

Efficiency and Contextual Responsiveness in Indian Vernacular Architecture: Lessons for Modern Tiny House Design in India

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Abstract

Urbanization has spurred the need for compact housing particularly in India. In this context, efforts have been made to design and build more compact, smaller-sized houses. However, there has been historically, 'a tiny house movement' in the late 19th century promoting the concept of purposefully building extremely compact living spaces. Nevertheless, the concept of designing houses for efficient living spaces remains an overlooked aspect.

In India, under the Pradhan Mantri Awaas Yojana scheme, the government has made a proposal for constructing small houses specifically designed for economically weaker communities. Notably, Indian vernacular houses have always been designed to be efficient and responsive to the contexts. Given this, this paper examines the vernacular housing practices to determine if their principles could inspire modern tiny house designs.

The research employs a literature survey and case study methods. Within the case studies, it employs observations, visual analysis and spatial analysis. It analyzes vernacular houses in terms of aspects such as the area, use of space, socio-cultural factors and cost-effectiveness, etc.

It concludes that India's rich vernacular architectural traditions have encapsulated the tenets that can buttress today's Tiny Houses. The research positions the global tiny house architectural movement as descended from traditional cultural concepts of optimized, viable housing intrinsic to India's antiquated vernacular construction. Insights from vernacular architecture reveal potential continuity between ancient and modern efficient housing models. This research paves the path to identify connections between vernacular and contemporary approaches to effective utilization of dwelling spaces.

Keywords: Vernacular Architecture, Tiny House, Context, Efficiency, Continuity, India.

Introduction

Indian vernacular architecture has embraced principles of efficiency and responsiveness to local contexts in house design. However, these principles remain largely overlooked in modern urban housing practices.

A house integrates two primary considerations: the configuration of definable spatial volumes and the contextual social dimensions. The physical enclosure of space by ground plane, boundary, and overhead plane creates tangible architectural forms. However, a house requires the integration of intangible user attributes and needs with the built fabric. These socio-cultural factors encompass the psychological, economic, demographic, and communal aspects that situate a dwelling beyond mere physicality. Through synthesizing the concrete formal qualities and abstract humanistic conditions, dwellings can transcend reductive shelter to become resonantly inhabited architecture. It is found that Indian vernacular architecture encapsulated tenets now valued in compact living spaces.

This research highlights the lessons that can be derived from such vernacular architectural practices. There is a need to investigate how the insights and principles underlying India's vernacular housing traditions can bridge the gap and inform the design of efficient living spaces in modern urban contexts. The focus is on how vernacular houses exemplify architectural strategies, spaces and forms that resonate with the inhabitants and communities through place-making. The intent is to reveal how vernacular residences conceptualize and embody domesticity, substantiating architectural interpretations of an optimal dwelling that holistically converges physical, spatial, and cultural qualities to make it truly inhabitable.

In this context, this research aims to study vernacular houses to understand how they align with an ideal model of an optimal house - one that seamlessly integrates materials, spaces, and experiences tailored to local lifestyles.

The objectives of the research are:

1. To analyze vernacular houses through various aspects such as the area, use of space, socio-cultural factors, cost-effectiveness, etc.
2. To understand how the insights and principles underlying India's vernacular housing traditions inform the design of efficient dwelling spaces in modern urban contexts.
3. To examine vernacular housing practices in India and determine if their principles could inspire incorporating efficiency into modern tiny house designs.
4. To position the global tiny home architectural movement as descended from traditional cultural concepts of optimized, viable housing intrinsic to India's antiquated vernacular construction.

Theoretical Premise

In English law, a dwelling is a place to live that is self-contained and substantial (Department for Communities and Local Government, 2017). Home is the place where one dwells. Dwelling and home are closely related concepts. A dwelling is the physical structure or space one calls home. According to Rapoport's Instrumental Theory, houses(dwelling) transcend their basic function as shelters; they serve as instruments that allow people to organize their lives and manifest their cultural identities, belief systems, and value systems through deliberate design choices that shape the built form (Rapoport, 1969). This asserts that the process of home-making intrinsically integrates cultural identities and belief systems, aligning with the concept of vernacular architecture that emerges from the expression of local traditions, values, and lifestyles through built forms.

The word vernacular, derived from verna, which means "native slave" or "home-born slave," means "domestic, native, or vernacular." The word is most likely a derivative of an earlier Etruscan word (Cambridge advanced learner's dictionary definition).

It was King (1828) who has first used the term "vernacular" to refer to the indigenous, regional building traditions and styles that had developed naturally among local people, without the influence of formal architectural training or academic design principles. In fact, vernacular architecture arises from 'group solutions'. These solutions cater to macro and micro-climatic

conditions. It also incorporates cultural skills and economic levels, evolving through a system of trial and error. This evolution happens over an extended period. According to Rapoport (1969), vernacular architecture is characterized by an open-ended and adaptive nature, allowing for changes and additions defined by their occupants based on use and necessity over time.

Hamdi (2004) supports the idea of incremental development, allowing for adaptability and flexibility based on changing needs and resources. The views of Rapoport and Hamdi underscore the inherent adaptability and capacity for organic evolution within vernacular architecture. This characteristic applies regardless of the initial small scale of vernacular architecture. Turner (1972) has seen vernacular self-help housing as a way for low-income communities to create affordable, autonomous living solutions outside formal housing markets and regulations. Vernacular architecture, whether starting at a small scale or through incremental self-build processes, inherently allows for adaptability and organic evolution to meet changing needs and resources, creating affordable autonomous housing solutions outside formal markets and regulations.

Bourdieu (1970) examining Kabyle houses show the spatial divisions of contrasting domains such as light/dark, communal, and private zones, as well as spaces designated for men and women. These divisions influence various aspects within the houses like religious practices, furnishings, occupant behavior and routines. Becker (1981) notes that households gain utility from home-produced goods, not just purchased items. It is quintessential to contain certain utilities in the premises of a house to qualify as a dwelling.

According to Amorim (1997), the spatial analysis of different domestic spaces and their classification can be done under three broad categories, as shown in the Figure 2.

1. Social Sector: This encompasses spaces such as the baithak (living room), courtyard and the verandah. These spaces are designated for entertaining visitors and social interactions.
2. Private Sector: This comprises personal spaces like bedrooms, which are intended for the exclusive use of the inhabitants and their private activities.
3. Service Sector: This includes spaces such as storerooms, toilets, staircases, and kitchens. Additionally, spaces designated for keeping cattle or livestock fall under this category.

These three sectors delineate the functional zones within a domestic setting, catering to the social, private, and service-related needs of the inhabitants.

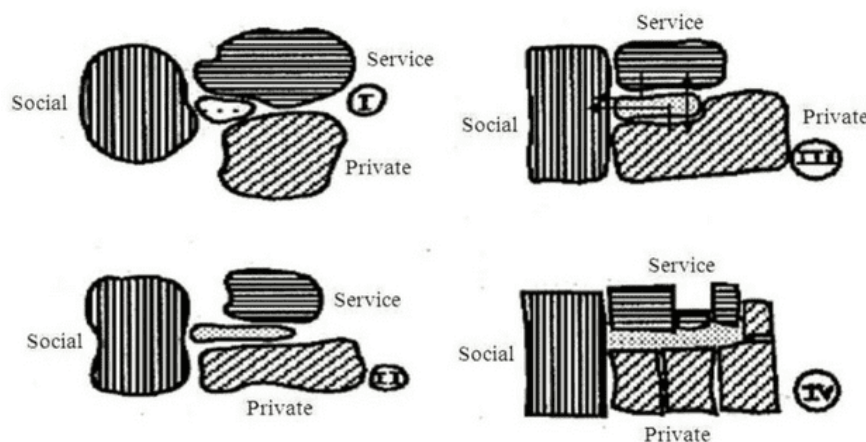


Fig. 1: Different Zones of a courtyard House

Source: Amorim, 1997

It is argued that insights from these theories on cultural and social dimensions of dwellings could enable comprehensively analyze the case studies of Indian vernacular houses. These theories position the household as a clear mechanism through which domestic economic activities are organized and carried out. The research paper analyzes and interprets vernacular case studies by drawing insights from these interrelated theoretical perspectives. They provide a framework for understanding vernacular architecture, and informing research questions, methods and interpretations.

Literature Review

The tiny house movement draws inspiration from philosophical ideas of simple living, minimalism, and environmental sustainability. However, there appears to be a lack of specific insights from traditional architectural wisdom and vernacular practices that could further inform efficient utilization of compact living spaces.

A pioneer of the tiny house movement gaining popularity in recent years, Shafer (2009) has founded the Tumbleweed Tiny House Company, promoting simple living in small, affordable houses. The movement connects to ideas like those of Thoreau (2008) on sustainable living with fewer possessions and Schumacher (1974) "small is beautiful" philosophy of doing more with less. Morrison's Tiny House Build teaches the design and construction of small dwellings, enabling more to embrace the lifestyle (Morrison, n.d.).

The phenomenon of residing in minimalistic houses is commonly referred to as the tiny-house movement or small-house movement (Jenkins, 2020). This trend encompasses both social and architectural aspects, promoting a simplified lifestyle and embracing the concept of "living with less" on a broader scale (Ford, 2017). Typically, tiny dwellings have compact dimensions, ranging from around 100 to 300 square feet (9.3 to 27.9 square meters) in area (Kaufmann, 2019). The tiny-house movement represents a conscious shift towards a minimalist lifestyle and sustainable living.

The movement can trace its roots back to the 'shotgun shack' (Fig. 3), a compact one-story structure prevalent among the urban African Americans from the late 19th century through the Great Depression. These compact dwellings offer not only an eco-friendly alternative to conventional housing, also a viable interim solution for people facing housing insecurity. Single tiny house owners rely on neighbours, communal amenities such as libraries, and shared properties (Anson, 2014). This in turn attunes with Rapoport's definition of a vernacular house.



Fig. 2: Shotgun Shack, Houston

Source: Lyon, 1973

The tiny house movement and vernacular houses share the core principles of compact living spaces, efficient spatial utilization, and minimalist lifestyles. The vernacular houses across India's diverse regions exemplify context-responsive designs that prioritize compactness and multi-functionality, aligning with the contemporary tiny house concept's focus on sustainable and simplified living within small dwellings. Challenging geographies like steep contours, restricted village plots, and adjacencies to waterbodies also physically constrain ground coverage. Local materials and construction methods, though sustainable, restrict extensive spread.

Moreover, modest material possessions have created larger spaces for storage and goods. Tiny house concept also represents relinquishment of materialistic life by allowing people to concentrate time and experiences (Mangold and Zschau, 2019; Shearer and Burton, 2021). Across India's varied biomes like deserts, highlands, river plains, and coastal regions, vernacular houses respond to environmental and socio-cultural contexts through an underlying spatial logic prioritizing compactness and multifunctionality - original embodiments of the tiny house.

Indian vernacular architectural practices are local to the area and supports the long-term sustainability of the community and environment. Social and cultural factors have had a significant impact on both vernacular forms. The hutments mostly comprised of two separate "culture areas." the use of space of the hutments was first imagined starting with a single cell shelter. Then, either this single cell was divided into multiple spaces or multiple single cells were combined to make a larger space (Jain & Jain, 2000).

The study of the single hutments and its efficiency as a dwelling unit will serve the research question. Traditional, locally-built houses provide viable solutions for addressing issues of resource scarcity, environmental impact and affordability. The small rural vernacular houses of India have single rooms which may contain mats, perhaps a native bedstead, and an array of cooking-pots. The probe here is that the minimalism in domestic architecture which is seen to be a newer concept is not novel to Indian Vernacular Architecture.

Correa's contributions to the exploration of home-making in the Indian context have been significant. His emphasis on user participation and the integration of vernacular building techniques into modern housing solutions is well-documented (Correa, 1999). Correa's notable projects, including the Belapur Housing (1983-1986) and the Aranya Low-Cost Housing (1989), exemplify the principles of community involvement and gradual expansion in housing design.

In India, diminutive dwelling options are also suggested by the government agencies. Contemporary building codes outline baseline area recommendations to support modern family functionality. For instance, the International Residential Code (2018) delineates a small house or "tiny home" as 37 square meters maximum, occasionally used interchangeably with the term micro-house (Kilman, 2016). Government of India housing schemes reflect comparable minimums, allocating 30 square meters in cities (Pradhan Mantri Awas Yojana Urban, 2017) and marginally smaller 25 square meter units rurally (Pradhan Mantri Awas Yojana Rural, 2017) to qualify meeting baseline habitation standards. It brings forth notion whether the vernacular precedents evolved parallel to these code-defined minima.

The compartmentalization between tiny house construction and vernacular architectural practices perpetuates the existing gap between the two systems.

Research Methodology

This research employs a multi-technique approach to explore the principles of efficiency and contextual responsiveness inherent in traditional Indian vernacular architecture and their potential application in modern tiny house designs.

A review of academic literature, scholarly articles, books and government reports is conducted to understand the historical context, theoretical frameworks and empirical evidence related to dwelling, house making, vernacular architecture, and the tiny house movement. This document survey provides a foundation for understanding the key concepts, identifying the research gaps and contextualizing the study within the existing knowledge.

The next step includes descriptive case studies of vernacular house examples across India's varied climatic zones, focusing on modest houses of peasants, artisans, and other commoners. These conversations with the inhabitants provide valuable insights into their daily lives, cultural practices, and the factors that have influenced the design and building of their homes. By understanding these influences, a critical review is performed.

Detailed plans, views, and spatial analysis are performed for each vernacular house, examining aspects such as room layout, circulation patterns, ventilation strategies, and space utilization, considering the specific climatic and cultural context. Through site visits, interviews with inhabitants, and documentation of contextual factors, this analysis delves into the lived experiences, adaptive strategies, and socio-cultural dimensions of vernacular housing. The study explores various traditional Indian vernacular houses such as the following.

1. Bhotia house of Uttarakhand,
2. Bhunga House of Kutch Region,
3. Sonowal Kacharis House of Majuli,
4. Mund of Toda Tribe, and
5. Chutillu of Coastal Andhra Pradesh,

They provide detailed plans, views, and spatial analysis for each. The research selects vernacular houses from different regions of India based on factors such as climate, culture, and architectural styles.

By employing these complementary methods, this research generates comprehensive insights into the principles and practices of Indian vernacular architecture and their relevance for modern tiny house design. Through systematic inquiry and interdisciplinary analysis, the study bridges the gap between traditional wisdom and contemporary housing challenges, fostering innovative approaches to efficient and culturally resonant urban housing solutions.

Case Studies

The samples are taken from diverse climatic zones of India (Figure 3). The antecedents chosen are primarily dwellings of peasants, artisans, livestock ranchers, and so on. The Indian vernacular house case examples can be validated as suitable dwelling solutions by considering the various principles and rationale underlying their design and construction approaches through the theoretical outlines. The morphological characteristics of the vernacular houses are shaped by the interplay of natural elements such as topography, climatic conditions, water sources and vegetation, as well as the prevailing social, cultural, and economic realities. Among the natural factors that mould the environment, the influence of climate on the form and structure of a settlement is the most profound (Gabriel & Garda, 1989).

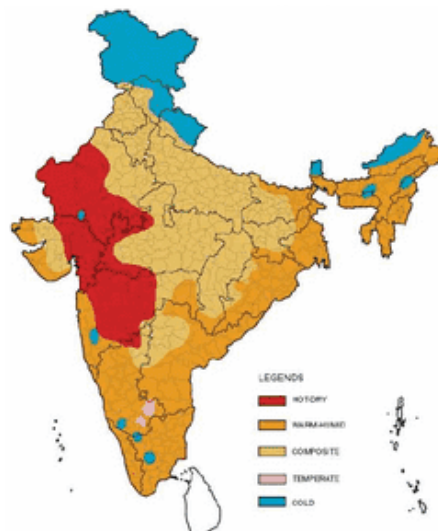


Fig. 3: Climatic Zones of India

Source: Energy Conservation Building Code (ECBC) User Guide, 2002

Bhotia House of Uttarakhand

The Kumaon region of Uttarakhand presents a unique case in a hilly region of Malla Johar situated at an elevation of around 2000 meters coersing cold climatic zone (As per ECBC). The alpine villages are inhabited by the Bhotia Tribes (Also known as Barpatiyas) who once flourished through commercial activities with travelers between India and Tibet. The region has a distinctive architectural style reflecting an adaptation to the rugged terrain and cultural influences (Figure 4).

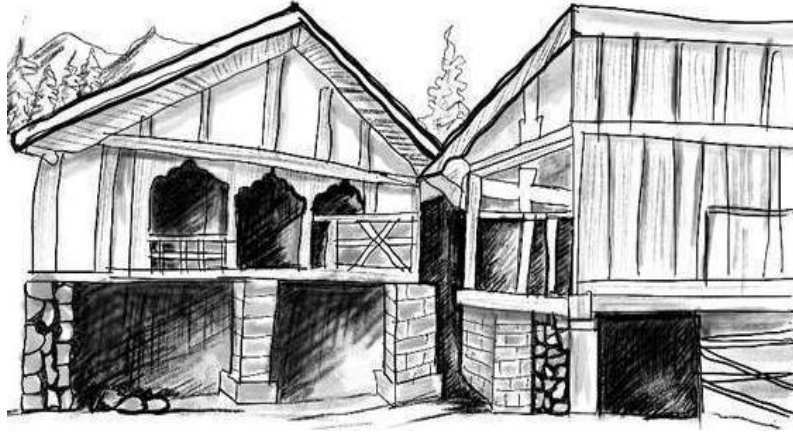


Fig. 4: View of Bhotia House
Source: Author, 2024

A Bhotia house (ghar or kur) is entered through an open verandah (majhyal), which is referred to as chajj while open and chak when closed. The dwelling (ghar or kur) is essentially divided into two floors. The lower story (goth) is used for storage and cattle. The first-floor verandah contains windows that overlook the courtyard. The number of windows indicates the size of the house, and window adornment, which is typically delicate latticework that creates a screen-like effect, is associated with the prosperity of the inhabitants (Figure 5).

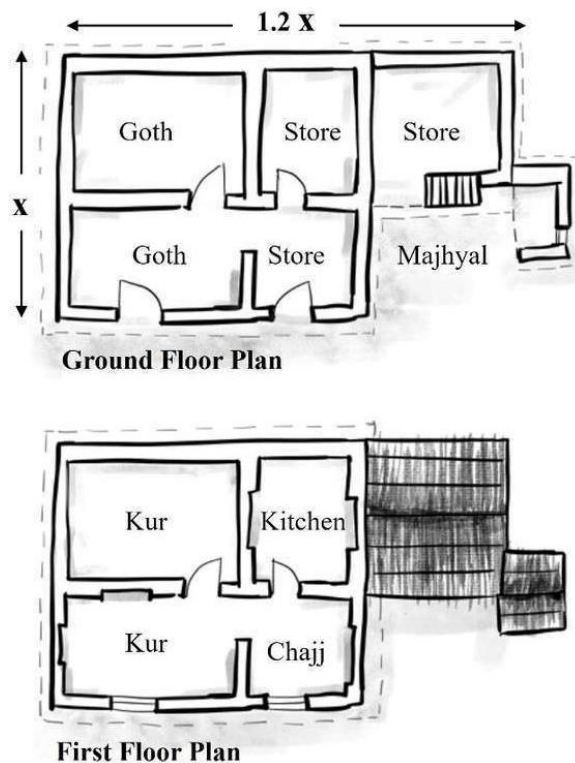


Fig. 5: Plan of Bhotia House
Source: Author, 2024

Running along the front facade and bounded by a low parapet wall, this versatile space serves multiple functions like seed drying, livestock housing, and washing activities. Its proportions are characterized by a width approximately 1.2 times its depth, typically ranging from 4 to 6 meters in length and 4.8 to 7.5 meters in width (Yadav, 2021).

The region's cold, arid climate necessitates the design of open spaces like verandas and front courts (*patagan*) to capture solar heat. These areas constitute the public realm of the houses, aligning with Amorim's categorization (Figure 6).

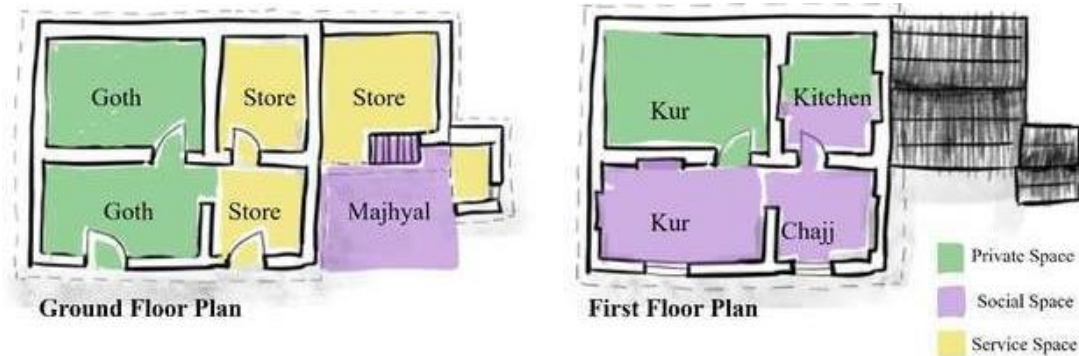


Fig. 6: Amorim's Analysis diagram of Bhotia House
Source: Author, 2024

Economists have examined the role of houses in shaping a unique economic model known as the 'house economy' (Gudeman & Rivera, 1990). Since the Bhotia Tribe practices pastoralism despite the harsh climatic conditions, they tend to save the food supply for extremities. The various parts of the dwelling are used for this purpose of serving the economy of a house. Typically constructed on steep, sloping terrain, these dwellings have compact footprints due to limited available flat land.

Consequently, the transitional threshold spaces manifest as balconies on upper floors rather than ground-level entries. These threshold spaces are often used for personal use and social interaction as well. It is useful for drying vegetables, fruits, and spices for extremities. This in turn offers an opportunity for the household economy as suggested by Becker (1981). The home-stored and conserved goods contribute to household production function. Despite their modest built area not exceeding 20 square meters, these dwellings achieve functional efficiency through multifunctional spaces, the utilization of threshold areas, and societal engagement in everyday activities. In spite of the challenges posed by the local context, the choice of materials and construction practices in these vernacular houses is carefully tailored to meet the desired spatial volumes. It is noteworthy that, within these small-scale residences, the principle of household economy is meticulously observed.

Bhunga House of Kutch Region

The Bhunga houses of the Kutch region, located in India's deserts of dry and hot climatic zone, serve as one of the case samples. This vernacular architectural practice dates back approximately 200 years.



Fig. 7: View of Bhunga Houses
Source: Author, 2024

It features a circular plan with a thatched roof. Their typical plan dimensions range from 3.0 to 6.0 meters, with ceiling heights varying between 2.1 and 2.5 meters (Choudhary, 2002) (Figure 7 & 8). This confers a floor area range of 7 to 28.3 square meters, where the ceiling height meets the minimum habitable space standard as per the International Residential Code, 2018.

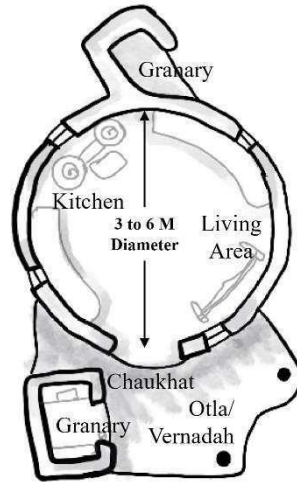


Fig. 8: Plan of Bhunga House
Source: Author, 2024

The long-standing practice of this construction method for houses undoubtedly demonstrates its sustainability. Despite their compact size, these dwellings are highly functional. The substantial wall thickness allows the area around the door frame, known as the *chaukhat*, to serve as the threshold of the residence. Although lacking a dedicated veranda space, the *chaukhat* area itself fulfills the role of a public area for the housing unit.

The phrase "wear a house and live in a cloth" used by the Kachchh community encapsulates their cultural ethos and serves as a lens to examine how their material culture imbues meaning. This expression reflects the ideology of hospitality and the structured rituals of social visitation and exchange that are intrinsic to their way of life (Pandya, 1998). Through this axiom, the Kachchh people articulate their distinct worldview, which is manifested in their tangible cultural artifacts and practices. The spatial analysis of Bhunga houses by Amorim is conducted using three spatial categorizations (Figure 9), with hatches converted to colour codes and a corresponding legend. Despite their tiny plan footprint, these houses encompass all three spatial categories within their built area.

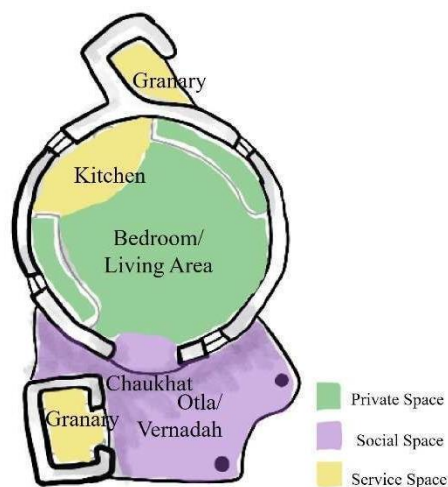


Fig. 9: Amorim's Analysis diagram of Bhunga House
Source: Author, 2024

The interchangeability of spaces in Bhunga Houses implies a sense of transience that resonates with flexibility rather than permanence. Despite their small built enclosures, Bhunga houses and their surrounding premises offer functional utility through annexed spaces.

Sonowal Kacharis House of Majuli

Sonowal Kacharis House (Bodo Tribes) of Majuli Islands, Assam experiences the warm humid climate. The Kacharis were skilled gold extractors from river sands, earning them the prefix 'Sonowal', meaning 'Gold Washer' (Barooah, 1998).

The vernacular houses of the Sonowal Kachari community on Majuli island, Assam, reflect their cultural traditions and way of life. These houses feature a single-ridge design with two sloping roofs, catering to the needs of joint family living arrangements (Figure 10). The main entrance is situated on the southern side of the structure. The interior is partitioned to create designated sleeping areas, while a spacious verandah connects to the rooms. The detached kitchen is linked to the main house via a corridor and is divided into three distinct spaces – a 'Thapana' raised clay area for prayer, a cooking area, and a dining space. The walls are constructed using bamboo mesh plastered with a mixture of cow dung and mud.

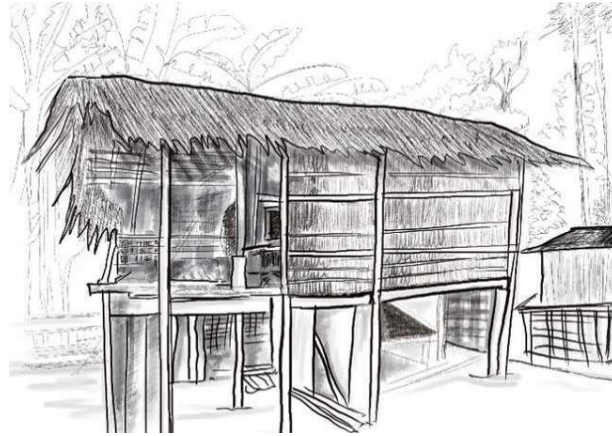


Fig. 10: View of Kacharis House
Source: Author, 2024

The houses have 2-3 spaces designated for sleep and activities. Kitchens are not contained in the enclosure. A prayer room is mandatory in each house. The granary is within the premise but not inside dwelling walls. Built with locally sourced natural materials, traditional Kachari homesteads comprise three primary structures within the farmstead - the Bar-ghar (cooking-dining area), Maral-ghar (living quarters), and Chora-ghar (granary), complemented by auxiliary barns, cattle sheds, and animal enclosures. The Bar-ghar is partitioned, with the northern muzia section housing the main fireplace and hearth, while the larger southern portion serves as the dining space (mozia) (Figure 11).

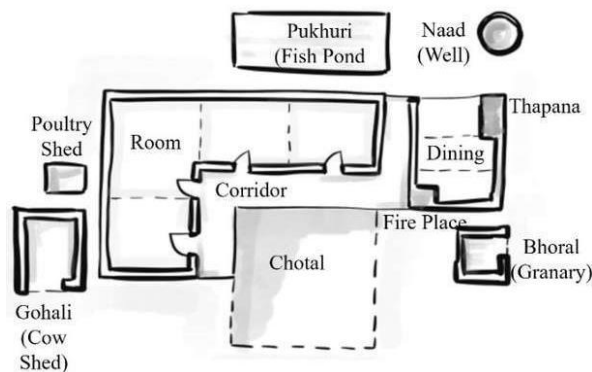


Fig. 11: Plan of Kacharis House
Source: Author, 2024

In some cases, a wall separates the randhani-shal cooking area. Near the northern wall lies the hearth, with the Lakhimi-shal altar in the south-east corner. Adjacent to the cooking area, offerings like rice, curd, and wine are made to deceased ancestors during the Na-Purusia Sakam ceremony (Dheka, 2017).

Surrounding the main house are auxiliary structures, including a raised granary, a cowshed, a poultry shed, a ring well, and a pond. A courtyard (chotal) is located in the front of the house

Among the Kacharis, the responsibility of rearing and generating income from cattle and poultry predominantly falls upon the female members of the household. This role necessitates a significant portion of their daily time being dedicated to the care and management of these domesticated animals. Consequently, the women are not confined within the boundaries of their dwellings for the entirety of the day, as their duties extend beyond the household enclosures. The division of household labor and utility maximization processes followed in these households enjoin Becker's theory.

Additionally, applying Bourdieu's dichotomies to this context highlights how the physical confines of the house are not the sole inhabitable space for the Kacharis women. Instead, the premises surrounding the dwelling, where they engage in livestock rearing and poultry farming, become an equally inhabited domain. Consequently, the scale or size of the actual household has minimal significance, as the women's lived experiences transcend the architectural boundaries, rendering the entire premises, irrespective of the house's dimensions, as their functional habitat.

The distinct feature of external cooking areas in Kachari houses reflects a variation in spatial analysis when viewed through the lens of Amorim's spatial categorizations (Figure 12). Remarkably, the same zone within the house serves as both a private and public space interchangeably, depending on the time of day. This fluidity in spatial usage highlights the dynamic nature of these traditional dwellings, which seamlessly adapt to the changing needs and activities of the inhabitants. Such flexibility in spatial allocation underscores the intrinsic connection between the built form and the cultural practices of the Kachari community, where boundaries between private and public realms are negotiated fluidly, reflecting their way of life. Moreover, it reflects how the scale is negotiated yet the utility of the space is not compromised.

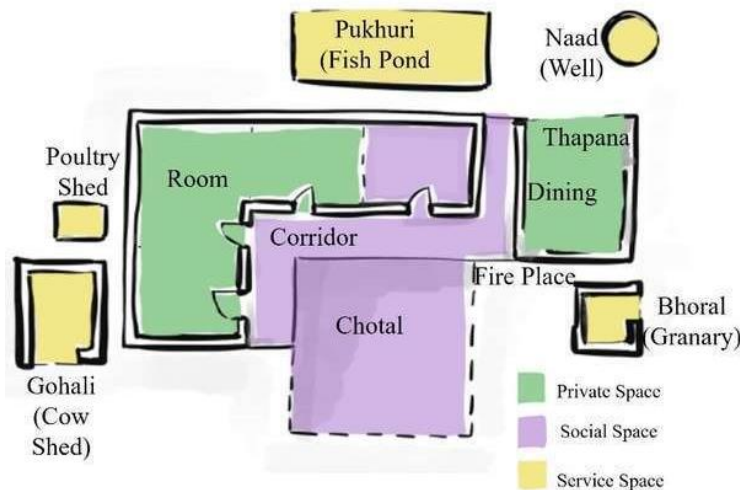


Fig. 12: Amorim's Analysis diagram of Kacharis House

Source: Author, 2024

Mund of Toda Tribe

Mund are the dwellings of the Toda pastoral community vernacular to the Nilgiri Hills of Tamil Nadu conversance with Temperate zone. These huts are rectangular structures measuring 17x8 feet with a 10-foot vaulted roof reaching the ground. To protect against harsh weather conditions, entry into these houses is through a low 3-foot eastern doorway that requires crawling (Fig. 13).

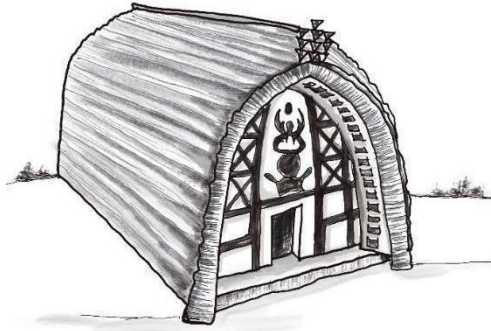


Fig. 13: View of Toda Mund House
Source: Author, 2024

Upon approaching the front of the Toda dwelling, one encounters a slightly offset entrance flanked by sitting platforms in the front porch. This axial composition extends into the interior, where a raised earthen sleeping platform, elevated 45-60 cm, occupies one side, while the opposing side serves as a dedicated work area (Figure 14).

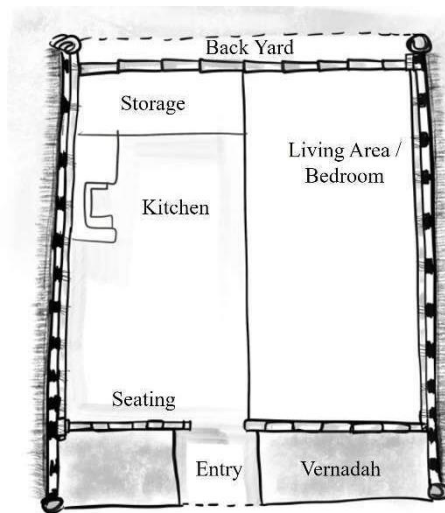


Fig. 14: Plan of Toda Mund
Source: Author, 2024

The spatial division in Toda houses reflects the duality principle, which is a key characteristic of their traditional architecture. The spatial division reflects gender roles as well - the front male public space with mortar and sacred milk churn, contrasted by the rear private female domain with fireplace, storage, and vessel display shelves. The sanctum sanctorum, deemed the most propitious area, is strategically positioned adjacent to the entrance. The stone-clad front elevation, embellished with motifs symbolizing the celestial bodies, floral emblems, and animal horns, carries profound cultural connotations. The facades of Toda huts are simple yet integrate all essential functional elements of the dwelling.

These habitats are constructed at a depth of 2 feet below the ground level and encircled by a 3-foot-high perimeter wall. This boundary not only delineates the spatial extent of each abode but functions as a windbreak, shielding the vaulted structure from the intense winds prevalent at elevated altitudes. The implication of traditional knowledge of the climate led to the form development of these hutments. The self-construction techniques employed in these dwellings pose a challenge in achieving larger spatial volumes. Nevertheless, they concurrently render the construction process highly cost-effective, making it an economically viable approach for the community.

In the Munds of Toda, the same spatial zone transitions fluidly between private and communal uses based on time of day. This adaptable spatial usage exemplifies the vernacular dwellings' ability to organically respond to inhabitants' evolving needs. Such negotiation highlights the symbiosis between built form and cultural practices, where private-public boundaries are navigated fluidly, reflecting the community's lifestyle. The way space is organized in this house allows for flexibility without sacrificing functionality. Amorim's spatial analysis of the Mund plans corroborates the fluid negotiation of private and communal domains within the same spatial zones, reflecting the adaptive nature of these vernacular dwellings (Figure 15).

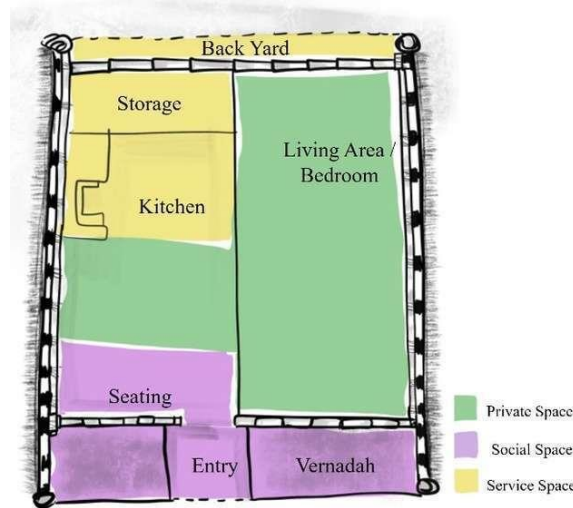


Fig. 15: Amorim's Analysis diagram of Toda Mund
Source: Author, 2024

Chutillu of Coastal Andhra Pradesh

The 'Chutillu' (translating to 'round house') of the fishermen community along the coastal Andhra Pradesh region is a distinct domestic typology within Composite climatic zone. The houses are constructed using the cob wall technique – a robust mixture of mud, water, and occasionally straw (Zachariah, 2020).



Fig. 16: View of Chutillu
Source: Author, 2024

As an independent and freestanding residential unit for each household, the chutillu's primary living area ranges from a modest 8.8 square meters to a slightly more generous 14.5 square meters (Figure 16 & 17), which falls below the typical spatial standards prescribed for contemporary tiny homes and GOI rural housing guidelines.

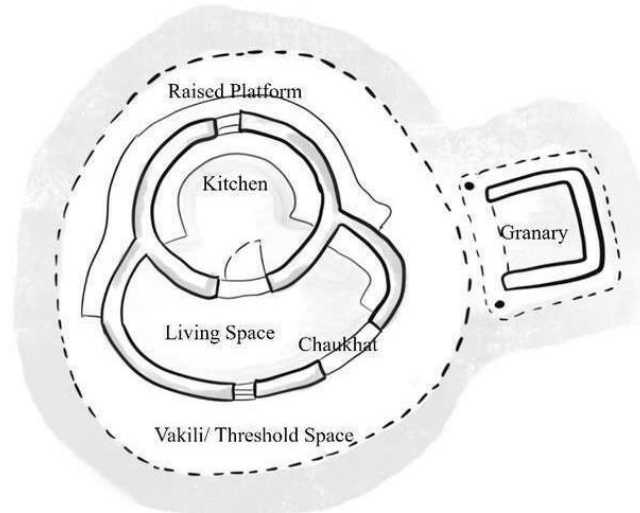


Fig. 17: Plan of Chutillu
Source: Author, 2024

Despite its diminutive scale, the chutillu exhibits Amorim's three essential spatial categories, validating its functional efficiency as a dwelling typology. The contextual rationale of these coastal houses from hot and humid climate, renders them susceptible to high waves. Hence, necessitating easy reconstruction and maintenance for these houses.

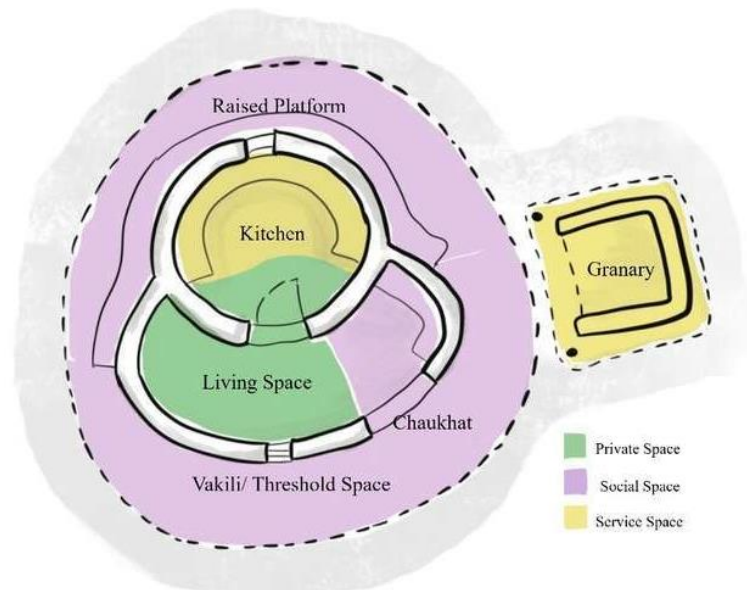


Fig. 18: Amorim's Analysis diagram of Chutillu
Source: Author, 2024

Furthermore, the load-bearing nature of the cob walls imposes constraints on the structure's size, contributing to the compact spatial footprint. However, the high apex of the roofing extends the shade beyond the walls, creating a threshold space or 'vakili' (verandah in Telugu) at the entrance. This semi-outdoor space facilitates interaction between the dwellers and the public realm, exemplifying the chutillu's sensitive response to its socio-cultural context. The chutillu, with its compact yet functionally efficient spatial organization (Figure 18), emerges as a contextually responsive vernacular typology that seamlessly integrates climatic, structural, and socio-cultural considerations into its humble yet ingenious design.

Findings

1. Vernacular architecture in India has traditionally embraced the principles of efficiency, minimalism, and responsiveness to local contexts in housing design, much before the contemporary tiny house movement gained popularity.
2. While a substantial body of theoretical work investigates the interplay between human behavior and the built environment, this study on vernacular domestic architecture concentrates on elucidating the conveyance of meaning, despite the diminutive scale of the dwellings in question.
3. The case studies of various vernacular houses across different climatic zones of India, such as the Bhotia house of Uttarakhand, Bhunga house of Kutch, Sonowal Kacharis house of Majuli, Mund of Toda tribe, and Chutillu of coastal Andhra Pradesh, demonstrate that these dwellings are functionally efficient and optimized despite their small built-up areas, often ranging from 7 square meter to 40 square meter.
4. The spatial analysis of these vernacular houses using Amorim's categorization reveals that they incorporate all three essential spatial sectors (social, private, and service) within their compact footprints, indicating efficient utilization of space.
5. The threshold spaces, such as verandahs, chaukhat, and opla, play a crucial role in extending the functional and social areas of these dwellings, enabling them to operate within minimal physical enclosures.
6. The vernacular houses exhibit fluidity and interchangeability of spaces, where the same zone can serve both private and public functions at different times, reflecting an adaptive response to the inhabitants' evolving needs.
7. The discussion on the house economy and the various utilities within the house premise established its relevance as a habitable space. According to Douglas, home is a localized concept, not a fixed physical area, but rather any space brought under control (1991). This was implied in each case where the built enclosures of vernacular houses can be of minimal scale, but because the annexed spaces or threshold spaces (Opla/Verandahs) are inherent to these dwellings, optimize its workability.
8. The study highlights the intrinsic connection between the built form and the cultural practices of the communities, where boundaries between private and public realms are negotiated fluidly, reflecting their way of life.
9. The research positions the global tiny house architectural movement as descended from traditional cultural concepts of optimized, viable housing inherent in India's vernacular construction practices.
10. One of the consequences of the tiny home movement can be that minimalism fails to incorporate cultural identity and contextual elements. This led to dwellings lacking identity and a sense of belonging.
11. The insights from vernacular architecture, optimized for local contexts, reveal potential continuity between ancient and modern efficient housing models, paving the way for incorporating these principles into contemporary urban housing solutions.

Conclusion

In conclusion, the research affirms the relevance of Indian vernacular architectural practices in informing the design of efficient and contextually responsive living spaces, offering valuable lessons for modern urban tiny and petite houses. The insights from the vernacular houses offer renewed relevance in the contemporary discourse on sustainable habitat design and resource-conscious architecture. A significant inference from the analysis, with reference to Amorim's categorization, is that the threshold space of the vernacular house partially serves as the public area. This functionality enables the dwelling to operate within the smallest possible areas.

Characterizing vernacular houses solely by their compact physical enclosures would be reductive. While the built structures themselves may be modest in size, the actual interactive and functional spaces associated with these dwellings extend far beyond their physical boundaries, encompassing expansive realms of lived experience and activity.

The paper achieves the aim to resuscitate the intrinsic value of vernacular practices and reaffirm their relevance in today's rapidly evolving and technology-driven architectural landscape.

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