



ITHALAR VILLAGE – A CLIMATE- RESPONSIVE VERNACULAR ARCHITECTURE

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Abstract: Understanding a place's history, origins, way of life, terrain, artistic expressions, and architectural surroundings is crucial to understanding its inhabitants. The culture of a society can be very diverse. Ithalar's traditional architecture has been influenced by the region's topography, climate extremes, and other natural phenomena. In addition, the native architecture complements the surroundings really well. The traditional architecture of the area serves as the cornerstone of its social and cultural framework. It is essential that the integrity of this architecture be preserved. The Badagas are the largest indigenous group in the district of Nilgiri. The Nilgiris were formerly a tribal area. There are about 303 "Hattis" (Badaga villages) in the district. The language of the Badaga people is called "Badugu". The language has no script. It elicits great interest and respect since it portrays the disclosure of the complex realities of the local populace. Traditional architecture used locally available building materials and construction techniques that were more appropriate for the area's temperature and topography in order to create buildings that were as comfortable as possible for inhabitants. If modern construction adopts the old building practices of the past, it can significantly improve future building designs. The research is centred on architecture because it will be utilised in the construction of the new homes. This study looks at the Ithalar region and how the research has affected the design of homes there. The language spoken by the Badaga people is called "Badugu." Language does not use script. Given that it depicts and illuminates the many realities of the local population, it arouses intense curiosity and respect. Using locally accessible building materials and construction methods that were more suited to the climate and geographic characteristics of the area, traditional architecture aimed to create comfortable spaces for people. Future building designs can be greatly enhanced by incorporating the conventional building lessons learned from the experiences of earlier generations. Architecture is emphasized because the research's goal is to create the new house. The Ithalar region is the subject of this research report, which also discusses how the study's findings affected house architecture. In order to learn from the local features, the research focuses on architectural design. The description of Kutch, albeit not comprehensive, aims to convey the essence of this remarkable region of India.

Index Terms - : Climate Responsive Building, Vernacular Architecture, Sustainable Construction, Living Style.

I. INTRODUCTION

The northeastt region of the Nilgiris is known as "Ithalar." It is a source of pride for the locals and delight for visitors due to its rich heritage. The people who live in the southwest of India have created their own vernacular architecture over the years using materials that are readily available to them. These traditional buildings are resilient to weather changes, natural disasters like earthquakes, and have withstood the test of time. In order to create contemporary design, a number of philosophers and notable architects, such as Hassan Fathy, have pushed the fundamental ideas of traditional architecture. Though improbable in the southwest, rapidly expanding concrete jungles have taken the place of traditional buildings. These new structures are neither sustainable nor sensitive to local climate fluctuations or natural disasters. There are two sections that run about horizontally from east to west in the settlement of Ithalar. Zone 1 is the larger of the two, running from the north to the southeast, while zone 2 covers the south-eastern region. The majority of Ithalar's northern region is made up of buildings.



1.1 Ithalar village view

II. CLIMATE AND VEGETATION

Any study of architecture and settlement studies is fascinated by the fact that humans have survived in these harsh climates, even aside from its distinctive and rich cultural legacy. It is one of the coldest locations in Udhagamandalam with a subtropical highland climate that is continually inhabited by people. The summers are considerably hot, with temperatures rising beyond 19°C, which presents fantastic growing conditions for tea plantations. Nonetheless, Ithalar village experiences chilly evenings, with a significant drop in temperature. Almost eight months of the year are spent in the summer. As a result, there are 345 days of sunshine a year with bright skies for most of the months. December is the coldest month of the year, with a recorded low of 15.8°C when winter arrives. It implies that while the days are dull or sunny and the nights are chilly throughout the winter. Rather, the contrast between the tea estate grounds and the lush green forest behind them, interspersed with sporadic residential buildings, highlights the village of Ithalar's varied topography. Architecture records constructed form and spatial organisation, and it examines the evolution, structure, public and private spaces, and the form and spaces of typical houses up to the entire village, including the basic layout of a minor tea storage settlement, before analysing regional indigenous architecture and the Ithalar village. The Western Ghats of Southern India are a charming, serene region of low, rocky hills sprinkled with perpetually damp contours. The central belt is a settlement zone known as "hatti," an arid arrangement of residential dwellings. The southern coastal region features nearly every kind of plant and animal life, abundant water supply, English vegetable plantations, and a significant concentration of eucalyptus trees.



2.1 Tea plantation in contours of Ithalar

In a subtropical climate, a habitat is made up of interwoven open, semi-open, and enclosed spaces that make up the public and private domain. This is known as the "built form" or "built environment." The way of life and the environment are shaped by the social structures, economics, materials, beliefs, and religion of the

local populace. On the other hand, the environment and way of life mirror the social structure, economics, behavior, ingrained customs, and aspirations of the populace. It also has a great deal of stone temples, residences, and public structures that exhibit a level of history comparable to that of before independence British era. The centre, western, and northern sections of Ithalar village include a dense population and long row-style homes with a system of small streets. This ancient community is home to traders, businesspeople, growers of English vegetables and tea. The semi-nomadic and nomadic pastoral communities inhabit the other settlements in the northern and upper regions of Ithalar village.

III. HUMAN SETTLEMENT AND LIFESTYLE

They live in compact little brick structures that are compassionately designed for them. The socioeconomic conditions and restricted supply of building materials in the contour region have caused a shift in the area. Every residence in the village is a row house, on both sides of the street. A house or group can be distinguished by a variety of features, including windows and doors, colours, textures, and architectural features. The row housing layout reduces the exposure of the external wall surfaces to rainfall because the dwellings share a wall. The houses also experiences less chilly airflow, which keeps the interiors comfortable and warm. The intersection of the street width, which is gradually getting narrower, is where the residential districts are situated. Narrow lanes and alleys terminate to form ten or twelve residential units.

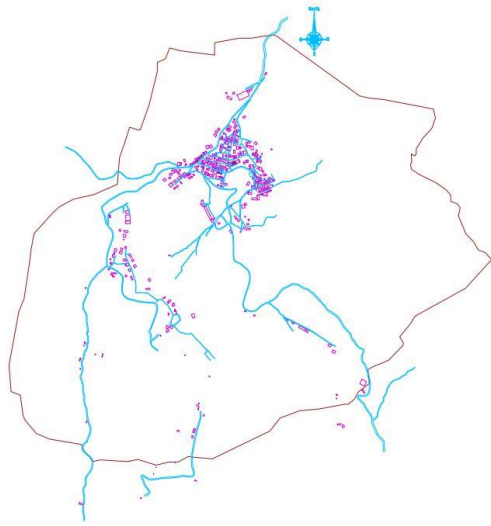


3.1 Residence in Ithaar

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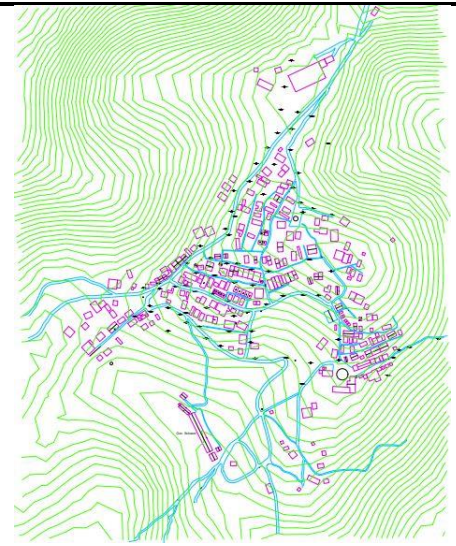
IV. STREETSCAPE

The settlement of Ithalar features a distinctive design on its streetscape. In the middle of the village are a series of steep, narrow steps made of uncut stone. These curved streets that link the settlements make up the entire village. It resembles a smooth water stream line that flows in several directions, with the breadth getting narrower as it passes, creating alleys. The curved streets act as routes for rainwater to flow out of the slopes without collecting, which is a clear benefit of the village's whole street network on a broader scale. By doing this, internal village water contamination is prevented. Every street in the village has a discreet sense of community visibility, which supports the curving street design. It is remarkable that most streets are arranged in a stepped pattern towards low level, following the contour slope, just as the water channel does for the majority of the year. It is an incredibly clever organic model that was constructed like a waterproofing technique to drain the ground all day. Each house is spaced a few feet apart to create the curved roadways. The 8 to 18 foot small streets allow for the circulation of cattle, carts, and pedestrians. The width of the houses' frontages ranges from ten to fifteen feet, and the height of the street facade walls vary according to the number of floors. Because the width of the streets is less than the height of the residences, the curving streets mostly shield the streets from large water accumulations during rainy seasons.



4.1 Ithalar map

map



4.2 Contour

4.1 Curvilinear Street

The main road serves as both the official entrance and the principal street in Ithalar village. One main street has several streets that branch out of it in various directions. As one approaches the core of the hamlet, the streets are increasingly narrow, with beautifully laid stone steps serving as connecting routes on steep inclines. These steps lead to row buildings, each featuring a recurrent main entrance door with two little niches and two tall windows on either side. There are frequent sharp twists in the streets, and because there is a lot of yearly rainfall, most homes have pitched roofs made of terracotta tiles. Despite being in a contour area, Ithalar village's modern architecture, in contrast to neighboring communities, includes flat roof buildings with gutters to divert rainwater from terraces.



4.1.1 Ithalar settlement map

4.2 Building materials and Construction techniques

In the village of Ithalar, architectural typologies have evolved as a result of tradition, climate, and utility. The terrain topography is generally preserved to the greatest extent feasible. Additionally, we like to leave the site land surrounding these water channels unpaved and porous. Locally transported building supplies, such as limestone, wood, bricks, R.R. stone, etc., are used. These homes are primarily formed of cut and fill form due to material and construction process limitations in the contour zone. When combined with mud, lime is used as a binding agent and for plastering. As entrance gates and roofing agents, tin sheets are supplied. Building development in such terrain necessitates extra attention and meticulous planning due to the steep slopes. To make sure the construction is safe and secure, it is crucial to take into account elements like the site's climate, contours, and context. In Ithalar village, wooden rafters, staircases and beams are the primary structural building elements. The ground is levelled and retaining and compound walls are built using R.R. stones. When building an Ithalar town, the cut and fill method is frequently utilized in areas with significant ground level variations, such as when building roads or homes on hillsides. The buildings known as retaining walls are meant to support the hill's incline.

4.3 Shared wall houses

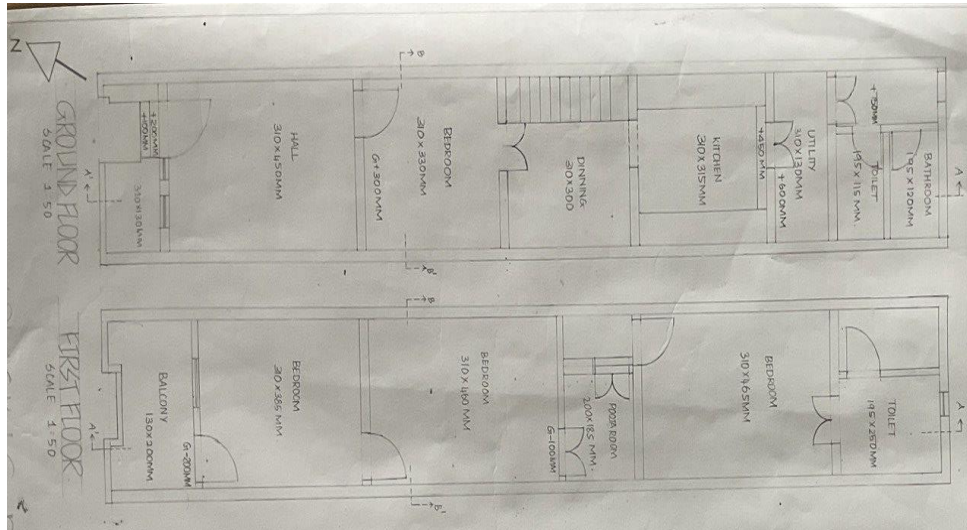
Major houses are built in a common wall-sharing system on the important roads and alleys, while individual buildings with setbacks and compound walls follow main and subsidiary roads. In the early phases of community development, such barricades were done to keep wild creatures like bison, wild boar, leopards, and tigers away from people and buildings. With a common wall sharing methodology that results in both thermal resistance and capacity, the houses would be more energy-efficient. Ithalar village is better insulated because to the shared wall system. To maintain a reasonable temperature in the house, anticipate more economical energy expenditures. Heat is retained by the building envelope's high thermal mass. In buildings where there are significant variations in ground levels, such building roads or homes on hillsides, the cut and fill method is frequently utilised.



4.3.1 Street view

V. RESIDENTIAL BUILDING DOCUMENTATION AND ANALYSIS

Two distinct architectural typologies (building types) have formed in Ithalar village as a result of the region's varying social, economic, and environmental factors. The village's homes were arranged in rows, with each row facing east. The Ithalar village region's "badaga houses" share common features because of the distinct microclimate and cultural beliefs. In the Indian state of Nilgiris, in the village of Ithalar, situated at a very high elevation above sea level, there is a traditional style of building. The common walls (Gode mane) between the homes may have served as a security mechanism. Every home had the exact same layout for the central living/dining room (Nadu mane) and bayilu (entry). The three rooms are called Oge mane (inner room), where cooking is also done (kitchen), Ereh (a separate room next to the bayilu), and Pillay (bathroom), with a big beskatti (basket) over the hearth where drying is done. Naturally, there was an attic above the beskatti, which is a kitchen with a hearth and is accessible through the nadumane. The back backyard door and the main door are usually arranged in a longitudinal configuration. Their spatial alignment creates an invisible passageway that serves as a cross ventilation. The alternating repetition of this creates a portion that gives the curving roadways movement and visual interest. Selecting the appropriate form for the building is crucial to guaranteeing its safety. Depending on the site circumstances and building requirements, a variety of forms can be employed for building on sloping terrain. The roof is a pitched structure composed of terracotta or mangalore tiles, the walls are composed of brick walls with lime plastering, and the plinth and foundation are composed of consolidated soil with R.R. stone. Badaga structure dates back several centuries. This kind of home is suitable for the frequent rainy weather and is highly durable. Its attractive aesthetics and resilience against natural dangers have earned this home the moniker "Architecture without Architects." Typical Badaga houses have the same sizes and plans due to material and construction technique limitations. A typical house plan has a living room, kitchen, bathroom, veranda and backyard. A common area for getting together or hosting family members or guests is the "thinnai," or front yard. Generally speaking, the platform, which is consistently elevated above the ground to a height of several centimetres to one metre, defines the housing unit. This platform is home to a number of buildings with a rectangular layout that range in size from 50 to 60 square metres with a pitched roof that slopes downward.



5.1 Sloped Roof Construction

In these conditions, abrupt fluctuations in roof temperature can also cause dimensional changes in roof materials, a phenomenon known as thermal shock. There are some higher elevations where UV exposure can be more harmful. Controlling condensation can also be difficult since wet air from the room moves to the cooler roof and condenses there. According to conventional wisdom, a pitched roof is ideal for a home located in an area prone to cold weather since it allows rainwater to flow on both sides during the rainy season, minimizing damage to the roof structure. Because of its strength and beauty, terracotta roofing has been widely used for a very long period. It is favored since it is an affordable, widely accessible building material in the area. Because of their greater reaction and tolerance to many of the characteristics of these surroundings, metal sheets have long been regarded the preferred building material in Ithalar village, to be sandwiched between the outer terracotta roof and the internal timber rafters. One of the main reasons people steer clear of metal roofs is that they rust easily, are not waterproof, and make noise when it rains a lot. Rainwater from the slopes is collected in metal gutters that are attached with an eaves board so as not to harm the building's outer walls.



5.1.1 Sloped roof in traditional house

5.2 Wooden Attic Installation

In Ithalar village, a wooden attic is an area on the top floor of a structure enclosed by gable walls, a pitched roof and a thermally insulated ceiling. Although most attics are transformed into bedrooms, a loft opening and ladder are typically used to access storage areas. The attic's temperature is mostly controlled by the outside air and the floors beneath it because it is situated outside of the primary thermal envelope. Because wood is an insulator, wooden attics contribute to temperature management in a home by supplying a big mass of slowly moving air. Attics are notoriously uninviting places because they frequently hold the heated air coming from a building's lower stories. In the winter, it keeps the heat from escaping the house.

For this reason, wooden homes stay warm throughout the winter. As it is customary and still the most effective method of maintaining an attic free of moisture, windows are designed to allow for cross ventilation by outside air. Overall, a wooden attic is a good choice for homes in cold climates because of its insulating qualities, energy efficiency, readily available materials and simplicity of construction, longevity, and cultural value.



5.2.1 Attic



5.2.2 Loft Hatch



5.2.3

Wooden Ladder

5.3 Inbuilt Metal Stove In Kitchen

Generally speaking, using the heat from appliances is an economical design need. Affixed to a kitchen corner that is between 6" and 3' above the floor and has a metal rectangular top. These stoves, like conventional cook stoves, run on solid fuels such as wood, charcoal, cow dung, agricultural waste, etc. to provide heat and meet other energy needs. Due to their open construction, traditional cook stoves typically lose the most heat to the atmosphere, which increases greenhouse gas emissions from both interior and outdoor air pollution. However, the purpose of these built-in metal stoves is to warm the interior while passing smoke through a metal tube that is connected to the kitchen wall and leads to the terrace. This aims to lessen the health risks that come with cooking-related smoke from combustion. This process continues to provide enough heat for the kitchen to operate in the winter. Because common labourers are unable to create these kinds of integrated metal stoves, locally available specialized labourers are used to build or install them with ease. This piece of integrated metal stoves is affordable and has effective inside insulation reactivity, much like metal roof construction.



5.3.1 Inbuilt Metal Stove

VI. CONCLUSION

The socioeconomic structure of Ithalar Village, which is primarily centered on agriculture, cultural identities, and a good climate, is reflected in the village's architecture. Numerous climate-responsive design aspects, such as regulating interior temperature, increasing interior warmth, and offering protection from landslides and earthquakes among other natural calamities, can be found while studying ancient architecture. Traditional housing, however, lacks a number of features that can cause problems like wall dampness and structural collapses during rainy seasons. These features include termite infestation from using untreated materials, a lack of damp proofing, and the use of unstabilized soil for construction. Once the building and design community is aware of the advantages and disadvantages of the old typologies, it will be possible to effectively produce the modern yet sustainable architecture found in Ithalar Village. Modern construction technologies can be properly blended with conventional ones to enhance benefits and minimize downsides. Given the numerous advantages of traditional housing that can be found throughout Nilgiris state, the government ought to draft local rules that encourage the traditional homes of Ithalar village and offer incentives to the residents.

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