Sustainable Living through Traditional Settlements: Exploring Indigenous Knowledge and Practices in Tamil Nadu's Agraharam Houses

Rajakumari Muthusamy [1], Banu Chitra[2], Anurag Bagade [3], Bhargav Teja[4]

1,3,4 -Department of Planning, School of Planning and Architecture, Vijayawada
2 - Department of Architecture, School of Planning and Architecture, Vijayawada

ABSTRACT

Traditional settlements serve as repositories of indigenous knowledge, embodying sustainable practices that have evolved through a deep understanding of local environments, cultural values, and social structures. They are often shaped in the way that it reflects the needs and the aspirations of the society. Such settlements have been shaped over a period of time by employing the wisdom, knowledge, and practices handed down from generation to generation. This paper examines the linear settlement pattern of Agraharam houses in Kumbakonam and Tiruvalluvar districts of Tamil Nadu as a case study to explore how traditional Indian settlement patterns promote sustainable living. These settlements characterized by climate-responsive architecture, shared open spaces, and locally sourced materials, reflect a harmonious relationship between built form, community life, and the natural environment. The study adopts a phenomenological research approach, combining architectural analysis, ethnographic insights, and sustainability frameworks to evaluate the relevance of Agraharam practices in the contemporary context. By documenting and analyzing the spatial configuration, morphology and everyday practices of Agraharam communities, the paper underscores the need to integrate traditional wisdom into present-day planning and design paradigms. Findings highlight how these settlements inherently support the goals of environmental sustainability, social cohesion, and economic resilience—resonating strongly with several United Nations Sustainable Development Goals (SDGs), notably SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action)

KEYWORDS: Indigenous Knowledge, Agraharam Architecture, Sustainable Settlements, Phenomenological Analysis

1. Introduction

One of the defining features of traditional settlements is their [DM1] built heritage together with their spatial organisation, which serves as a tangible representation of the community's identity and values. Every structure within these settlements tells a story, reflecting the unique

cultural ethos, customs, and way of life of its inhabitants. From the spatial planning of the village to the architectural style of the building, each element is carefully selected to harmonize with the natural surroundings and fulfil the diverse needs of the community. Furthermore, the spatial organization of traditional houses is not merely functional but deeply symbolic, reflecting the intricate social dynamics and cultural practices of the society. The traditional knowledge system and the indigenous practices that have come out of the knowledge fits in their living and accounts for the sustainability. Such knowledge systems have addressed the environmental sustenance to various aspects in physical planning, spatial organisation, maintaining vegetation, irrigational practices and so on. Houses are designed to accommodate not only the physical needs of the occupants but also their social interactions and cultural rituals. The layout of spaces within these houses often mirrors traditional lifestyles, fostering a sense of belonging and community cohesion. In essence, traditional settlements are more than just clusters of buildings; they are living repositories of cultural heritage and communal identity. By studying and preserving these settlements, we gain valuable insights into the ingenuity, resilience, and sustainability practices of past societies, offering valuable lessons for building more harmonious and sustainable communities in the future. Tamil Nadu, situated in the southern part of the Indian peninsula, is renowned for its rich cultural heritage, vibrant art, and magnificent architecture. The region's vernacular settlements serve as a testament to the ingenuity and creativity of its people, reflecting the cultural ethos and values ingrained in Tamil society. The rivers of Tamil Nadu played a pivotal role in shaping the region's civilization. Villages flourished along the banks of major perennial rivers, benefiting from fertile soil and abundant water resources. In areas where major rivers were scarce, innovative irrigation systems, including canals and lakes, were devised to support agricultural activities and sustain livelihoods. Overall, Tamil Nadu's history is intricately intertwined with its natural landscape and ecological diversity. The region's eco-based habitations, river-based civilizations, and innovative agricultural practices highlight the symbiotic relationship between humans and the environment. Through centuries of cultural evolution and adaptation, Tamil Nadu continues to cherish its heritage while embracing modernity, ensuring a vibrant and dynamic future for generations to come. During the medieval period in Tamil Nadu, temple-centric urbanism and development emerged as prominent features of the socio-cultural landscape. This era, particularly under the Pallava kingdom's reign, witnessed a significant influx of Vedic scholars from northern regions, settling in the southern part of the peninsula. The ruling monarchy facilitated this migration by granting land to these scholars, leading to the establishment of settlements known as Brahmadeyam, which eventually evolved into the present-day Agraharams. The word 'Agraharam' finds its etymological roots in Sanskrit, where 'Agra' means foremost and 'Haram' denotes a garland. This metaphorically suggests a garland of houses built in reverence around a temple, which acts as the epicentre of socio-religious life. Also, they were designed as cohesive communities with close proximity to temples and temple-related activities. The layout of these settlements revolved around the temple, serving as focal points for religious and social life. The presence of Brahmadeyams or Agraharams facilitated the integration of Vedic scholars into the local society while fostering a strong sense of community and cultural identity. Furthermore, temple-centric development contributed to the growth of urban centres around these religious institutions. Temples served not only as places of worship but also as centres of economic, social, and political activities. The patronage

extended by the ruling monarchies towards temple construction and maintenance further bolstered the influence of temples in shaping the urban landscape.

2. Literature Review
2.1 Vernacular settlements- Approaches in the study of Traditional Settlements

The study of vernacular settlements encompasses a multifaceted approach, exploring their physical, functional, social, and cultural dimensions. (Rapoport 1969) (Oliver 1997) Scholars and researchers employ diverse methodologies to delve into the intricacies of these settlements, recognizing their significance as living environments shaped by human interaction and adaptation over time. One prominent aspect of studying vernacular settlements involves examining their spatial formation, which entails analysing how the physical layout and arrangement of structures contribute to the overall organization and functionality of the settlement. (Rybczynski 2003). This includes investigating factors such as building placement, street patterns, and the use of space for various activities, all of which reflect the needs, values, and social dynamics of the community. Numerous scholars have delved into the study and analysis of vernacular settlements in various housing, physical planning, socio-cultural, ethnographic aspects. (Alexander 2018.) (Oliver 1997) (Rapoport 1969) Scholars such as Alexander, Rapoport and Oliver have emphasized the cultural significance and environmental considerations of such settlements [DM2].

The medieval period in Tamil Nadu was characterized by the symbiotic relationship between temple-centric urbanism, Brahmadeyam or Agraharam, and the socio-cultural fabric of the region. This temple-centric development not only promoted religious practices but also played a vital role in fostering communal harmony, cultural exchange, and urban growth. Pallasmaa (2005) suggests that the physical, sensual, and embodied aspects of traditional living spaces, significantly enhance a sense of belonging through their experiential qualities and cultural associations. Agraharams are exclusively Brahmin neighbourhoods, characterized by their unique architectural design that fosters inward-focused environments. Phenomenological approach of the physical, sensual and embodied aspects of living spaces could be well perceived in these Agraharam neighbourhoods. These traditional houses are typically arranged in a linear format, with a central courtyard that serves as the heart of the home, reflecting the community's way of life and cultural practices. Teston (2020) emphasizes that the concept of interiority, which refers to the inward feeling and phenomenological perception of space, is essential because architecture is inherently created and experienced by humans. The Agraharam houses, passed down through generations, accumulate layers of memories and experiences, thereby enriching the community's character and reinforcing cultural continuity. Tuan (1975) posits that places are centres of meaning constructed by experience. In Tamil Nadu's temple towns, the distinctiveness of Agraharam houses, along with the streets and temples, mirrors the community's identity and religious practices. This distinctiveness creates a strong sense of place and belonging, as the built environment reflects the collective experiences and traditions of the community. The Agraharam houses, with their inward-focused design and cultural significance, thus provide a profound sense of interiority and continuity within the community, highlighting the intimate connection between space, experience, and cultural identity. Moreover, scholars have developed numerous theories to elucidate the spatial organization of vernacular settlements. (Desai 2016) (Jon Lang 1997)

(Dayaratne 2018) (Oliver 1997) (Rapoport 1969) These theories offer insights into the underlying principles and patterns that govern the layout and structure of these settlements, shedding light on the factors influencing their development and evolution over time. By studying the spatial formation of vernacular settlements, researchers gain a deeper understanding of how human societies interact with their built environment and how cultural norms and practices manifest in the physical realm. Additionally, some approaches to studying vernacular settlements focus on understanding them as lived spaces, emphasizing the experiential aspect of inhabiting and navigating these environments. (A. Krishna Shankar 2018,) This perspective considers the subjective experiences and perceptions of individuals within the settlement, examining how daily activities, social interactions, and cultural practices shape the built environment and vice versa. By adopting this lived-space approach, researchers aim to capture the nuanced ways in which people interact with and imbue meaning into their surroundings, enriching our understanding of vernacular settlements as vibrant, dynamic spaces of human habitation. Scholars have also made intense study on the inter connectedness of the natural and man-made world.

2.2. Traditional Communities and Vernacular settlements

From history, the ancient Tamils exhibited a remarkable astuteness in understanding the intricate relationship between human settlements and their surrounding environment. Their approach to selecting settlement locations was meticulous, considering factors such as topography, natural resources, and climatic conditions to ensure optimal suitability and resilience over time. (Ganesh 2009) Sangam period speaks of understanding of the environments through their unique habitats. (Karashima 2019) Bhakti period saw the emergence of religious centric development in Tamilnadu. (Champakalakshmi 1999.) Structural temples were constructed and more elaborate rituals were performed. Priesthood neighbourhoods or the Brahmadeyam emerged as a typical residential settlement that adheres to the Vedic values of life. Embedded within the fabric of daily life were Vedic traditions, which permeated every aspect of existence in ancient India. (Bharne 2014) These traditions, deeply rooted in reverence for nature, guided individuals in practices such as sacred bathing rituals, cooking methods that respected the elements, and nurturing plants with a sense of reverence. (Bharne 2014) (Pandya 2014.) (Jan March 1980) This holistic and sympathetic approach to nature reflected an ethos that viewed the environment not merely as a backdrop to human existence, but as a living entity deserving of respect, care, and harmonious coexistence. There were numerous treatises and texts emerged in the field of architecture and planning such as vasthu sastra, manasara, Mayamatham, samarangasuthradhara, offering comprehensive insights into various facets of environmental harmony and sustainable living. These sacred texts provided detailed guidelines on site planning, soil types, vegetation, and construction techniques (Sthapati 2001) (Acharya 1998.) (Bruno 2007) (Shukla 1995). The wisdom encapsulated within these texts underscored principles of symmetry, proportion, and orientation, aiming to optimize energy flow and promote the well-being of inhabitants while seamlessly integrating built environments with the natural landscape.

The indigenous settlements had the profound significance accorded to water bodies, which were revered not only for their practical utility but also for their spiritual and symbolic resonance. Water bodies were celebrated as sacred sources of life and fertility, embodying the

nourishing and purifying qualities essential for sustaining both human settlements and the surrounding ecosystem. (Pandya 2014.) Ancient texts and scriptures often extolled the virtues of dwelling near water bodies, recognizing their vital role in fostering biodiversity, supporting agriculture, and nurturing community life. The ancient Tamils and the broader Indian civilization exemplified a holistic understanding of habitation and environment, blending spiritual wisdom with practical knowledge to create sustainable living environments that honoured the sanctity of nature. This profound reverence for the natural world continues to resonate in contemporary approaches to environmental sustainability and habitat design, serving as a timeless source of inspiration and guidance in navigating the complex interplay between human society and the environment.

3. Materials and Methods
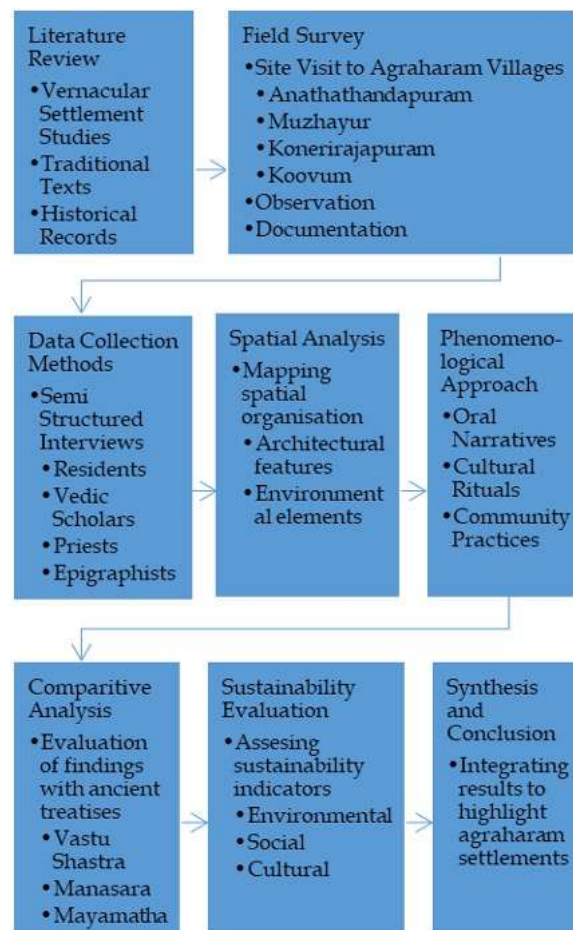
This study adopts a phenomenological research approach to investigate the functional, social, cultural, architectural, and environmental values embedded within the Agraharam settlements of Tamil Nadu. Phenomenology, as a qualitative method, centers on the lived experiences and embodied interactions of individuals with their spatial environment. It is particularly well-suited for exploring traditional vernacular settlements, where the built environment is not merely a physical construct but a manifestation of deep-rooted social, ritualistic, and environmental relationships. The Agraharam, typically a linear arrangement of dwellings aligned along a temple-centered axis, offers a unique case to understand how spatial form, cultural practices, and environmental sensibilities intersect to shape sustainable community

life. Through immersion in these settlements, the research captures the multisensory, symbolic, and experiential qualities of space. The built form of the Agraharam is not static; it is continually activated through social interactions, religious rituals, and seasonal cycles. Elements such as thresholds, courtyards, streets, and temple vistas acquire meaning through daily use, becoming zones of memory, ritual, and social cohesion. The study records oral narratives from elderly residents, priests, and scholars, emphasizing how intangible heritage—myths, stories, and local cosmologies—inform spatial organization and environmental ethics.

Phenomenology allows these narratives and experiences to guide the research, enabling insights that conventional architectural or planning methods might overlook. From the very orientation of houses, integration of sacred groves, placement of water bodies to the use of locally sourced materials, design choices were the outcomes or expressions of ecological wisdom and cosmological order. Rivers, tanks, and trees are understood not merely as environmental features but as sacred entities woven into the ritual geography of the village. These elements reflect a vernacular logic of site selection, environmental adaptation, and sustainable resource management that aligns with the principles of ecological planning and climate resilience.

The research method includes participant observation, documentation of houses, mapping the spatial organization and semi-structured interviews with key knowledge holders. Extended fieldwork allowed for the observation of spatial rhythms and across seasons. These observations revealed how spatial use is shaped by different user groups and ecological cycles, offering a nuanced understanding of lived space. The phenomenological lens also acknowledges the agency of space and nature, treating them as active participants in shaping human experience and cultural continuity.

This study ultimately argues that Agraharam settlements exemplify a form of sustainable living deeply intertwined with indigenous knowledge systems. By focusing on the lived, felt, and sacred dimensions of space, phenomenology offers a pathway to recover traditional planning wisdom that remains highly relevant to contemporary sustainability discourse. The research thus contributes to the growing body of work advocating for culturally sensitive and ecologically attuned planning approaches. It highlights the potential of phenomenological inquiry not only as a methodological tool but as a philosophical stance—one that values place, memory, and human-environment relationships as foundational elements of resilient settlement design.

The study employs primarily qualitative methods through survey, interview, interactive sessions for shaping the research inquest. It is done through the following methods

a.   By going through the sacred texts on architecture and town planning namely Manasara, Mayamatham, Vastu Sastra and Samaranga Sutradara. This is essentially for the understanding the application of these treatsies in the physical planning of the present settlements

b.   Examining the theoretical texts on vernacular architecture and regional classics on folklore traditions. Some archival texts on the history and development of Agraharam houses were also done. Texts on History of early South India is done. References were taken from inscriptional records through the guidance of epigraphists

c.   By examining the folklore narratives

d.   By examining the narratives on oral traditions

During the stay the researcher has interviewed and made observations with the residents,

interacted with few Vedic scholars, history teachers (Koovum, Thiruvallur) who were aware of the historical evolution of the village and the priests. The researcher has made observational study on the inscriptional records found in the village with the help of Sanskit Scholars and epigraphists (Koovum, Thiruvallur). Inferences were further generated from the lived experiences in those villages. The researcher has done extensive study in various type villages of Tamilnadu which are coastal, weaving, tribal and priesthood villages for the purpose of her research and academic purposes. For the purpose of this paper four important Agraharam and temple centric villages are identified, studied and analysed. The selection is based on the geographical features, regional importance, significance of river-based development, older temple and so on. Villages in Kumbakonam namely Anathathandapuram, Muzhayur and Konerirajapuram - These three villages are part of the 18 Vathima Villages of Kumbakonam. The Vathima Villages are essentially the agraharam villages that are dotted around the Cauvery delta region- very rich and fertile with temple centric development. The settlements are linear with wall-to-wall construction and the physical planning of the village strictly adheres to the vastu shastra. There were numerous grants for the temple and its associated activities.These villages have inscriptional records from the Chola period. this zone is also called as the Rice Bowl of Tamilnadu owing to its contribution in agricultural produce.

· 	Koovum Village, Thiruvallur- One of the medieval villages during the Chola period. From the location of the Shiva temple, to the location of the waterbodies, to the location of open spaces and the burial ground, the adherence to the Sastric texts could be easily established. This zone is also called as the Second Rice Bowl of Tamilnadu owing to its contribution in agricultural produce.

4. Results

Agraharams of Tamil Nadu, demonstrate a deeply rooted understanding of spatial organization based on cosmological, environmental, and social principles articulated in ancient Shastric texts such as Vaastu Shastra, Manasara, and Mayamatham. From the studies of the four villages, it is been observed that the spatial layout was thoughtfully planned, with houses arranged in linear rows along a central street leading to the temple—the focal point of the settlement. This central axis not only provided a physical orientation but also symbolized a spiritual journey from the mundane to the sacred. Within each dwelling, a clear progression from public to private space was observed—beginning at the entrance hall (thinnai), leading to the inner courtyard (mutram), and ending in service zones like kitchens and backyard gardens. This hierarchy promoted social cohesion while ensuring personal privacy and domestic functionality, forming a spatial grammar that governed everything from the placement of shrines to the direction of cremation grounds.

Water, regarded as sacred and purifying in Vedic philosophy, played an integral role in shaping both the settlement's structure and the daily routines of its inhabitants. Temple tanks, wells, and ponds were not merely utilitarian features but spiritually significant elements aligned to cosmic directions—often situated in the northeast to receive maximum solar and lunar influence. These water bodies were used for ritual bathing, domestic chores, and temple festivities such as float festivals (teppotsavam), forming a rhythmic link between human activity and natural cycles. At the household level, water from backyard wells supported daily ablutions and cooking needs, while kitchen gardens, nourished by greywater, ensured self-

sufficiency. Species like Tulsi, Neem, Banana, Curry leaf, and Canna indica were commonly cultivated—not only for their spiritual or medicinal value but also for practical roles like air purification and wastewater treatment. The presence of Canna indica near water outlets exemplifies the traditional ecological wisdom in recycling greywater, maintaining hygiene, and enhancing the microclimate.

The regular routines of these communities were closely tied to their spatial and environmental settings. Morning rituals often began with a dip in the tank or a bath using well water, followed by offerings in the courtyard or temple. Women engaged in cooking using herbs from the backyard, while children studied or played in the open thinnai. Communal life unfolded around the central street and temple precincts, which acted as social theaters during festivals, processions, and village gatherings. The layout also supported agricultural and religious calendars—seasonal planting, harvest rituals, and temple celebrations were all synchronized with cosmic patterns and local ecology. In this way, spatial organization, water infrastructure, and sacred ecology were not isolated components but formed an interdependent system that sustained daily life, reinforced cultural values, and cultivated a resilient, self-sufficient community.

4.1. Formation of Agraharam through its historical lens

The Sangam period classified habitats into five ecological zones called ainthu tinai: kurunji (mountains), mullai (forests), marutham (agricultural lands), neithal (coastal areas), and paalai (wastelands), each with distinct features in terrain, leadership, deities, flora, fauna, and occupation (Karashima 2019; Ganesh 2009; Champakalakshmi 1999). Among these, marutham and neithal regions gradually evolved into urban centers due to their favorable conditions for settlement and trade.In the post-Sangam era, marutham landscapes became hubs of urban development, marked by organized land division, strong administration, and advanced irrigation (Karashima 2019). With the rise of the Bhakti movement, temples emerged as central institutions. Structural temples led to the formation of Brahmadeyams—land granted to priestly communities proficient in Sanskrit, Vedic rituals, and temple management (Bharne 2014). These neighborhoods became integral to the urban fabric, with livelihoods centered around temple functions.

Temple-centric urbanization shaped the region's social and economic landscape. Regardless of size, settlements revolved around temples as their spiritual and administrative core. The proliferation of Agraharams—Brahmin settlements—defined Tamil Nadu's cultural geography during this period. Royal patronage from dynasties like the Chalukyas, Pallavas, Cholas, and Pandyas led to land grants supporting temples and priestly needs, prompting agricultural expansion through forest clearing. Vedic scholars from these settlements played key roles in local governance, reinforcing the Agraharam as a living center of tradition, knowledge, and administrative authority.

4.2 Principles of the spatial organization in the Agraharam Houses and its adherence to Sastric texts

The spatial organization within the Agraharam reflects socio-cultural values. (Sadanand 2020.) (A. KrishnaShankar 2018) The layout includes a clear distinction between communal and private spaces. Communal areas, such as the main street and spaces surrounding the temple, are venues for public interaction, celebrations, and festivals, reinforcing social cohesion and a shared cultural heritage. In contrast, the internal courtyards within homes provide private,

intimate spaces for family life and domestic activities, emphasizing the importance of family and privacy within the broader community framework. The spatial organization of the Agraharams adheres closely to the principles outlined in the shastric texts. There are numerous treatises such as Manasara, Mayamatham, Vastu Shilpa Sastra and others that speaks of architecture and town planning. These ancient treatises provide guidelines for the planning and construction of buildings, ensuring they align with the cosmic and natural principles.

The Agraharam houses often followed a linear pattern of houses that had wall- to – wall construction. (Miller 2001) (Jeyaraj 2021) Most of the houses will have one or more inner courtyards. This inner courtyard forms the bindu or the inner core. From the planning of the House to the planning of the town or village, there is a grammar that guides the physical planning – the Vaastu sastra. Vaastu Sastra is basically the science of architecture that describes the principles of design, site analysis, layout, measurements, spatial organization and so on. Most of these texts mention on the basic generator of the form namely the mandala. Mandala is the generator of the grid. Ancient town planning practices are based on the grid planning. As mentioned earlier, Agraharam houses follow a linear grid pattern. The streets are aligned to the cardinal directions. The location of the major shrines, location of the temple tanks, location of the guarding deities, location of the cremation Grounds are planned in a such a way it adheres to the guidelines given in the sacred texts. Not only the physical location of the builtform, but also the functioning of the spaces is also through the Sastric texts. The location of the temple is in such a way that it occupies a prominent position. (Singal 2022.) (Sadanand 2020.) The temple is approached by the sannidhi streets. There are circumambulatory streets surrounding the temple. The moving deity comes out of the temple on auspicious days and goes around in circumambulatory movement. The spatial organization shows a distinct hierarchy in terms of the built form, open spaces and the path system.
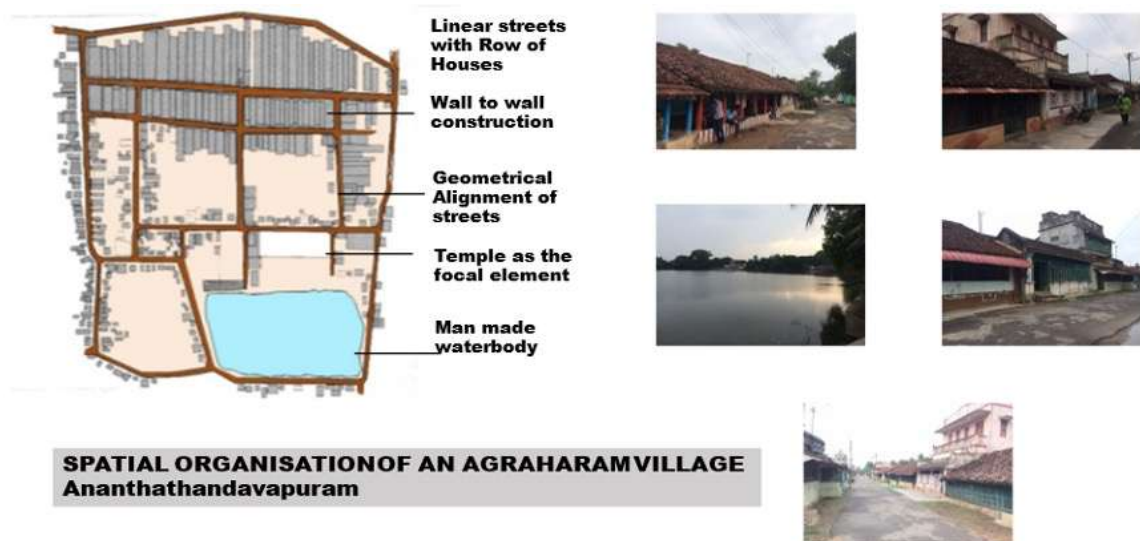

Figure 2

Table 1

Principles of the spatial organization and its adherence to Sastric texts

Principles of the spatial organization and its adherence to Sastric texts
The spatial organisation of Agraharam is deeply rooted in traditional principles and adherence to Sastric texts, which includes ancient scriptures and treatises that provide guidelines on various aspects of life. The key principles of spatial organisation, as mentioned in these texts, focus on harmony, balance and alignment with

cosmic and natural forces		
Principles	**Application**	**Description**
Principles of Vastu Shastra	Grid layout Orientation	Vastu Shastra emphasizes the use of a square or a rectangular grid- the basic mandala. This grid becomes the generator of the form Buildings and streets are alignied with the basic cardinal directions to harness the positive harmony with natural elements
Zoning and Spatial hierarchy	Sacred zones Profane zones	Places that are considered very sacred such as the temple or the sacred water bodies are placed in the central or the North- Eastern part of the settlement Housing zones reflect the social hierarchy and the community structure.
Proportions and symmetry	Harmonic Proportions Symmetry	The physical planning of all the spaces – from village to the planning of houses are designed according to specific mathematical ratios that are believed to bring balance and harmony
Symbolism and sacred geometry	Symbolic elements Sacred Geometry	The use of sacred geometry in the layout and design of building and settlements incorporates symbolic elements that respect various deities and cosmic principles
Cosmic Alignment	Directional Alignment Astrological considerations	Spaces are aligned with cardinal directions which in turn with the celestial bodies, which is believed to bring cosmic harmony and positive energy for the inmates of the settlement The timing and placement is often determined by astrological factors All the construction process involves rituals and ceremonies as per the Sastric traditions

Table 2 Vatima Village Spatial Arrangement, Satellite and Street View

Name and Layout	Google earth	Street view
 1. Mudikondan		
 2. Arasavanagadu		
 3. Thippirajapuram		

 4. Vishnupuram		
 5. Manthai		
 6. Ananthathandavapuram		
 7. Konerirajapuram		

Table 3 Village Characteristics

Sr	Name of the Vathima	Spatial Organisation	Street characters	Housing typology	Water bodies	Festive events	Genius Loci
1	Mudikondan	Main village has a grid layout with geometrically aligned streets along cardinal directions. Temple occupies a prominent position in the layout. Guarding deities are located at the outskirts of	Two major Agraharam streets with intercepting smaller lane s	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs	Annual temple festival at the kothanda ramat temple	

		the village					
2	Arasavanagadu	Main village has a grid layout with geometrically aligned streets along cardinal directions. Temple occupies a prominent position in the layout. One of the anthana villages formed by the cholas	One major Agraharam street	Wall to wall tube houses in the main Agraharam street	Man-made water bodies to address the physical, functional, cultural and metaphysical needs		Arasavanangadu Kailasanathar Temple
3	Thippiraja-puram	A square layout with geometrical grid. Temple occupies a predominant position. Distinct cluster around the siva temple and a concentric cluster around the varadharaja swamy temple	Grid aligning to cardinal directions as mentioned in the sacred treatises	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs	The panchamoorthy procession involves the village residents carrying the lord on their shoulders through the four Agraharam streets.	Vikrama Choleeswarar Temple
4	Vishnupram	One linear settlement of Agraharam houses	Linear pattern similar to dandaka type	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs		Kailasanathar Temple

5	Manthai	Two major agraharm streets at right angles forming the layout	Rectilinear pattern	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs		
6	Ananthath-andavapuram	Two major streets - rettai theru that has houses on both sides and othai theru with one side	Rectinear pattern similar to the dandaka type of plan	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs		Panchava diswarar Temple
7	Koneriraja-puram	A bigger layout in terms of size with four major Agraharam streets	Grid pattern with wider streets aligning with cardinal directions	Wall to wall tube houses in the main Agraharam streets	Man-made water bodies to address the physical, functional, cultural and metaphysical needs	Vaikasi brahmm otsavam	Uma Maheswarar Temple

Scientific notions behind the planning of Agraharam houses

The planning of Agraharam houses in Tamil Nadu is deeply rooted in a scientific worldview embedded within traditional Indian knowledge systems, particularly Vastu Shastra, Manasara, and Mayamatam. These settlements are typically laid out with houses aligned along cardinal directions, forming a linear or looped street with the temple as the focal point. This orientation is not merely symbolic; it ensures optimal daylighting and cross-ventilation, making the homes

thermally comfortable without mechanical interventions. Thick lime-plastered walls, internal courtyards, narrow shaded streets, and sloping tiled roofs provide effective protection from the tropical sun and monsoon rains. The underlying planning principles reflect a sophisticated understanding of local climate, solar movement, and hydrology. Temples are centrally placed, with tanks nearby, promoting water conservation and ritual purity. Thus, the Agraharam is conceived not only as a social space but also as a climate-responsive, energy-efficient, and ecologically integrated unit of settlement.

The Agraharam houses exhibit a subtle hierarchy and zoning that balances sacred, social, and private needs. As one moves from the temple towards the residences, there is a transition from public to private domains, echoed within the homes themselves, where spaces like the thinnai (verandah) enable public interaction, while the mutram (courtyard) and kitchen are reserved for internal family life. The use of spatial geometry, human-scaled proportions, and symmetrical arrangements of rooms aligns with Vastu principles and creates psychologically harmonious spaces. These built forms are not arbitrary but derive from modular measurements and ratios that relate to the body, ritual practice, and cosmic principles. The acoustics of the street, enhanced by the linear arrangement of built forms, reinforce a collective temporal rhythm through the sounds of bells, chants, and conversations. This fosters a deep sense of community identity and shared daily rituals, underscoring the science of spatial memory and human experience embedded in the architecture. Additionally, the Agraharam is a demonstration of resilient and sustainable design. Materials such as locally sourced timber, terracotta tiles, and lime mortar are used for their breathable, adaptive qualities. Raised plinths prevent flooding, while overhanging roofs and ventilated attics moderate internal temperatures. These features reflect centuries of empirical observation and optimization. Beyond construction techniques, the planning also accommodates social functions like festivals, oral traditions, and intergenerational living. Women's roles are centered around domestic spaces that are both productive and expressive, while elders and priests inhabit liminal spaces like the thresholds and temples, maintaining a balance of sacred and secular life. The Agraharam thus stands as a living laboratory of environmental wisdom, architectural intelligence, and sociocultural continuity. Its scientific logic, though not encoded in modern engineering terms, is no less rigorous in its grounding in observation, proportion, and empirical adaptation to people and place.

4.3 Water and its significance

Water holds profound metaphysical significance in Vedic philosophy, representing the absolute due to its intrinsic properties—it is adaptable, taking any form, and it pervades everything. This metaphysical essence is mirrored in various daily rituals, especially those of householders who are obligated to bathe multiple times a day as part of their Vedic rituals. The day often begins with a holy dip in water accompanied by specific rituals, underscoring water's sanctity in daily life.

Water bodies are not only central to individual rituals but also serve as focal points for communal and celestial events. Annual temple floats are common in the shrines of Tamil Nadu, highlighting the ritual importance of sacred water bodies in placemaking along waterfronts. These waterfronts often become vital public spaces where significant life events, both individual and communal, take place. Access to these sacred waters is provided by ghats,

known locally as "padithurai," which are flights of steps leading to the water. These ghats are frequently equipped with platforms, pavilions, or smaller shrines, serving various functions from ceremonial purposes during festivals to routine rituals on ordinary days. Bathing ghats are also common features.

Table 4

Water and its significance in the Agraharam Settlement		
Water bodies hold significant socio- cultural, religious and functional importance in Agraharam settlements. Their role are intertwined with the daily lives, spiritual practices and environmental sustainability o these communities		
Significance of Water as an element	**Narration**	**Activities Involved**
Religious significance	Water is one of element. The concept of Sthala(place), Murthy(deity), Theertham(water) and Vriksham is significant with the temples where Theertham becomes an integral part of the pilgrimage	Holy dip of the pilgrims, visitors and inmates. This ritualistic purification is believed to cleanse sins and impurities.
Cultural Significance	Many temples that has temple tanks will conduct the float festival. There are water pavillions in the temple tanks that gets consecrated through the set of water-based rituals	Float festivals are conducted annually in the temple In some temples, the deities are also involved in water-based rituals. Madurai Kalalagar is an example of this phenomenon
Metaphysical Significance / Spiritual Meaning	From the Birth to the Final rites, water has inbound connections in a Hindu life. Water witnesses all the sacred happenings in one's life. The purity is done through the water at all levels of life	A holy dip in the water body is considered very sacred. If not a complete Dip, good amount of ablutions are so very meaningful The water body is often considered as the representation of the cosmic ocean and is linked the divine
Normal Usage	Many temple tanks or the man-made water bodies are used for the regular usage for the society	From fetching of water for household and domestic purposes to the holy dip everyday , the waterbodies are the part of the integral society in an Agraharam They also serve as important community gathering spots where people meet, socialise and engage in communal activities
Significance in terms of its environmental sustenance	The man-made water bodies often serve as rainwater harvesting structures, collecting and storing rainwater for use during dry periods. It also contributes to the recharge of the ground water levels. It helps to regulate the local microclimate by	The community is in -charge of maintaining the waterbody. This has been in practice for many centuries. There are lot of Inscriptional records that states the maintance of the water bodies and the role of administration in maintaining

mitigating temperature extremes, cooling the surrounding areas during hot weather	
	631

Figure 3

Figure 4

Figure 5

Figure 6

4.4 Nature and its significance

In Hindu mythology, every aspect of nature is regarded as sacred, with Vedic traditions placing immense respect and importance on forests, groves, gardens, rivers, water bodies, plants, seeds, living organisms, mountains, and places. The rituals followed in these traditions are imbued with symbolic, metaphysical, and scientific meanings. This reverence for nature is evident from the micro level of individual homes to the macro level of town planning. The physical planning of the Agraharam incorporates metaphysical interpretations of spaces, ensuring a harmonious response to nature. At the household level, this is often exemplified by the presence of a courtyard with a sacred tulsi plant in the center, which holds great spiritual significance. At the village level, the focus shifts to temple gardens or sacred groves, which are central to community life and often associated with various festive events. Nature is not just preserved but also worshipped at every level. Temple gardens, for instance, serve as places for ritualistic practices and festivals. The worship of serpents and the associated rituals are particularly common, reflecting the deep connection between nature and spirituality in Hindu traditions.

Table 5

Nature and its significance in the Agraharam Settlement		
Significance /Meaning of Nature	**Description of the Events**	**Activities Involved**
Cultural and Spiritual Connection	The integration of sacred plants and natural elements in religious and cultural practices	Rituals associated with worshipping sacred grooves
Worship of sacred Trees	At the level of the residence to the level of town, the trees are considered very sacred. They are worshipped for its association with various deities	The rituals involve offering water, flowers and prayers. Temple trees are circumambulated and are offered lamps, flowers and are tied threads during certain festivals
Regular / Household practices	Agraharam settlements are known for the Vedic Practices. From worshiping of cows to feeding of Crows, everything is considered sacred and spiritual	Wetting the floor and front yard before putting kolam , making Kolam with rice Flour for the ants to feed in, Worshipping Cows, worshipping ant hills, worshipping the sacred Mounds, feeding the cows before eating
Social and Cultural connotations	There are significant amount of events and rituals that are associated with the equinoxes	Holy Dip in the water body, Holy Dip using certain leaves-For instance the festival Ratha Sapthami marks the change in the solar direction, it involves bathing or Arghya Pradana with *Calotropis Gigantea*
Rituals and festivals	There are harvest festivals such as Pongal and Shankranthi, where the festivals are celebrated to thank the Sun God	Involves cooking rice from the new harvest and offering it to the Sun
Metaphysical Interpretations	Nature and its elements are considered very sacred. The entire Hindu philosophy is on the Pancha Boodas or the Five great elements namely Earth, Water, Fire, Air and Space. These elements have different characteristics and these also account for different faculties of human experience	Most of the Festivals celebrate nature. For Instance, Pongal, the Harvest festival celebrates Sun. Some may not directly celebrate but there are good amount of activities like pouring milk in the anthill, keeping vermilion in the trees, offering copper coins in the waterbodies are some of the activities that shows the respect for nature

Conclusions

The planning of Agraharams, traditional South Indian Brahmin settlements, is deeply rooted in cosmic principles, religious beliefs, and practical necessities, adhering to sacred texts and architectural guidelines. These settlements are organized around a central temple, serving as the spiritual, cultural, and economic hub—supported historically by land grants and endowments from ruling monarchs—and housing quarters are arranged in geometric patterns such as grids or concentric rings. Streets are narrow and linear, facilitating social interaction and connecting communal spaces designated for rituals, gatherings, and temple-related activities, while sacred water bodies, both natural and man-made, play a vital role in religious and social practices, aligning with Vedic norms. The spatial layout symbolizes the Hindu cosmos, with the temple at the center and houses radiating outward, reflecting cultural values, religious philosophies, and social hierarchies—where influential families traditionally lived closer to the temple. Though rooted in tradition, Agraharams exemplify values aligned with multiple United Nations Sustainable Development Goals (SDGs), including SDG 11 (Sustainable Cities and Communities) through their compact, walkable layouts and temple-oriented planning; SDG 12 (Responsible Consumption and Production) through the use of locally sourced materials and climate-sensitive architecture; and SDGs 13, 14, and 15 (Climate Action, Life Below Water, Life on Land) through their ecological reverence for rivers, tanks, trees, and groves. They also support SDG 4 (Quality Education) through oral knowledge systems and place-based learning, SDG 3 (Good Health and Well-being) via clean air, seasonal diets, and spiritually enriched routines, and SDG 16 (Peace, Justice and Strong Institutions) through shared rituals and community cohesion. Far from being relics of the past, Agraharams offer a timeless, integrated model of sustainable living, with their embedded wisdom providing valuable guidance for future planning approaches that are environmentally sound and culturally rooted.

References

Acharya, P., 1998. . Indian Architecture According to Manasara Silpasastra.. s.l.:Manasara Series, vol. II..

Alexander, C., 2018.. A pattern language: towns, buildings, construction.. s.l., Oxford university press..

Bharne, V. a. K. K., 2014. Rediscovering the Hindu temple: the sacred architecture and urbanism of India.. s.l.:Cambridge Scholars Publishing..

Bruno, D., 2007. Mayamatam (2 Vols.) Treatise of Housing Architecture and Iconography. Delhi: (Indira Gandhi National Centre for the Arts.

Champakalakshmi, R., 1999.. Trade, ideology and urbanization: South India 300 BC to AD 1300.. s.l.: OUP Catalogue..

Dayaratne, R., 2018. Toward sustainable development: Lessons from vernacular settlements of Sri Lanka.. Frontiers of Architectural Research, 7(3), pp. 334-346.

Desai, M. a. D. M., 2016. . The Bungalow in Twentieth-Century India: The Cultural Expression of Changing ways of life and aspirations in the domestic architecture of colonial and post-colonial society.. s.l.:Routledge..

Ganesh, K., 2009. Lived Spaces in History: A Study in Human Geography in the context of Sangam texts. s.l.:Studies in History, .

Jan, P., March 1980. "The Spatial Structure of Suchindram "-Ritual Space in India,. AARP.

Jeyaraj, G. a. S. M., 2021. Assessing Cultural Experiences in Historic Urban Centres: Built Forms and Qualities. Indian Historical Review.

Jon Lang, M. D. M. D., 1997. Architecture and independence : the search for identity--India 1880 to 1980. New Delhi: Oxford University Press.

Karashima, N., 2019. A Concise History of South India: Issues and Interpretation. First edition ed. New Delhi: Oxford University Press.

KrishnaShankar, A., 2018,. Space, Sacrality and Profanity Tracing the Religious and Spiritual Spatial Text of Mylapore.. s.l., nternational Conference on Urban Sustainability: Emerging Trends, Themes, Concepts & Practices (ICUS)..

KrishnaShankar, A., 2018. Space, Sacrality and Profanity Tracing the Religious and Spiritual Spatial Text of Mylapore.. s.l., International Conference on Urban Sustainability: Emerging Trends, Themes, Concepts & Practices (ICUS)..

Miller, C., 2001. Landscapes of Encounter: Gender and the Morality of the Road in South India. Women's Studies Quarterly, Volume 29(1/2).

Oliver, P., 1997. Encyclopedia of vernacular architecture of the world.. s.l.:s.n.

Pandya, ., 2014.. Concepts of Space in Traditional Indian Architecture. . s.l.:Mapin Publishing.

Rapoport, A., 1969. House Form and Culture.. New Jersey: Prenrice Hall. Inc. Englewood Cliffs.

Rybczynski, W. B. V. A. M. B. A. B. A. P. B. P. A. P. R. R. N. a. R. P., 2003. . How the Other Half Builds. Time-Saver Standards in Urban Design;. New York, NY, USA.: McGraw-Hill Companies, Inc: .

Sadanand, A. a. N. R., 2020.. Transition Spaces in an Indian Context.. Athens Journal of Architecture, .

Shukla, D. N. .., 1995. Hindu science of architecture: Engineering, town planning, civil architecture, palace architecture, temple architecture and an anthology of Vastu-laksanas. Delhi: Munshiram Manoharlal Publ..

Singal, M., 2022.. Interiority of Agraharam: Traditional Houses in Temple Towns of India.. Interiority.

Sthapati, V. G., 2001. Building Architecture of Sthapatya Veda. Chennai, Tamilnadu: Dhakshina Publishing House .