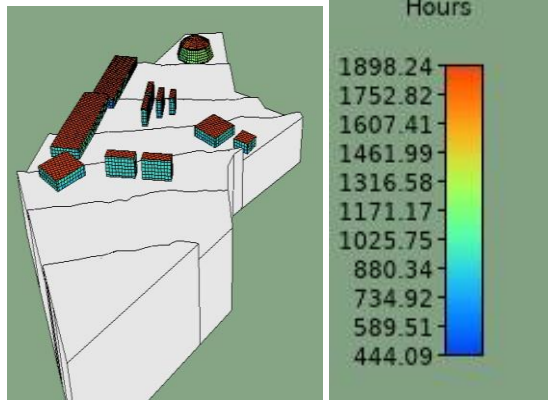
Option 1

The longer facade of the buildings facing East and West side

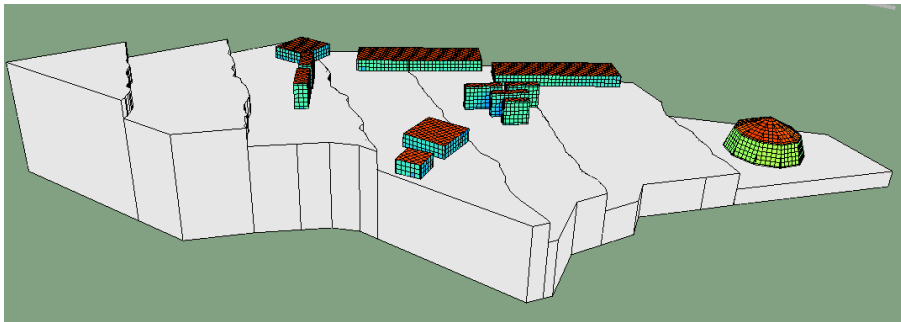
North



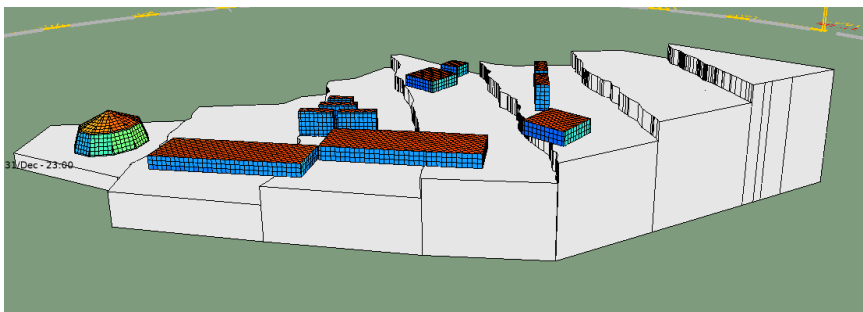
South



East



West



7.21 Iteration 1 solar radiation

7.7 Option 2 Zoning – Solar radiation

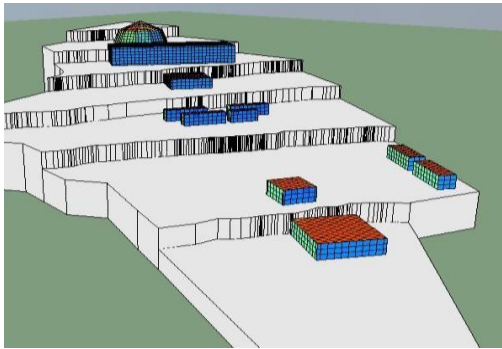


Fig.7.22 Option 2 Zoning

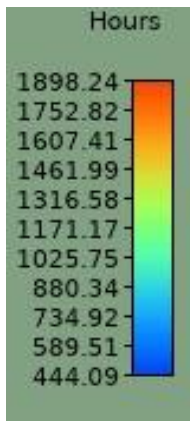
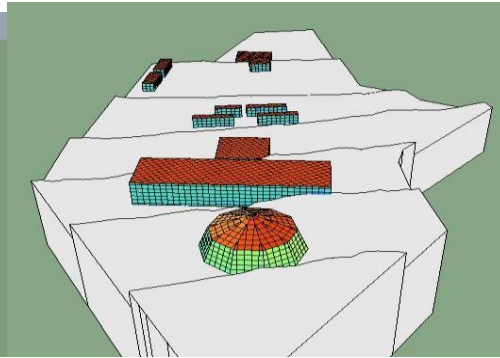
Option 2

The longer facade of the buildings facing North and southern side

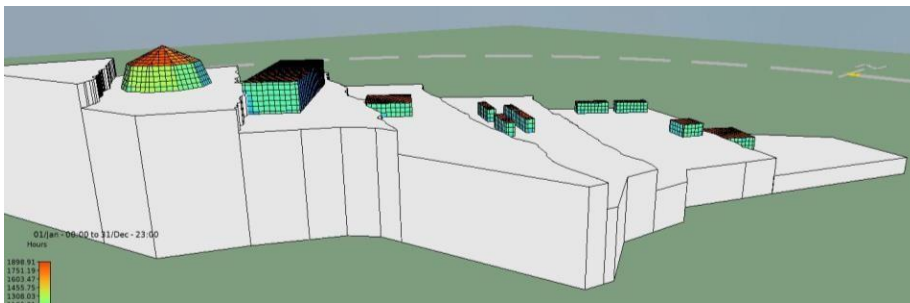
North



South



East



West

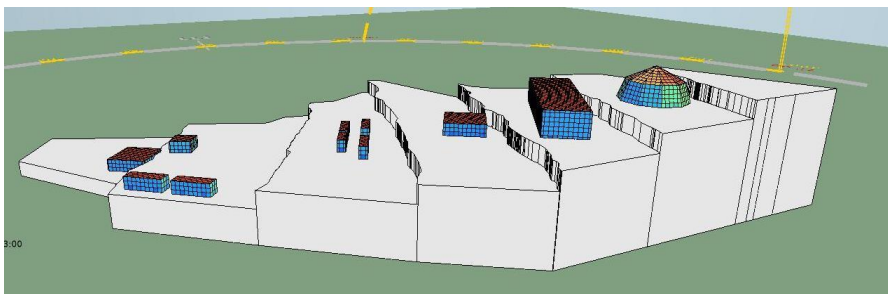


Fig.7.23 Iteration 2 solar radiation

7.7.1 Inference

As the site is located in Ooty, cold region, the occupants require, sufficient thermal comfort inside the building.

From the thermal imaging it shows that the South side predominantly gets more radiation than other three sides.

Thus, the building is positioned in such a way the longer façade face south and north

7.8 Proposed Zoning

SPACES

Public Spaces

- Admin (ticket counter, toilets)
- AV Room
- Gallery
- Pottery Training area
- Building material making area (& Klin)
- Kiosk
- Canteen
- Public toilets
- View point

Semi Public Spaces

- Conference hall

Private Spaces

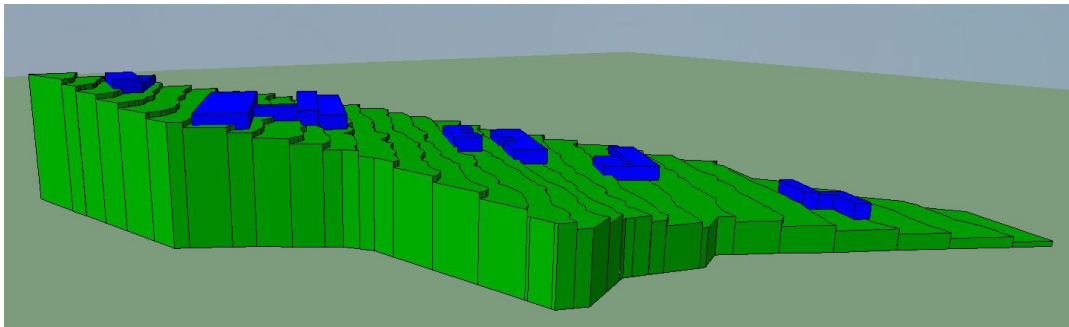
- Guest House
- Dormitory
- Kitchen



Fig7.24 Iteration 3 solar zoning

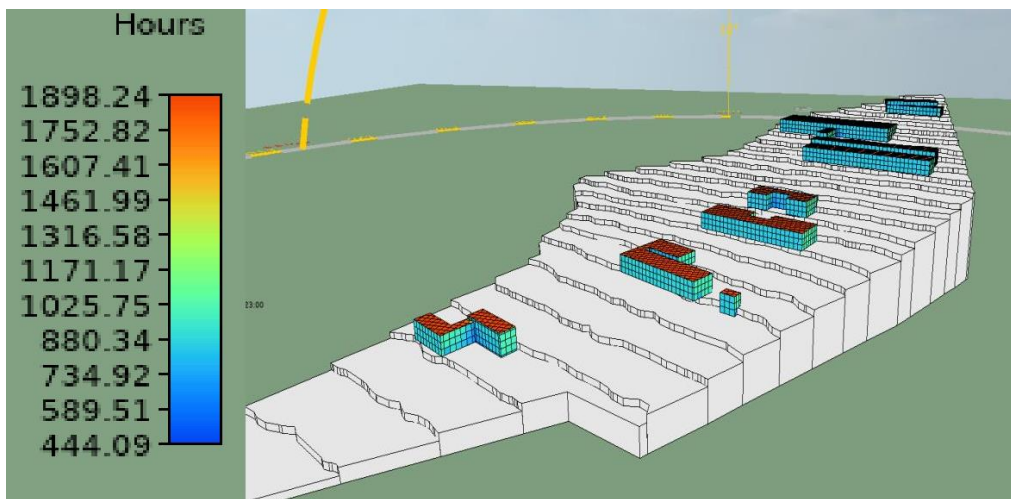
KEY

- 1 – Admin/AV Room/ Conference
- 2 –Galley / Kiosk
- 3- Pottery training /Klin
- 4- Material production
- 5- Kitchen
- 6- Canteen
- 7- Guest House
- 8- Dorm



Iteration 3 3D

7.8.1 Proposed Zoning – Solar Radiation



North & West

East

South

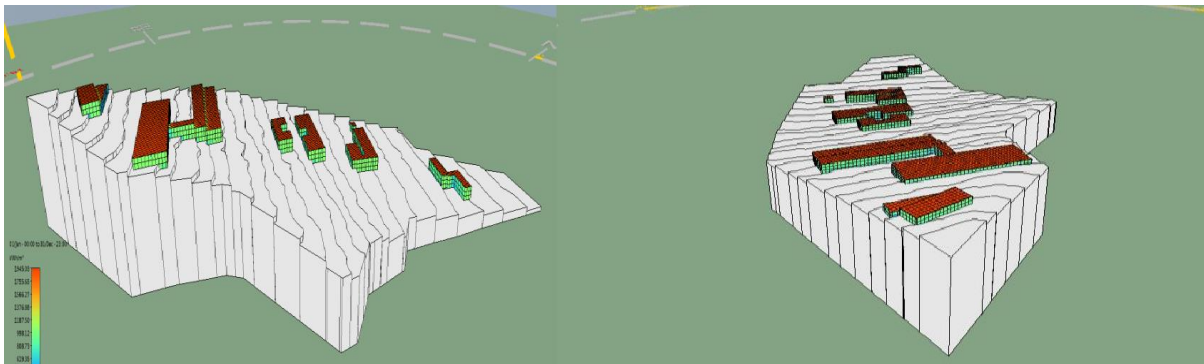
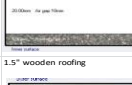


Fig 7.25. Iteration 3 Solar radiation

7.9 Materials

Case No.	Element	Material	Thermal Quality (Based on ASHRAE)	Source	Durability	Costing	Advantages	Disadvantages			
1	Wall- 1	Brick with mud plaster 	Thermal Quality is good. U value- -1.968 W/m ² K	Mud plaster is sourced locally (At Sholur)	Mud plaster should be replastered two year once.	Bricks- 11-12rs Mud plaster- raw materials from locally available raw materials cost- 300/day machinery	1) Mud is a locally Available Material Traditional construction method a) Good thermal Quality b) Less embodied carbon c) Naturally available - cost effective	1) Labour intensive 2) Tends to crack easily 3) should be treated against termite attack			
2	Wall- 2	Brick with cement plaster 	Thermal Quality is good. U value- -1.792 W/m ² K	Cement is sourced from Mettupalayam	good durability, can be replastered ten years once	225 rs/sq.ft (Inclusive of labour)	a) Easily available in market Less labour intensive	2) More embodied carbon a) has to be sourced from the plains, 3) increasing the transportation cost			
3	Wall- 3	Mud blocks 	Thermal Quality is good U value- -1.32 W/m ² K	Locally available at site and surroundings	Locally made blocks have to be replastered every year and lime plaster for avoid termite attacks.	Mud plaster- Locally available raw materials machinery cost- 300/day	a) Traditional construction method b) Built by local people cost effective reduces carbon foot print	2) Skilled labour 3) Frequent maintenance 4) Easily infiltrated by pests			Interlocking Mud blocks are cost effective, it is a traditional construction method. Mud block have a good thermal quality. & to avoid termite and other insect attack can be coated with lime plaster.
4	Wall- 4	Cement Particle Board 	Thermal Quality is good. U value- -1.653 W/m ² K	The Board should be sourced from the plains (Coimbatore/Chennai/Bangalore)	Strong and durable.	12mm - 8'x4' - Rs.1152 18mm - 8'x4' - Rs. 1728	a) Cement boards are pre fabricated structures Easy to construct Durable	2) Skilled labour 3) Material cost is high			
1	Flooring- 1	Cement flooring 	Thermal Quality is good U value- -2.652 W/m ² K	Cement is sourced from the Plains (Mettupalayam/Coimbatore)	Strong and durable.	130 Rs./ sq.ft	a) Cement is easily available in market b) Less labour intensive low maintenance	3) High transportation cost			
2	Flooring- 2	Ceramic tile flooring 	Thermal Quality is good. U value- -2.532 W/m ² K	Tiles are sourced from plains (Mettupalayam/Coimbatore)	Highly durable, highly resistance to scratches, stains and moisture.	Tile - Rs.80/- Labour- Rs.45/- Rs.40/- Paste	a) Highly durable low maintenance	2) skilled labour 3) High transportation cost and labour charges			
3	Flooring- 3	Mud flooring 	Thermal Quality is good U value- -2.064 W/m ² K	Locally available material (at Sholur)	very durable and can last decades, if maintained well	Construction method Practised by local tribal community people	a) Highly durable Locally available material Cost Efficient Good thermal property	2) High maintenance 3) Porous material 4) Not heavy load resistant			While comparing the flooring materials cement flooring is better in terms of cost, availability of material and durability.
4	Flooring- 4	wooden flooring 	Thermal Quality is good U value- -1.256 W/m ² K	Locally available (Oak tree is an native speccies)	Can sustain high foot traffic and are durable	Material cost - Rs.200/ sq.ft. Labour cost- Rs.150/ sqft.	a) Can sustain high foot fall Locally Available Local labours can be used for carpentry and installation	2) Good Quality wooden floorings are expensive 3) Moisture damage 4) Expansion and contraction due to temprature and humidity			
1	Roofing- 1	Clay Tile Roofing 	Thermal Quality is good. U value- -2.930 W/m ² K	Terracotta tiles are locally available and can also be reused from old buildings	They are highly resistant to all type of weather conditions	Material cost - Rs.25/ tile	a) Locally available material Cost effective Weather resistanat Traditional construction method	2) will brake if hit by debris 3) Will require under layment for cold resistant			
2	Roofing- 2	Concrete Tile Roofing 	Thermal Quality is poor U value- -3.003 W/m ² K	Sourced from Ooty town	Durable in cold climates.	Material cost- Rs.35/Tile	a) Concrete is durable Resistant to termite moisture resistant	2) Concrete tile have a tendency to absorb moisture when not properly treated and weather proofed. 3) Should be purchased and manufactured from the plains. 4) Low thermal Quality. 4)Mould would grow			
3	Roofing- 3	Slate tile roofing 	Thermal Quality is poor U value- -3.084 W/m ² K	Tiles are sourced from plains (Mettupalayam/Coimbatore)	Durable in cold climates. But material is brittle	Material cost- Rs.50/Tile	1) Well insulated Highly resistant for fire and water	2) 1) Poor thermal quality 3) Very brittle 4) Has to be sourced from coimbatore or mettupalayam 4) Mould growth is probable			Terracotta tile roofing is cost effective, locally available, and it is an traditional method of roofing.
4	Roofing- 4	1.5" wooden roofing 	Thermal Quality is good U value- -1.484 W/m ² K	Locally available.	Strong and durable, Can last upto 20 years	Material Cost- Rs.250/Sq.ft	a) One of the best insulating materials b) Locally available Reduced maintenance Local Labour can be used for construction	2) High maintenance 3) Have to be treated and installed 3) Expensive			

Tab.7.3 Materials

7.10 Planning



Fig7.26 Plan and section

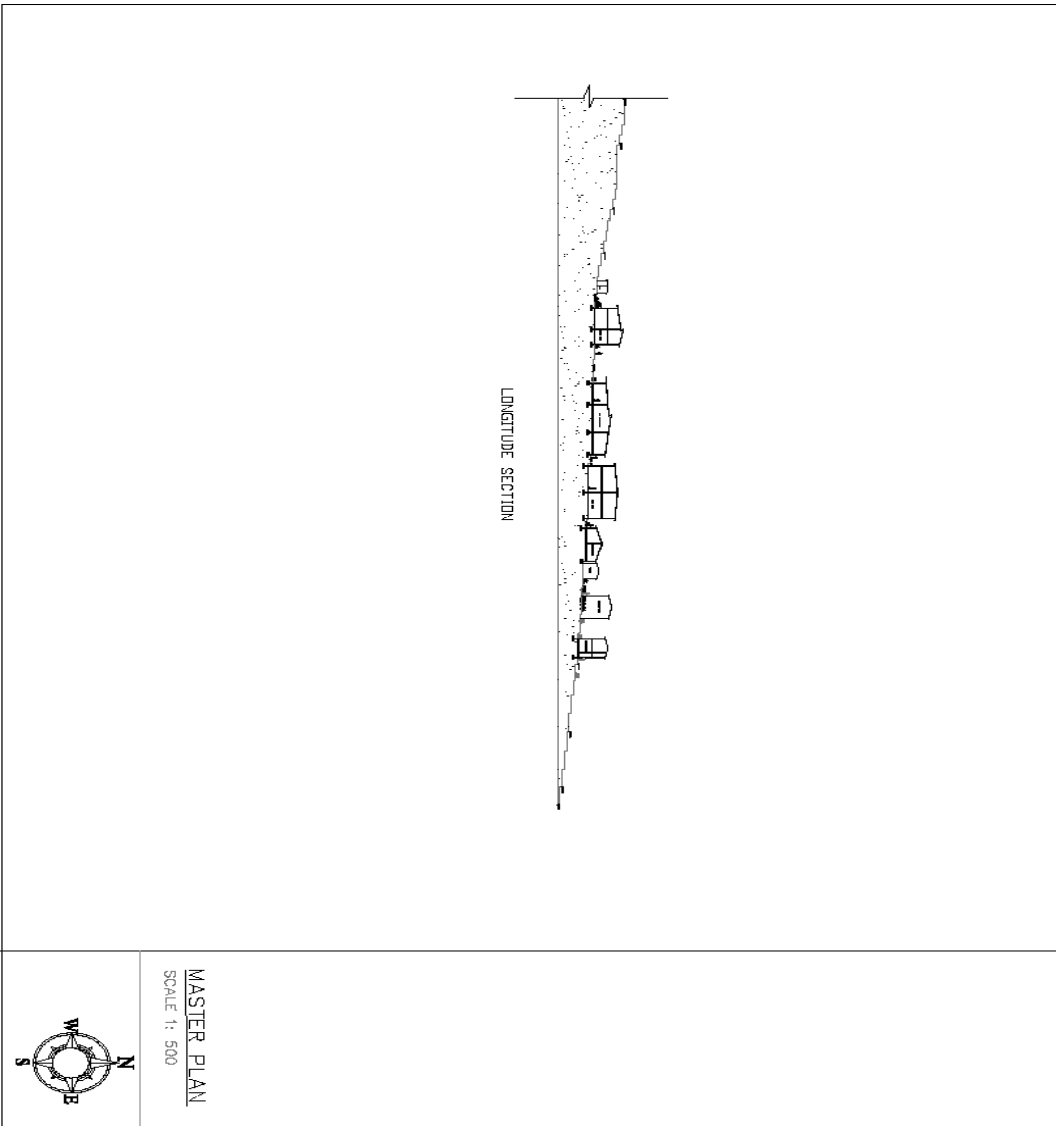
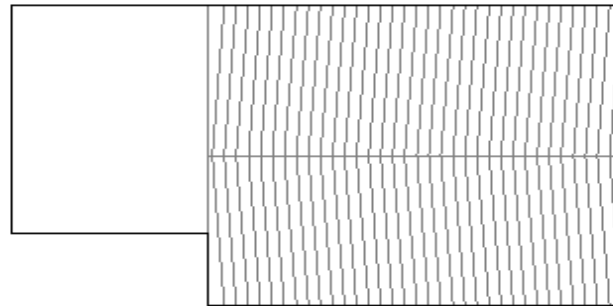
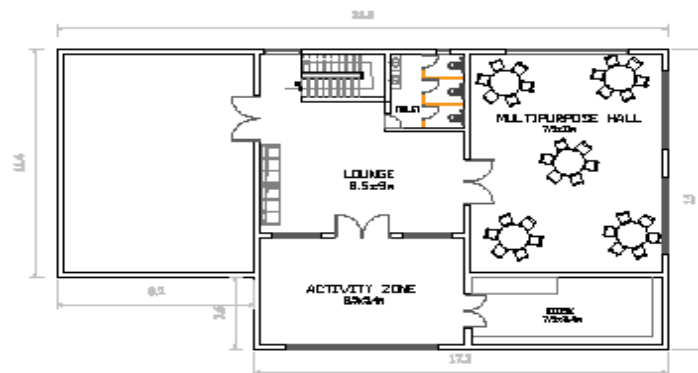


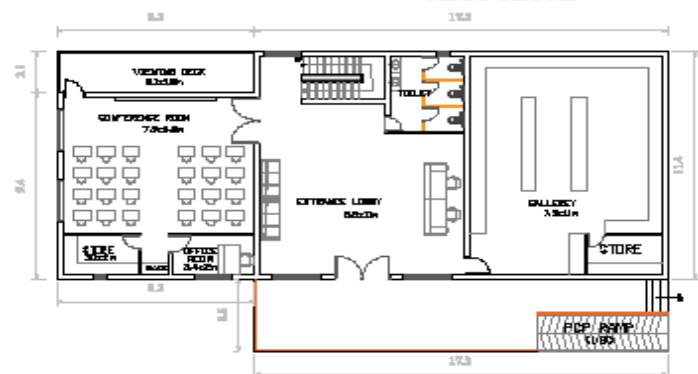
Fig.7.27 Longitude section



ROOF PLAN



FIRST FLOOR



GROUND FLOOR

FLOOR PLAN ADMIN BLOCK



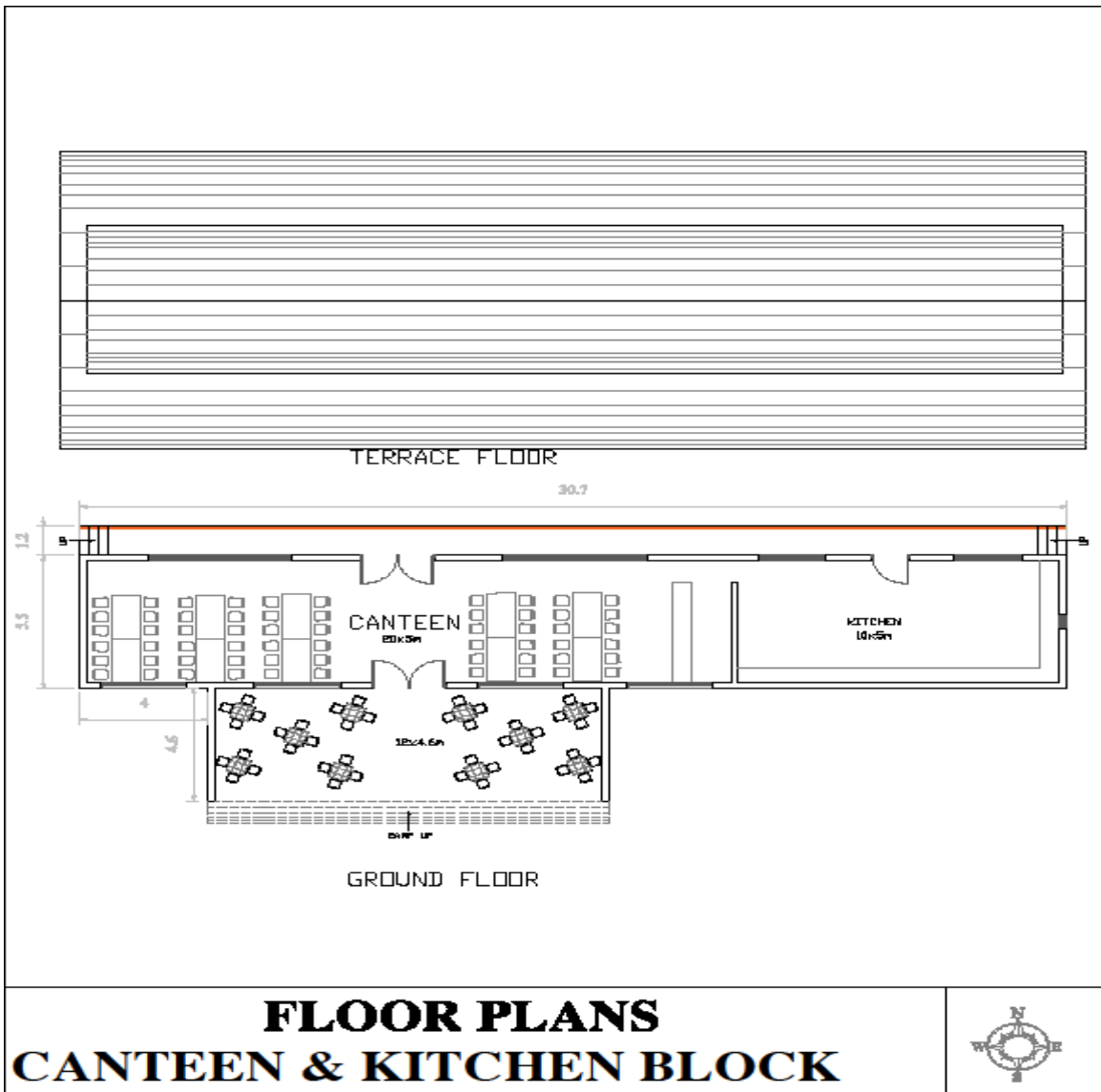


Fig 7.29 Floor plans canteen and kitchen block

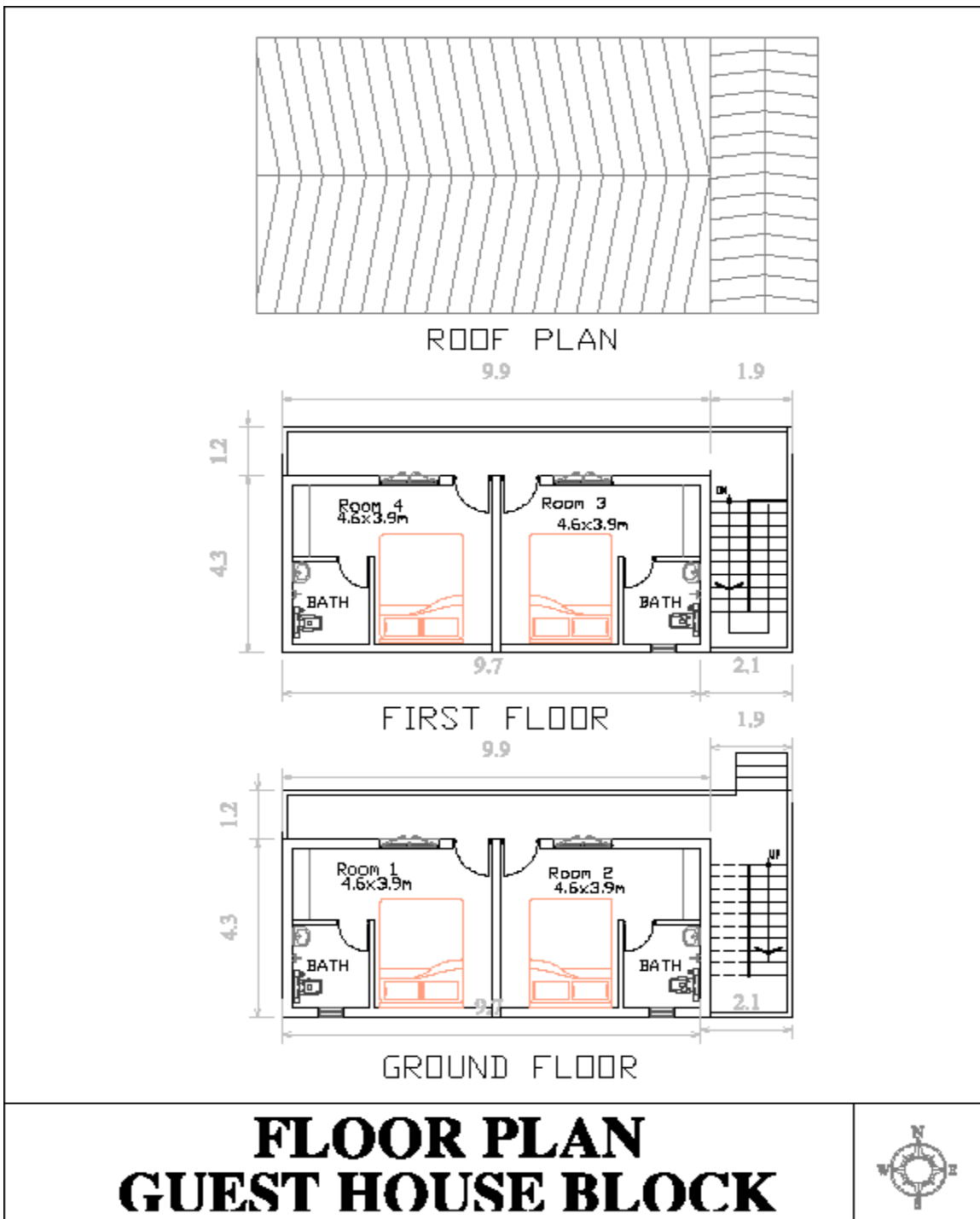


Fig7.30Floor plan Guest house block

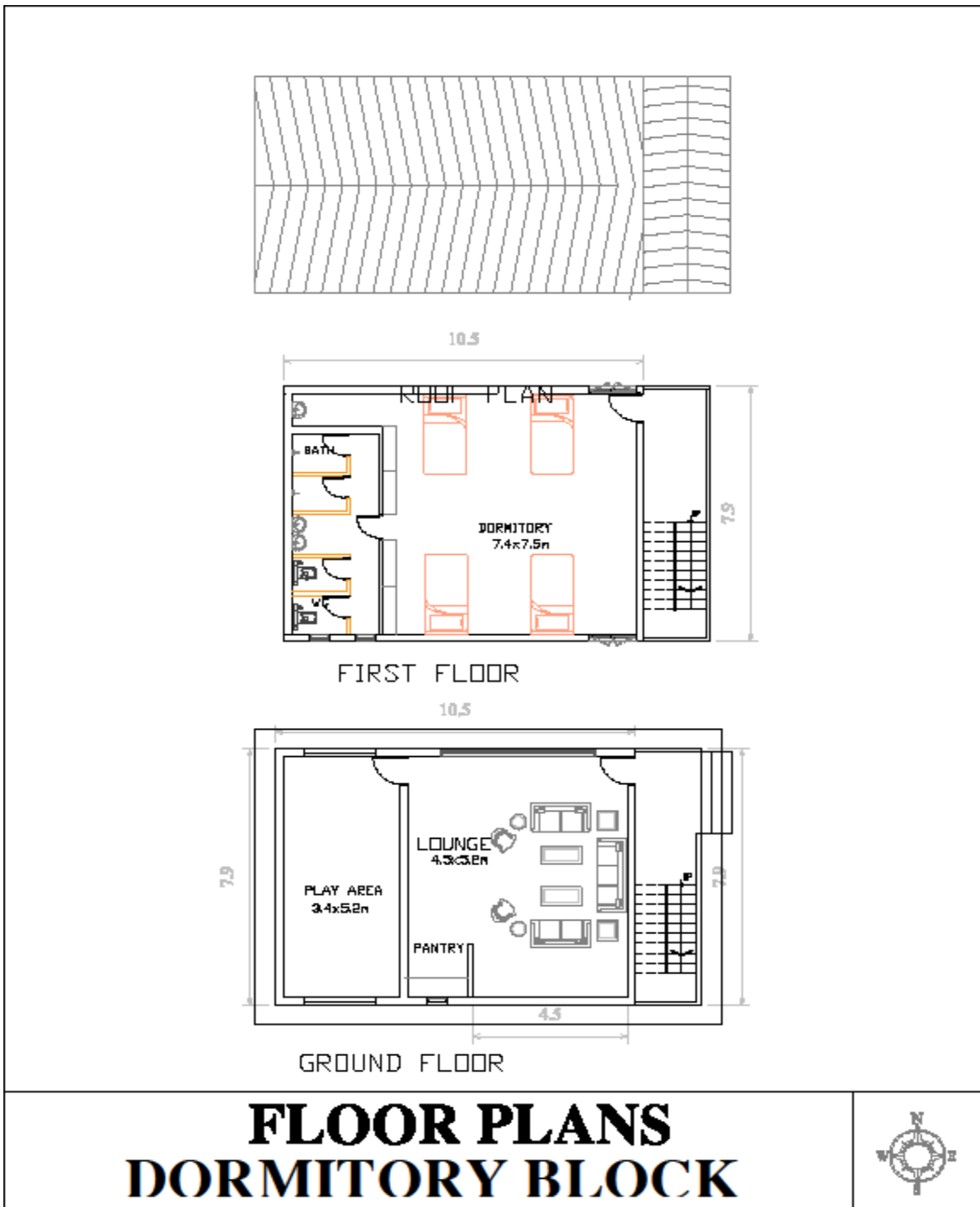


Fig7.31Floor plans Dormitory block

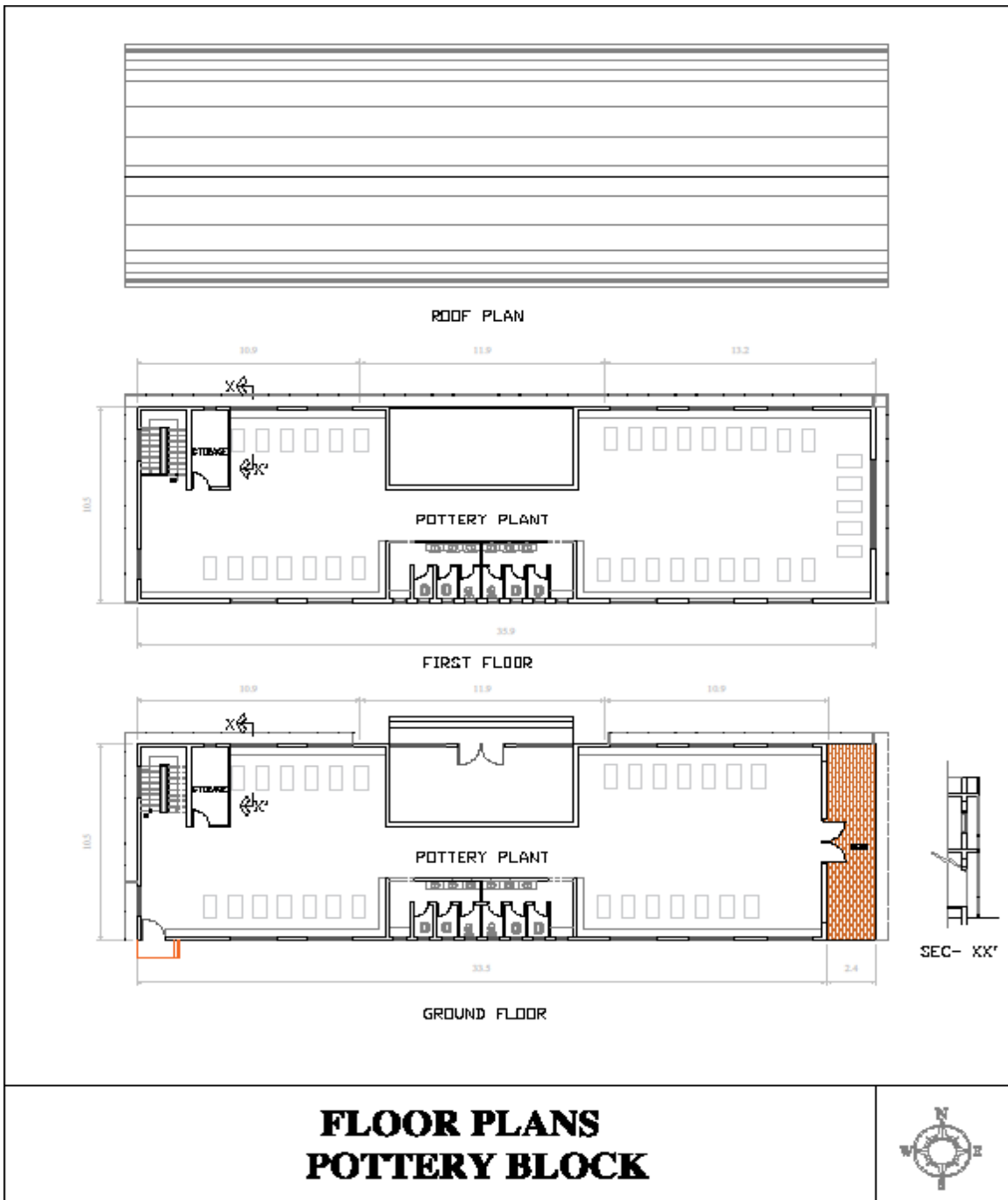


Fig7.32 Floor plans pottery block

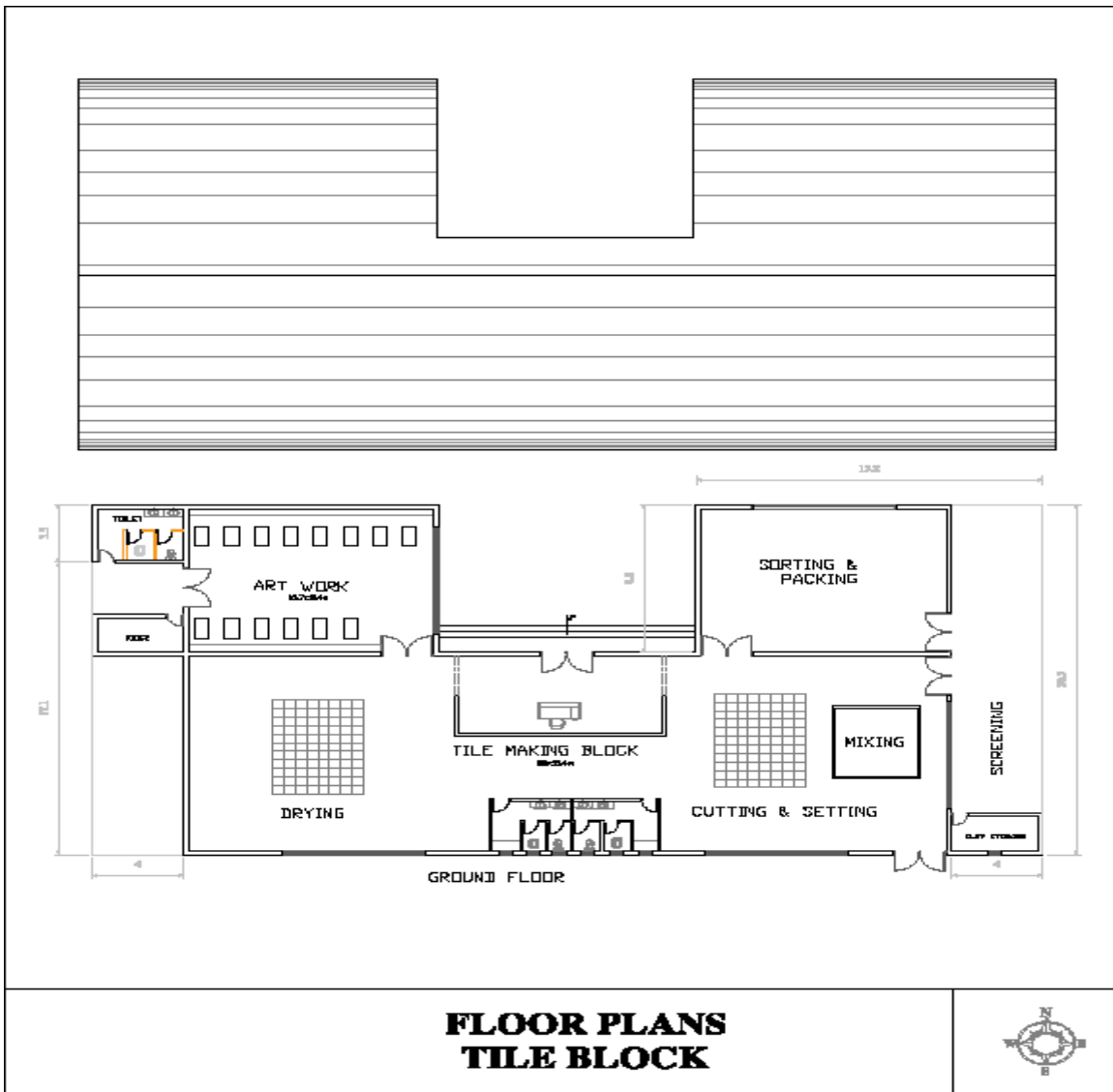


Fig 7.33 Floor plans Tile block

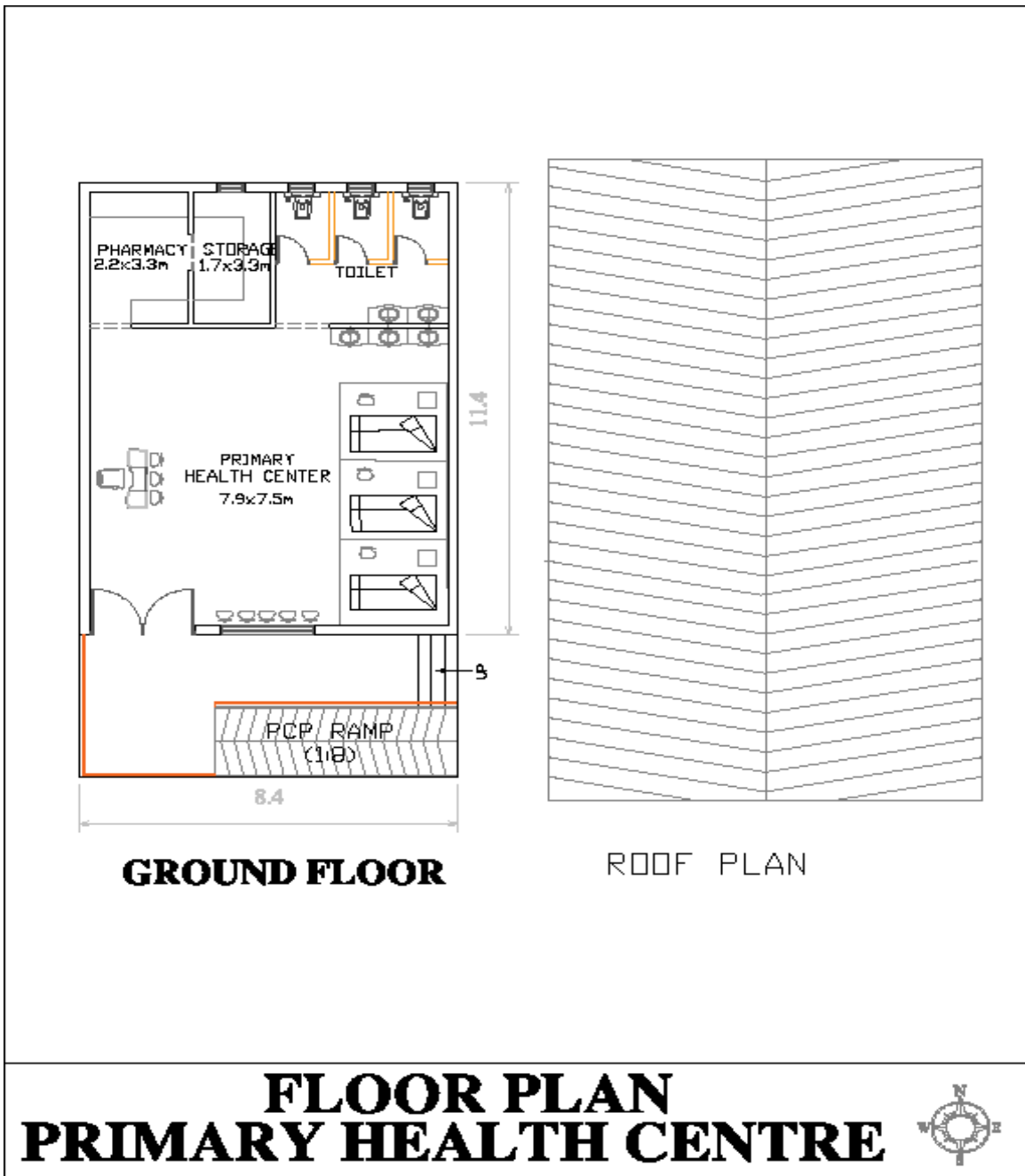


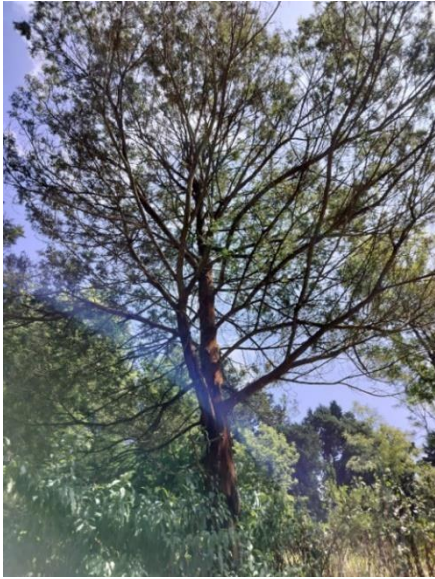
Fig.7.34 Floor plan Primary Health center

Area of the site- 8,658.80 sq.m (2.1 acres)

Total Built up Area – 2005.63 sq.m

Length of the site- 200.53m

Flaura & Fauna - Silver oak, peach, segai tree



Segai Tree



Peach



7.11 Silver oak

7.11 Revenue generation

Economic Development –

Revenue generation from the community centre per month

Kiosk-

rent- Rs.500/ month

$$(2*500) = \underline{\text{Rs.1000}}$$

Stays –

Dorm – Rs.800/ person

$$(1500 * 8) = \underline{\text{Rs. 12,000/-}}$$

Guest House -Rs. 2000/-

$$(2500* 4) = \underline{\text{Rs. 10,000/-}}$$

Gallery/ Tile making/ Pottery

Entry fee- Rs. 50/-

$$(40* 50) = \underline{\text{Rs.2000/-}}$$

Material making -

(90 tiles / weekly twice production (8)

= 720 tiles)

$$(720 * \text{Rs.25/ tile}) = \underline{\text{Rs. 18,000/-}}$$

Pottery

Experience pottery – Rs. 150

$$(\text{approx. } 25 * \text{Rs.150}) = \underline{\text{Rs. 3750}}$$

Pottery Learning

Rs 1,500 for a single session (1.5 hours)

Rs 9,000 for a 1-month course of 8 classes.

Rs 12,000 for a 1-month course of 12 classes. Rs

17,000 for a 2-month course of 24 classes.

Approx revenue/- = Rs. 40,000

Selling pottery

(Approx.50 potters/ day make 4 pots = 200 pots/ day

200 pots * 20 days = 4000 pots)

100 * Rs. 400 = Rs. 40,000

Terracotta Art

Rs. 250- 300*/ piece

(25* Rs.300) = Rs. 7500/-

Mess-

RS. 250/ Meal (Tourist)

(40 * Rs.250) = Rs.10,000

Total Revenue Generated- Rs.1,44,250 (Approx./ month)

7.12 Schemes

Approach, Plans and Programmes for development for Kota, At Kokkal, Nilgiris

Plans for tribal development should be such as to empower tribal communities to decide about their own development based on their needs and priorities, including protection of their distinct identities.

Approaches to Tribal Welfare

Tribal Development Schemes- Central

- **ARTICLE 275(1)**

Constitution of India guarantees annual grants-in-aid from the Consolidated Fund of India to promote the welfare of Scheduled Tribes (STs). The grants are intended to bridge the gap between STs and others by accelerating their development.

Protected drinking water, Road connectivity, Electricity, Housing, Bridges, Dams, School buildings, Community halls, Cultural complexes, and Rural electrification.

The scheme is implemented through the Infrastructure Development Program (ITDP) and Social Welfare Department (SDWO). The Ministry of Tribal Affairs approves the schemes, which are used to create and upgrade critical infrastructure to improve the economy of tribal areas

- **Market Development of Tribal Products/Produce** - Under the scheme of Grants-in-Aid are released to TRIFED for the following activities:
 - (i) Retail Marketing Development Activity
 - (ii) Minor Forest Products Marketing Development Activity Vocational Training,
 - (iii) Skill Upgradation and
 - (iv) Capacity Building of ST Artisans and MFP Gatherers.
 - (v) Research & Development /IPR Activity.
- **Vocational Training in Tribal Areas** - The Schemes of Vocational Training in Tribal Areas is a self-employment or increasing employability of ST boys and Girls equally.
- **Research, Information and Mass education, Tribal Festivals and Others** - Research activities supported under the scheme help the Ministry identify the nature and reasons for the existing gaps. T

They also give an insight about the impact of the schemes and programmes, formulated for development of the Scheduled Tribes and their shortcomings/limitations. These schemes also support dissemination of information and training of trainer so that schemes and policies are given proper publicity and consideration. These goals are ensured through giving financial support to;

1. Tribal Research Institutes (TRIs)
2. Centres of Excellence
3. Supporting projects of All India or Inter-state nature
4. Publicity campaigns

7.12.1 Tribal Development Schemes- State

- **Organisation Name:** Adi Dravidar Welfare Directorate
- **Concerned Department:** Adi Dravidar and Tribal Welfare Department

Concerned District:All Districts

Scheme Details

Title / Name:Community Halls

How To Avail: DAD and TWO / District Manager, TAHDCO.

Description: Community Halls - Community Halls are constructed in Adi Dravidar Habitation for conducting social functions like marriage etc. Habitation without these facilities.

- **Nilgiri Adivasi Welfare Association (NAWA)**

nawa -fields of health education and socio- economic development.

Daily clinics and dispensaries

8.Conclusion

Tribes have their own way of living in hills of Nilgiris, their practices and knowledge is invaluable, sustainable which is observed when research is done on their mode of living. It is seen that traditional construction practices followed in tribal areas were more sustainable and now we are carrying out projects to teach sustainable practices to them. Lifestyle they were living was environmental friendly, self-reliant and sustainable with no adverse impact on climate but living isolated leaves them socially and economically under developed

In independent India there are constitutional provisions, welfare schemes for Scheduled Tribes institutional financial support, central government, state government and NGOs trying to train them cope with their problems, integrate them into mainstream development and safeguard them from exploitation by spreading health, educational and infrastructural facilities. They are being helped to adopt sustainable means and increase their incomes preserving their cultural, traditional beauty.

The focus of tribal development is ensuring enabling ecosystem of equal opportunities for occupation, health and better livelihood and to promote sustainable development of the tribal community economically as well as preserving the unique identities and culture of these communities.

The Kota tribal residing possessing separate ethnic situations and cultural traits and it is their identity. They need to be inclusive part of mainstream development yet preservation and sensitivity towards their socio-cultural identity need to be addressed.

Proposing Community centre encompassing skill training center, primary health center, handmade construction center and educational space etc., to develop their socio-economic status in par with other common people in the state, considered imperative. It is calculated that approximately R.1,44,250 revenue would be generated.

The community center gives the Kotas an opportunity to enhance their pottery skills, learn advanced methods and techniques from the gov. projects and also teach their traditional art form to others, giving tourist an experience of traditional pottery method.

Manufacturing of terracotta tiles is a way of generating income as well as producing a traditional material for construction.

Building a primary health centre allows the government doctors to visit and also regularly.

Both the government and voluntary sectors have emphasized on tribal development with the approach of project formulation and timely effective implementation of the development projects and sustainability issue has not received much attention.

Questionnaire

The questions are categorised into 4 parts- General, Socio Economical, Climatology & Construction

General Information/ ப ாதகவல்

1.Name:/ பெயர்:

2.Age / வயத :

- 10- 20 b) 21-30 c) 31- 50 d) <50

3.Sex/ொலினம்:

- Male b) Female c) other /

அ) ஆண் ஆ) பெண் இ) மூன்றாம் ொலினம்

4.Tribal Community/ மலை இனக்குழு

- Toda b) Irulas c) Kotas d) Kurumbas e) Paniyars f) Kattunayakan

அ) ததாடர் ஆ) இருளர் இ) தகாடர் ஈ) குரும்ெர் உ) ெணியர் ஊ) காட்டு நாயக்கன்

Location/ இடம்:

Socio-Economic/ சமுதாய-ப ாருளாதார

- Education /கைவி :

- Literate b) Illiterate

அ) ெடித்தவர் ஆ) ெடிக்காதவர்

If (i) 1-5th ii) >10th (iii) Hsc (vi) Undergraduate

ெடித்தவர் எனின், அ) 1-5வF வலர, ஆ) 10 ம் வகுெ்பு வலர, இ) தமை நிலை வகுெ்பு, ஈ) ெட்ட ெடிெ்பு

- Occupation / தவலை:

- Agriculture b) Daily wages c) Animal husbandry d) Domestic work

Other_____

அ) தவளாண் லம ஆ) தினக்கூலி இ) காண் நலட வளர்ெ்பு ஈ) வீட்டு தவலை உ)மற்றலவ_____

- monthly Income/ மாத வருவாய் :
- No of people in your residence & their age / குடும்ப உறுப்பினர் எண்ணிக்கை & வயது
 - 0-1 b) 2-4 c) more than 5/ அ) 0-1 ஆ) 2-4 இ) 5 க்கு தமை
- Year in which they moved to this settlement _____
இந்த குடியிருப்பிற்கு வந்த ஆண்டு _____
- Any specific settlement pattern followed by the community?
இனக்குழுவின் தனித்தன்மை குடியிருப்பு வகை ஏதும் உண்டா?
- Have the community basic amenities been met? / சமுதாயத்திற்கான அடிப்படைத் தகவல்கள் பூர்த்தி செய்யப்பட்டுள்ளனவா?

Water facility yes no/ குடி தண்ணீர் ஆம்/ இல்லை

Drainage Yes no/ வடிகாணம் வசதி ஆம்/ இல்லை

Electricity Yes no/ மின்சாரம் ஆம்/ இல்லை

- Type of house you reside in/ வாழ்விட வகை:
 - Thatched house b) Pucca house with roof tiles c) Pucca house with Concrete Terrace d) Concrete house with GF, First floor and above e) Traditional house
 - அ) கீற்றுக் பகாட்டலக ஆ) நிலையான ஓட்டு வீடு இ) நிலையான கான் கிரீட் கூலர் வீடு உ) ஒரு மாடிக்கு தமை உள்ள கான் கிரீட் வீடு ஊ) டெம்புக் குடி வீடு
- How old is your house?/ உங்கள் வீடு எத்தனை வருடமாக உள்ளது?
 - 0-10 years b) 11- 20 years c) 21- 50 years d) more than 50 years

அ) 0-10 வருடம் ஆ) 11-20 வருடம் இ) 21-50 ஈ) 50 வருடத்திற்கு தமை

- Mode of transportation / தொக்குவரத் வாகனம்

a) Local transport b) 3 Wheeler c) 2 wheeler d) cycle

அ) பொ஑ெ் தொக்குவரத் ஆ) மூன்று சக்கர வாகனம் இ) இரண் டு சக்கர வாகனம் ஈ) இரு சக்கர மிதிவண் டி

Climatology/ ருவகொல நிலல

- Type of clothing preferred/ விருெ்ெமான உலட வலக

• Cotton b) wool c)Nylon / அ) ெருத்தி ஆ) கம்ெளி இ) பசயற்லக இலழ

- Compared to the previous years (last 10 years) how has climate changed

கடந்த ெத் வருடங் களிண்ெ்ருவ நிலை ெெ்டி மாறி உள்ள஑

Colder Warmer Hot / குளிரச் ெசி மித பவெெம் அதிக பவெெம்

- Most comfortable season of the year? _____

வருடத்திண்ெ்ந்த ெருவ காைத்திண்ெ் இதமாக இருக்கும்?____

Jan Feb. March April May June July Aug. Sep. Oct. Nov. Dec.

ஜன பிெ் மார்ச் ெ்ரெர் தம ஜூன் ஜூலை ஆக பசெ் அக் நவ டிச

- Are there any health or wellness issues that concern you?

(Air quality/ the natural environment)

காற்று மாசெ்ாடு/ இயற்லக சூழைண்ெ் உடை நைக்குலறவு ஏ஑ம் ஏற்ெ்டும் என உங் களுக்கு கவலை ஏ஑ம் உள்ளதா?

- Which part of the day do you feel more comfortable?/ஓரு நாளிண்ெ்

எச்சமயத்திண்ெ் நீங் கள் இதமாக உணர்கிறீரகள்?

Morning Afternoon Evening Night/ காலை,மதியம், மாலை, இரவு

- How comfortable are you inside your house/வீட்டிற்குள் எவ்வளவு பசாளகரியமாக உணர்கிறீர்கள்

1 Very comfortable 2 Comfortable 3 Moderate 4 Not comfortable

- மிக பசாளகரியம் 2. பசாளகரியம் 3. மிதம் 4. பசாளகரியமின்லை

- Do you use artificial heating and ventilation, if so when

பசயற்கயான பவ்வெழுட்டை, காந்தறாட்டம் ஁தயாகிக்கிறீர்களா? ஆம் எனின் ஁பொழுது,

FAN - Jan/஁ன Feb/பின் March/மார்ச் April/ஏன் May/தம்
June/஁ன் July/஁லை Aug/ஆக Sep/பசை Oct/அக Nov/ நவ Dec/டிச

HEATER - Jan/஁ன Feb/பின் March/மார்ச் April/ஏன் May/தம்
June/஁ன் July/஁லை Aug/ஆக Sep/பசை Oct/அக Nov/ நவ Dec/டிச

- Would you like to add in your house for more comfort, / இன்஁ம் வீட்டின் பசாளகரியம் கூட்டிக்பகள்ள விருண்மா?

- Satisfied with present condition b) Comment if any_____

அ) இருண் தொ஁ம்

ஆ) ஏதத஁ம்

பசாண் விருண்மா_____

Construction of Dwellings/ வொழ்விட கட்டுமொனம்

- Has there been any renovation since the construction?/கட்டியதிலிருந் ஏ஁ம் புணர் நிரமாணம் பசய்யெட்டதா?

- Yes b) No அ) ஆம் ஆ)னஇலை

If a) Yes – a) less than 5 year b) 6- 10 years

- What were the traditional practices followed in construction in the community?

இச் சமூகத்தின் கட்டிய கட்டிடங்களின் எவ்வித ஁ாரம்஁ரிய முலறகள் ஁கயா஁ண்டுள்ள?

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