

Vernacular Dwellings of the Rakhaine Diaspora in Bangladesh: Decoloniality, Tropicality, Hybridity

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Abstract

Decolonization in tropical architecture upholds cultural identity and diversity in both its material and non-material forms. The Rakhaine, a diasporic ethnic minority in southern Bangladesh, migrated from the former Arakan state more than two centuries ago. They have gradually adapted their cultural way of life as well as their vernacular dwellings to their displaced context, especially in the last few decades. Their cultural identity shows a new dimension, which is termed hybridization in postcolonial discourses. Considering the above context, this research initially aims to understand the unique spatial-physical morphology of the Rakhaine's traditional stilt houses. Later, the study explores different influences behind the current hybridized transformation taking place in their vernacular dwelling. Through a qualitative case-study approach, an in-depth comparison of two dwellings was undertaken to document and understand both their traditional and hybridized aspects. Theoretically influenced by decoloniality, tropicality and hybridity, this study contributes to decolonial and postcolonial studies in tropical architecture and will be of interest to academics and professionals in understanding the unique in-betweenness of cultural hybridization of ethnic minorities in the South Asian and Southeast Asian contexts.

Keywords: decolonizing vernacular architecture, postcolonial hybridity, tropical architecture, stilt houses, Rakhaine diaspora Bangladesh

Introduction: The Rakhaine

Colonialism is understood as a system that is still pervasive in today's society, and decolonization is the effort to undo this system (Napawan, 2023). It is not an event historically far removed from us and not irrelevant to architecture (Said, 1993; Bhabha, 1994; Smith, 2012). Vernacular practices in architecture can be effective tools in the decolonization of design and to help designers reimagine their works beyond western hegemonic systems of knowledge and practice (Asquith & Vellinga, 2006; Tian, 2020). Furthermore, vernacular architecture and traditional dwellings are manifestations of sociocultural ways of life of formerly colonized peoples and demonstrate Indigenous ways of being and knowing (Rapoport, 1969; Oliver, 1997). In different international agendas and organizations, such as the Sustainable Development Goals (SDGs) and the International Council on Monuments and Sites (ICOMOS), vernacular architecture is defined as built cultural heritage and given priority in the recognition and protection of cultural diversity (ICOMOS, 1999; Vries, 2020). However, the cultural identity of ethnic minorities across the tropical world has been further threatened over the last century. Edward Said notes in his work, *Culture and Imperialism*, that: "No one today is purely one thing.... Imperialism consolidated the mixture of cultures and identities on a global scale" (Said, 1993, p. 336).

In the processes of colonialism and imperialism, Indigenous and ethnic peoples were seized and subjugated, and numerous migrations of ethnic groups ensued. Again, in post-colonial times, contemporary western hegemony and rationality, now incorporated in forms of neo-colonialism into ex-colonized states, continues to reject ethnic people's "opportunities to be creators of their own culture and own natures" (Smith, 2012, p. 1). Homi K. Bhabha, a leading figure in contemporary postcolonial studies, has further called attention to the fact that, while marginal positions are the most tangible manifestation of inequality, postcolonial criticism reveals the unequal and asymmetrical forces of cultural representation (Bhabha, 1994; Hernández, 2010).

The Rakhaines are an ethnic people who migrated from Arakan state (now called Rakhine) over two centuries ago and settled in a "utopian" enclave in southern Bangladesh. Over time they have to some degree adapted to the cultural environment, and have done so deliberately in a process of acculturation, which involves balancing two cultures while still maintaining their original cultural values and traditions. In the 1800s they constituted the majority in the settled territory, but these roles have now been reversed, and they are the 'others' (Islam, 2022). The cultural institutions of these hill people are in contrast to many features of the flat-land culture of rural Bangladesh (Ara & Rashid, 2018). Although they have managed to maintain their cultural, linguistic, and ethnic integrity for more than two hundred years, in the last few decades, it has become harder to keep their cultural practices "intact". Today the Rakhaine

culture and lifestyle are on the verge of profound change (Rahman et al., 2021). Aside from changes in their non-material culture, the material culture of their traditional vernacular dwelling is being transformed. Rather than viewing this change as simply a loss of traditions (and defective), in postcolonial theory, such emerging physical forms of cultural productivity are viewed through the concept of hybridity (Bhabha, 1994).

It is worth noting that the vernacular architecture of the Rakhaine is a stilt dwelling and represents the oldest surviving examples of house forms evolved from ancient tree-house dwellings (Oranratmanee, 2018). It is a distinct Southeast Asian vernacular stilt dwelling typology, and its many components have a fundamental correspondence to the ancient heritage (Ara & Rashid, 2018). The Rakhaine stilt dwelling is an inherent aspect of their culture and therefore fits within the National Cultural Policy and Vision of the Ministry of Cultural Affairs of Bangladesh which is committed to conserving and promoting the cultural identity of small ethnic communities (MoCA, 2006).

In order to document and understand the cultural and material hybridity of the Rakhaine stilt house, this research undertakes a comparative case study. It firstly presents the morphology of an old Rakhaine vernacular dwelling, which is closer to the original form as it occurred in the Arakan State. Secondly, it explores how this dwelling morphology is being hybridized by different cultural, social and tropical dynamics of the current context in southern Bangladesh. The research identifies contextual attributes responsible for the hybridization of the Rakhaine's built environment, which is a prerequisite for protecting their cultural identity. Theoretically influenced by concepts of decoloniality, tropicality and hybridity, this study contributes to decolonial and postcolonial studies in tropical architecture and will be of interest to academics and professionals in understanding the unique in-betweenness, or the cultural hybridization, of ethnic minorities in the South Asian and Southeast Asian contexts.

Before detailing the case studies, it is necessary to briefly introduce the notion of decoloniality as it pertains to architecture, and especially vernacular architecture; it is also necessary to give a clearer background of the Rakhaine diaspora, and to discuss the notion of hybridity as it pertains to the Rakhaine vernacular stilt house dwelling.

Decoloniality, Diaspora, and Hybridity

Decolonizing Vernacular Architecture

Architectural decoloniality is about “questioning, replacing, dismantling and transgressing the previous containments and hierarchies of spaces, power and

knowledge” (Loo, 2017, p. 631). The notion of decolonizing architecture, offers new ways in which to think about the historical and contemporary links between colonialism, culture, architecture, power, knowledge, modernity, and space. Both decolonial and postcolonial approaches in architecture question and unsettle binary perspectives inherited from colonialist ways of thinking. This includes the binary of vernacular architecture versus modern architecture:

...conservative architectural historiographies have often positioned vernacular (and non-western) architecture in opposition to modern architecture. In the late twentieth-century vernacular architecture was not considered dynamic, multi-faceted and progressive, but relatively static, resistant to change and lacking modern relevance. This position has since changed in the global field of vernacular architecture.... Recent scholarship has questioned this binary opposition, and has begun to expand approaches to vernacular architecture. (Memmot & Ting, 2020, p.1)

Decolonial and postcolonial methodologies demonstrate how historical (colonial and imperial) and contemporary (neo-colonial) relationships between cultures and the material culture of vernacular and modern architecture is the result of complex socio-cultural movements and negotiations. In order to understand this complexity in terms of vernacular architecture “involves a process of decolonisation, and of using critical multidisciplinary methodologies to broaden and break down conservative approaches that have segregated the vernacular from modern architecture” (Memmot & Ting, 2020, p.1).

Thus, research needs to more closely engage with the tensions of regional cultural change and how they are expressed through architecture, including the building typologies and morphologies of vernacular dwellings. This is best undertaken through case studies inclusive of cultural history and architecture.

Rakhaine Ethnicity and Diaspora

The name ‘Rakhaine’ is an ethno-religious affiliation where the ethnicity is Tibeto-Burman and the religion is Buddhism. The Rakhaine first migrated from Central Asia in the eleventh century to the former Arakan province (Charney, 2005; Majid, 2005; Cho, 2018). The Arakan (Rakhine) state lies between the south-east of Bangladesh and the north-west of Myanmar. Arakan had a long and rich history as an independent state until the 18th century, when it was invaded by the Burmese king, Bodawpaya (Falconer & Moore, 2012; Htin, 2015). In 1784, Bodawpaya took control of Arakan, which resulted in genocide against the general population. Consequently, many

Rakhaines escaped to areas in southern Bangladesh, which was at the time colonized by the British (Tun, 2005; Islam, 2013). In the words of Mustafa Majid: “There was a genocide on the Rakhaines. As a result countless Rakhaines fled into the neighbouring places controlled by then East India Company” (Majid, 2005, p. 50).

In this context, Rakhaines are displaced ethnic groups that are not considered indigenous peoples because they are migrants; consequently, they are referred to as a “diasporic community” (Islam, 2022). Diaspora, as the term has been adapted and adopted by writers and postcolonial scholars, refers to the voluntary or forcible movement of peoples from their homelands into new regions, which is a central historical fact of colonization (Ashcroft et al., 2013; Mare & Granado, 2020). In short: “Modern Diasporas are ethnic minority groups of migrant origins residing and acting in host countries but maintaining strong sentimental and material links with their countries of origin – their homelands” (Sheffer, 1986, p. 3). This statement corresponds precisely with the current condition of the Rakhaine ethnic communities in Bangladesh.

Though Rakhaines have been settled in Bangladesh for more than 200 years, their culture and way of life are strongly connected with their roots (Tun, 2005). They ardently adhere to their traditions as evidenced in the material culture of their buildings. As an element of their cultural landscape, the Rakhaine constructed their distinctive type of stilt house – locally called *Eing* – in the same style and following the building techniques of their ancestors. *Eing*, the vernacular stilt dwelling of the Rakhaine is similar to other pile dwellings of Southeast Asia, which have been the subject of studies by architects and anthropologists (Brauns & Löffler, 1990; Hasan, 2010; Waterson, 2012; Rahman et al., 2021). Rakhaines have brought this enduring style with them, which was ideally suited to the tropical climate and environment of Rakhine state and Myanmar (Falconer & Moore, 2012). Today, the housing culture of the Rakhaine is consistently transforming into a new vocabulary as a result of acculturating with the prominent local cultures of southern Bangladesh and adapting to the availability of materials and changes in the local tropical climate and environment. Nonetheless, the strong tangible and intangible cultural ties to their origins position them in an in-between state of cultural practice, in which hybrid forms of building are evident.

Hybridization of Rakhaine Traditional Dwelling

The Rakhaine’s process of adapting to existence in a different state could be evaluated thoroughly because their cultural adaptation is still ongoing. It is thus possible to trace the hybridization of their traditional dwelling through a postcolonial lens. Over the last thirty years, postcolonial criticism, which is broadly defined as the critical examination

of the cultural and ideological legacies of colonialism and imperialism (Said, 1993; Sidaway, 2000), has developed sophisticated cultural techniques of analysis, that are also well suited to studying the Rakhaine situation.

Postcolonial perspectives emerge from the colonial testimony of Third World countries and the discourses of 'minorities' within the geopolitical divisions of East and West, North and South. They intervene in those ideological discourses of modernity that attempt to give hegemonic 'normality' to the uneven development and the differential, often disadvantaged, histories of nations, races, communities, peoples. (Bhabha, 1994, p. 171)

Following Bhabha's assertion regarding the uneven developmental histories, especially for minorities, as a result of colonialism, the changes Rakhaines are adopting right now in Bangladesh, particularly in the forms of architecture, would be defined as a spontaneous reaction to colonization by a colonizer (Bhabha, 2012). Both the approach of "postcolonialism" and the comparatively new approach of "decolonization" attempt to intervene in the normalized, irregular development of often disadvantaged communities like the Rakhaine ethnic minorities (Bhabha, 1994; Smith, 2012; Petti et al., 2013; Loomba, 2015; Rizvi, 2019).

As decolonial and postcolonial theories note, in situations like the Rakhaine diaspora cultures are in a constant process of transformation and renewal. Hence, that liminal or in-between culture is where the cutting edge of translation and negotiation occurs in terms of cultural hybridity (Bhabha, 1994; Hernández, 2010). This hybridization may appear to be a typical human response, but for minorities such as the Rakhaines, it should be viewed as their free practice against neo-colonization, which may take many forms.

Today, the formal transformation of Rakhaine built forms is readily apparent, retaining their key patterns while evoking a composite form in response to their cultural, material, and environmental requirements. According to Bhabha's theory, it can be argued that a new phase of adaptation that is independent of their cultural ties has emerged at this particular moment in time. Perhaps no other term has been more powerful and evocative in postcolonial theory than hybridity to clarify this situation. Hybridity is no longer the sign of 'inappropriate' cultural productivity, the term aims to undermine the notions of originality and purity (Hernández, 2010), and for Bhabha, hybridization is, in fact, the most powerful sign of cultural productivity. He states:

Hybridity to me is the 'third space,' which enables other positions to merge. This third space displaces the histories that constitute it, and

sets up new structures of authority, new political initiatives, which are inadequately understood through received wisdom. (Bhabha, 1994, p. 211)

In an interview published in 1990 under the title 'The Third Space', Bhabha equates the third space with the concept of hybridity (Rutherford, 1990). Accordingly, the acculturation and changes taking place in the Rakhaine community can be positioned by this hybridity, or third space, which enables other cultural positions to emerge. The third space is an attempt to 'spatialize' the liminal position it represents, like the transformed dwelling of the Rakhaine; in other words, to give a certain tangibility to the in-between space where hybridization occurs (Bhabha, 2012; Hernández, 2010).

In our context, the spatial characteristics and uniqueness of Rakhaine vernacular architecture morphology are well researched in different studies (Ruan, 2003; Falconer & Moore, 2012; Ara & Rashid, 2018; Rahman et al., 2021). However, there is a gap in research through the lens of hybridity on the changing form of Rakhaine traditional dwelling and its causes, which could be seen as an independent reaction to the needs of the time and place and to cultural challenges ending in a third space caused by colonization and processes of decolonization. However, in this context and beyond, postcolonial approaches to hybridity and the third space are usually insufficiently contextualized (Krishna, 2009; Acheraïou, 2011). Thus, the conceptual framing of this study is constructed in such a way that certain contextual attributes are responsible for the dwelling transformation of Rakhaine in Bangladesh. Identification of these factors would help to facilitate the pathway to decolonizing the vernacular architecture of the Rakhaine. To understand the morphology according to the first objective, this study considers architectural composition (layout of the elements), site restrictions, the expected usage, and the materials and techniques used for construction (Asadpour, 2020) in the selected vernacular dwelling.

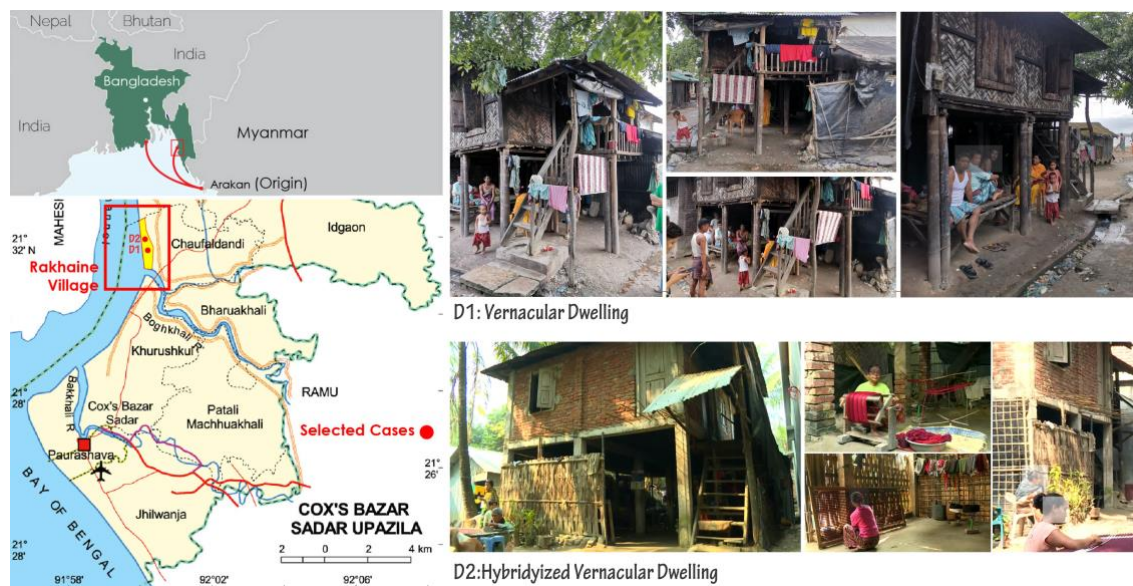
Methodology: Qualitative Research for Decolonial Practice

As a qualitative research practice, this study is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. Qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them (Kothari, 2004; Groat & Wang, 2013). Here, the vernacular dwelling is the setting, and the Rakhaine people represent the cultural phenomenon. To explore the morphology and hybridity of traditional dwellings, this study initially identified the destinations of the displaced Rakhaine in Bangladesh. Secondary sources revealed that the Rakhaine refugees fled into different parts of present-day Bangladesh: some settled down in Cox's Bazar, a few fled into the

Chittagong Hill Tracts, and others took shelter in the heavy forest areas along the coastal line of the districts of Patuakhali and Barguna (Hall, 1919; Majid, 2005).

The study selected one representative area, that of Chaufaldandi Union (local rural unit) in Cox's Bazar Sadar Upazila (sub-district) in the south-eastern coastal district of Chattogram. Rakhaines are the early settlers of this coastal area which is surrounded by several hills, rivers, and upward slopes, which are the important reasons for Rakhaines migration to this place (Majid, 2005; Khan, 1999). Chaufaldandi is named after the Rakhaine word 'Chau', which means 'Char' or vacant high land. The name is indicative of the early presence of Rakhaine. Indeed, Rakhaine people settled the region and their early descendants transformed the current area into a habitable landscape. Chaufaldandi Union is located about eight kilometres north-east of Cox's Bazar, the longest beach city in the world. Considering these factors, Chaufaldandi was selected as the study area for this qualitative research with representative dwellings selected from the sub-village of Madhyam Rakhaine Para.

Figure 1. Location Map



Location and images of the selected cases. Source: Authors.

This case study investigates a contemporary phenomenon within its real-life context where the boundaries between phenomenon and context are not clearly evident (Yin, 1981; Zainal, 2007). An attempt is made to connect the theoretical aspects of this research with real-life cases (Gummesson, 2000; Ahmed et al., 2016). Two dwellings are selected as specific cases for exploration: one was built around the mid-twentieth century (D1: Vernacular Dwelling), and the other was built in the last decade (D2: Hybridized Vernacular Dwelling). These two cases represent the development of Rakhaine dwellings in both traditional and hybridized ways (See Figure 1). However,

the old example was already modified a little, and thus original morphology is extracted through archival records of secondary data, and primary data from field studies.

Qualitative research study involves the collection and use of a variety of empirical materials (Denzin, 1994; Groat & Wang, 2013). For the primary data, in-depth interviews using a semi-structured questionnaire were conducted. Male and female middle-aged and elderly Rakhaine people of Madhyam Rakhaine Para were selected as respondents for the face-to-face interviews. As more senior members of the village, they have a better understanding of the transformation and morphology of their dwellings. The selected respondents constitute what is technically called a 'sample' (Kothari, 2004). Furthermore, direct observation was conducted by the authors within the territory of the selected two cases. Later, the collected data was triangulated through narratives and visualizations to identify the determinants and indicators responsible for the dwelling transformation or hybridization.

Findings

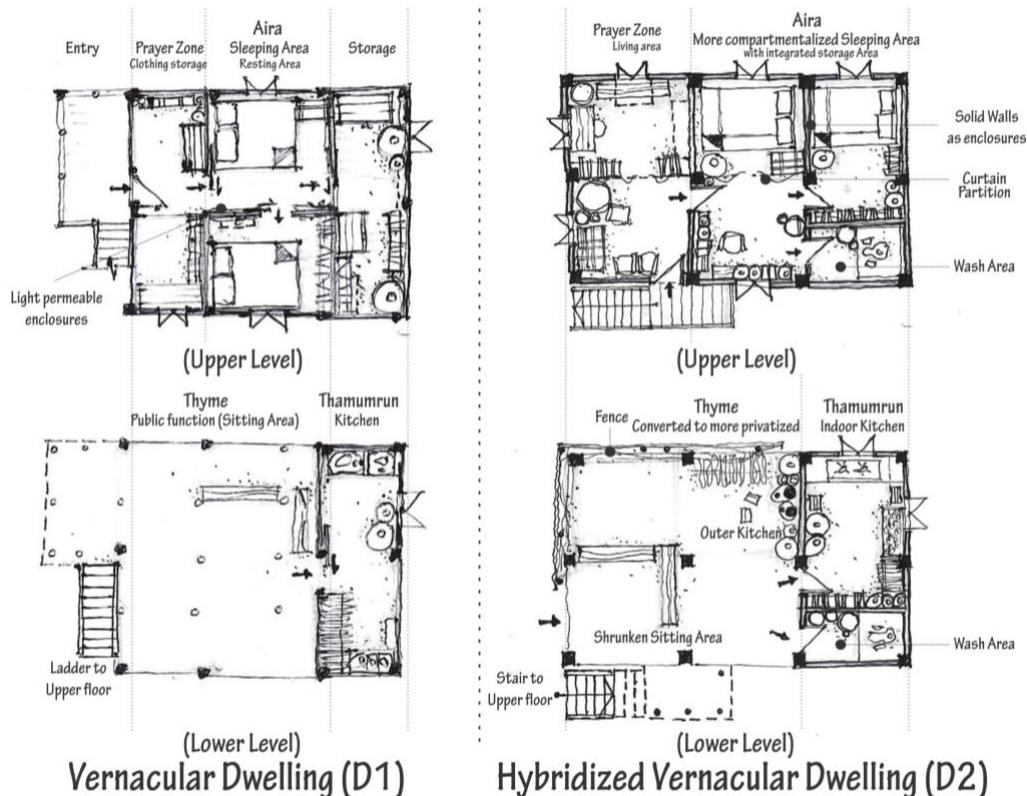
Morphology of Rakhaine Dwelling

To investigate the morphology of the Rakhaine vernacular dwelling in Bangladesh, three architectural typology indicators are selected as representative examples to comprehend inherent architectural analogies. The first characteristic, referred to as 'Architectural Compositions,' will characterize the distinct spatial sequence of Rakhaine vernacular dwellings as well as the distribution and specification of various architectural arrangements of a dwelling unit's constituent elements. The second characteristic, 'Site Restriction and Intended Uses,' defines the constraints (climate, topography, hazards, etc.) imposed by the site on the domicile's intended use and activities. The third characteristic, 'Material and Construction Technique,' focuses on the technical and physical aspects of the house form as depicted in Chaufaldandi Rakhaine village dwellings. All of these factors will aid in gaining a clear understanding of the traditional concept of space held by migrant Rakhaines, particularly in the form of their dwellings.

In the village of Madhyam Rakhaine Para in Chaufaldandi, the architectural compositions practiced by the Rakhaine comprise dwelling units designed as a single compound resembling South Asian vernacular architecture. Under a single roof, interior and semi-outdoor spaces are arranged which serve and service various functions. In contrast to Bengal Indigenous vernacular architecture where courtyard-centred housing in which all spaces are horizontally distributed around a courtyard is prevalent; in Rakhaine homes, the lower level of the constructed form serves the primary purpose of a courtyard. In this regard, the Rakhaine's traditional vernacular

architecture is distinctive and exceptional, as are the current hybrid forms that attempt to adhere to their traditional origins in order to preserve their cultural identity. Under the single canopy roof, various public, semi-public, and private spaces are vertically arranged. As with traditional homes of the former Arakan state, the entire dwelling can be separated into three distinct functional levels illustrated in the figure 2 and 3.

Figure 2. Plan of Dwellings



Lower and middle tier spatial components are demarked in the plans. Source: Authors.

It is evident from the plan (figure 2) that the first level is simply situated on the ground and is connected to its surroundings due to its openness and the reduced use of vertical enclosures. Wooden piles are distributed around the house's periphery and toward the longer centreline; they serve as the primary load-bearing component of the upper level and are the principal vertical elements at the ground level. This portion of the Rakhaine dwelling is open to the public. Other than the seating area (locally known as *Thyme*) used for family, social, and income-generating purposes, and the kitchen (locally known as *Thamumrun*) which is the only enclosed area on this level, there are no other functional components to this public space. The area known as *Thyme* is furnished with timber benches and tables for seating, and it is open on three sides. To the west of this linear stratum is a solid enclosure surrounding the kitchen. Inside, the cooking essentials, such as a clay stove, firewood, and cooking implements, are

located above the ground. The bathroom is located at the rear of the site, separate from the primary dwelling.

The upper level of the Rakhaine dwelling, which is connected to the lower level by a short wooden staircase, is the primary living space. This semi-private and private platform, which is typically 8–10 feet above ground level, includes space for family gatherings and bedrooms. The space immediately accessible after ascending the stairs is the wooden attic, which has three open sides. The remaining linear portion of the home contains the entire interior space. Multiple double-hung timber windows that open to the exterior can be found on the enclosures. In this indoor portion of the rectilinear configuration, the primary functional space consists of the shrine and sleeping rooms (locally referred to as *Eira*). Multiple partition walls separate these tiny private areas. The only notable furnishings are the floor bed, the Buddhist shrine, and the luggage container. The load-bearing capacity of the wooden floor is limited, so the minimalism of practical objects is significant.

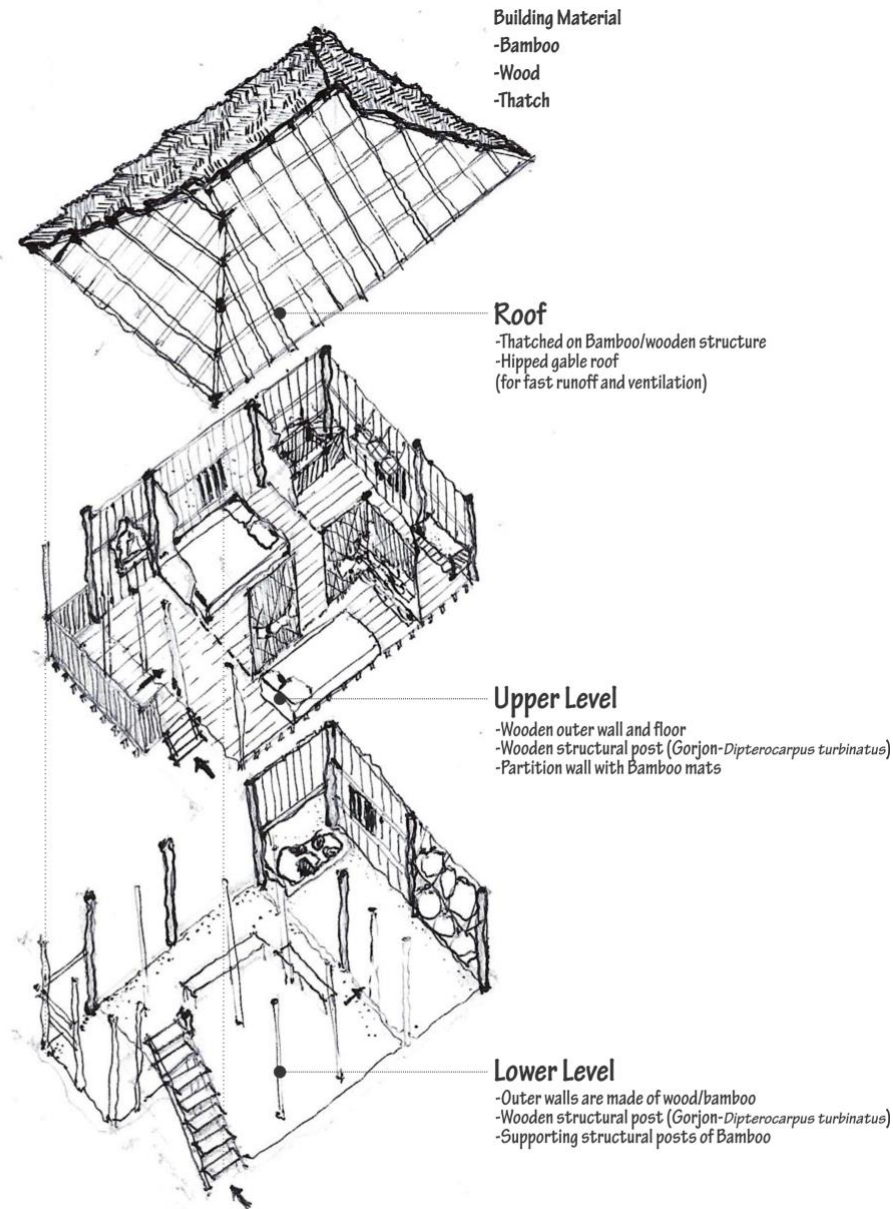
The third level of this Rakhaine dwelling is the roof. This roof has a single linear superstructure and is of the hipped gable or gable and hip variety. This steeply pitched roof does not function as a storage attic. It is typically comprised of exposed wooden beams on the interior, covered with thatch from the outside. These aspects are clearly evident in figure 3. There is an opening in the upper portion connecting the gable and hip elevation for climate control. Based on this spatial description of a traditional Rakhaine dwelling, it is evident that this form of spatial distribution is unique and differs from both the Indigenous architecture of the colonized Bengal people and British colonial architecture.

Since the 11th century, this unique Rakhaine stilt dwelling has adapted to the climatic and geographical variables of its tropical environment. According to previous literature evaluations of site restrictions and intended uses, houses adapted to constraints imposed by any given site. Similar reflections on site restrictions can be observed in the Chaufalandi village stilt houses. The Rakhaine people who were uprooted from their native land, relocated to this site due to the profusion of various natural resources. They settled in Madhyam Rakhaine Para riverside community's floodplain lowlands.

As observed during the survey period, dwelling one (D1) has a rectangular and linear layout similar to that of other homes. The rectangular house shape extends laterally in the north-south direction, i.e., the east and west sides of the house are the shortest. As a result, light and air can easily enter the living areas through the house's numerous windows on the north and south sides. On the other hand, stormy winds from the north-west can pass through. In addition, the space beneath the home protects the upstairs living environment from water inundation and tidal surges. This open space (lower

level of Figure 3) also serves as a barrier between the house's inhabitants and the various reptiles and insects that inhabit the region's soil and vegetation.

Figure 3. Axonometric View of Vernacular Dwelling



Vernacular Dwelling (D1)

Single three tier compound structure

Building materials and construction technology of vernacular dwelling. Source: Authors.

The upper layer's floor is made of wood and sits on wooden piles, preventing heat transfer from the earth. Given that less moisture can penetrate, the indoor environment remains dry. This middle stratum with the most interior living space is enclosed by a

light bamboo fence or wooden plank enclosure that aids in the rapid transmission of heat and cold (figure 3's upper level). Due to the pitched roof's overhang, rain cannot reach these enclosure surfaces and windows. The wooden loft, accessed by a staircase, is an important feature of this floor of the house.

The principal feature of the upper level is the steeply sloping gable-hip roof that shields this residence from the tropical climate like an umbrella. The slope is highly effective for facilitating the rapid discharge of moderate or heavy precipitation. On the other hand, due to the angular slopes on both sides, a void is created above the interior living space, which contributes significantly to passive cooling by exhausting heated air from within and creating a heat buffer (figure 3's roof level). There is an opening for ventilation and wind passage between the pitched roof and the wooden enclosure. Additionally, family activities temporarily occupy this space during an emergency period following a natural disaster.

In terms of intended use, it should be noted first that this stilt house is designed exclusively for residential use. The activity beneath their stilt home is very lively. It is the primary area where family, neighbours, and outside visitors congregate. Here, brief activities such as family and social gatherings, conversations, and shared meals take place. Men whose primary source of income is agriculture or fishing, perform supplementary tasks such as the processing of post-harvest produce and the weaving and mending of fishing nets. Nowadays in addition, many women prepare weavings, handicrafts, and processed foods in this location as an alternative source of income and a part of cultural resurrection.

The upper level of the vernacular dwellings includes areas for relaxation, worship, and family gatherings. These pursuits are conservative in nature because they are confined by solid walls and limited openings. However, the semi-outdoor loft, which is connected to the private environment via a wooden stairway, serves as a transitional area between the public and private milieus. Lightweight partitions compartmentalize indoor relaxing activities, and the area immediately following the entrance is reserved for communal devotion. The remaining chambers are divided based on the age and gender of the family members. The bedroom of the family's male or female patriarch or matriarch is located in the front of the house, while the living area of young women and the elderly is situated inward. The trunk containing the family's valuable possessions and assets is stored in these inner rooms. Notable is the absence of any functional purpose or activity for the vacant space under the roof in the dwelling examined in this study.

Technical and physical aspects of the Rakhaine traditional house form were highly influenced by the landscape of Cox's Bazar at the time of construction. During the

period of settlement formation, the area was full of natural resources, including an abundance of wood and bamboo. Among these indigenous materials, wood is one of the most widely used in Rakhaine vernacular dwellings. Traditionally, Arakan state and Myanmar had a natural wealth of various types of timber. After being displaced to Bangladesh, the Rakhaine continued their tradition of using wood to build houses. The main house is built 8-10 feet above the ground with wooden poles, which are the primary load bearing elements of this house design. The use of wooden planks in making the upper enclosure and floor is noticeable; these are lightweight and easy to replace for maintenance. The use of a bamboo fence can be seen for the inner partition. Fences were used instead of wood in the outer enclosure of several nearby houses. The use of thatch covering the slopes of the pitch roof is noticeable and the hipped gable structure below is made of a wood frame.

In terms of construction technique, the floor of the middle tier and the upper pitch roof are supported by woodpiles as vertical structural members. In floor construction, planks are supported by crisscrossing timber beams of varying sizes. In contrast, the roof structure is created using the angular joint of the timber beam in the rafter purlin method. Multiple wooden slabs are connected side by side with smaller wood panels to form walls. In addition, wood has been used to create minor detail components such as windows and stairs. All these practices are native to the Rakhaine building method.

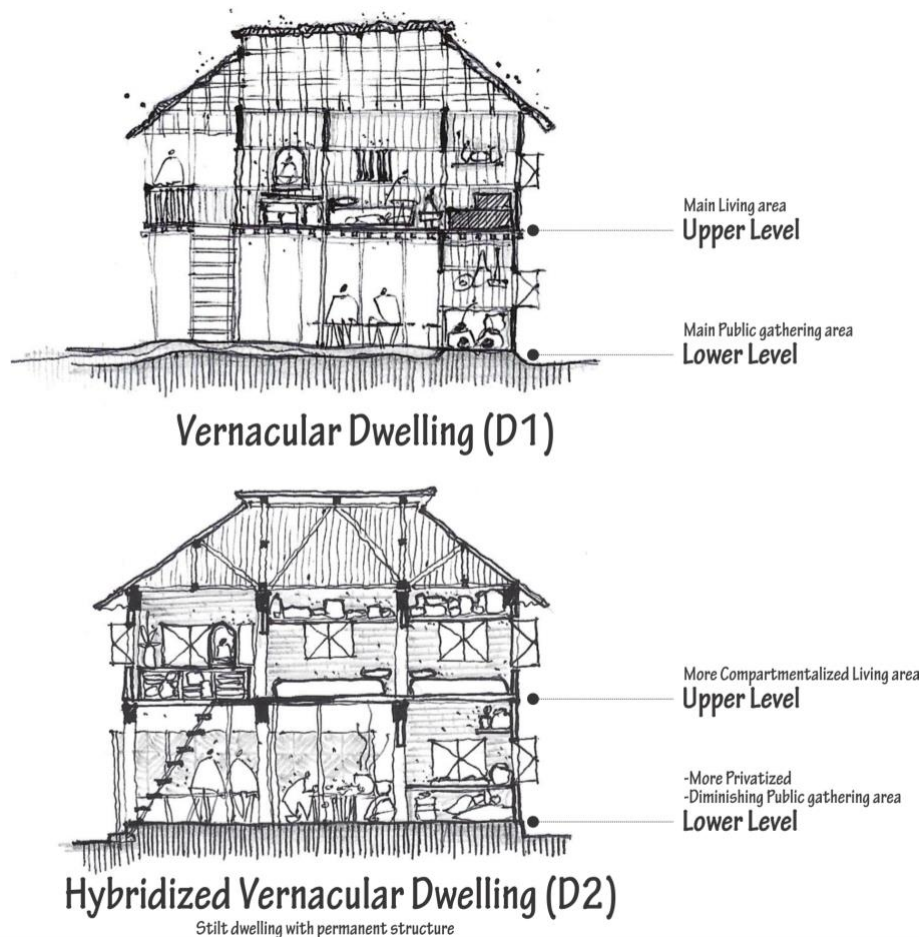
Hybridization of Rakhaine Dwelling

The second objective of this study is to explore the hybridization status of Rakhaine dwelling morphology in the present context. It is identified from the empirical data that the houses have changed drastically in the last couple of decades. Therefore, the second dwelling is selected because it was constructed in recent times. These changes are explored and elaborated upon below through narratives and visualization (figures 4 and 5). Thus, the following segment sequentially narrates the dwelling transformation through different architectural components, adaptation to local climatic variables and vulnerabilities, modification of space use, and changes in building materials and construction techniques.

When the Rakhaines first came to Chaufaldandi, they cleared part of the environment, and settled down. Being completely self-reliant, there was little connection or conflict with the surrounding local community. Later in 1947, after the colonials withdraw and the region underwent partition, the Indigenous Bengali people became the decision-makers in this context. Ethnic minorities like the Rakhaine started to be considered refugees and their living facilities began to deteriorate in various ways. The surrounding Bengali population gradually began to infiltrate within the Rakhaine settlement. On the other hand, as the Rakhaine population increased, the density of

dwelling units within this settlement territory also increased. New functions are being added to the previous single compound structure through the addition of porches. As a result, newly built houses tend to incorporate several new elements and characteristics beyond their traditional identity.

Figure 4. Section of Dwellings



Intended uses and activities of both dwellings. Source: Authors.

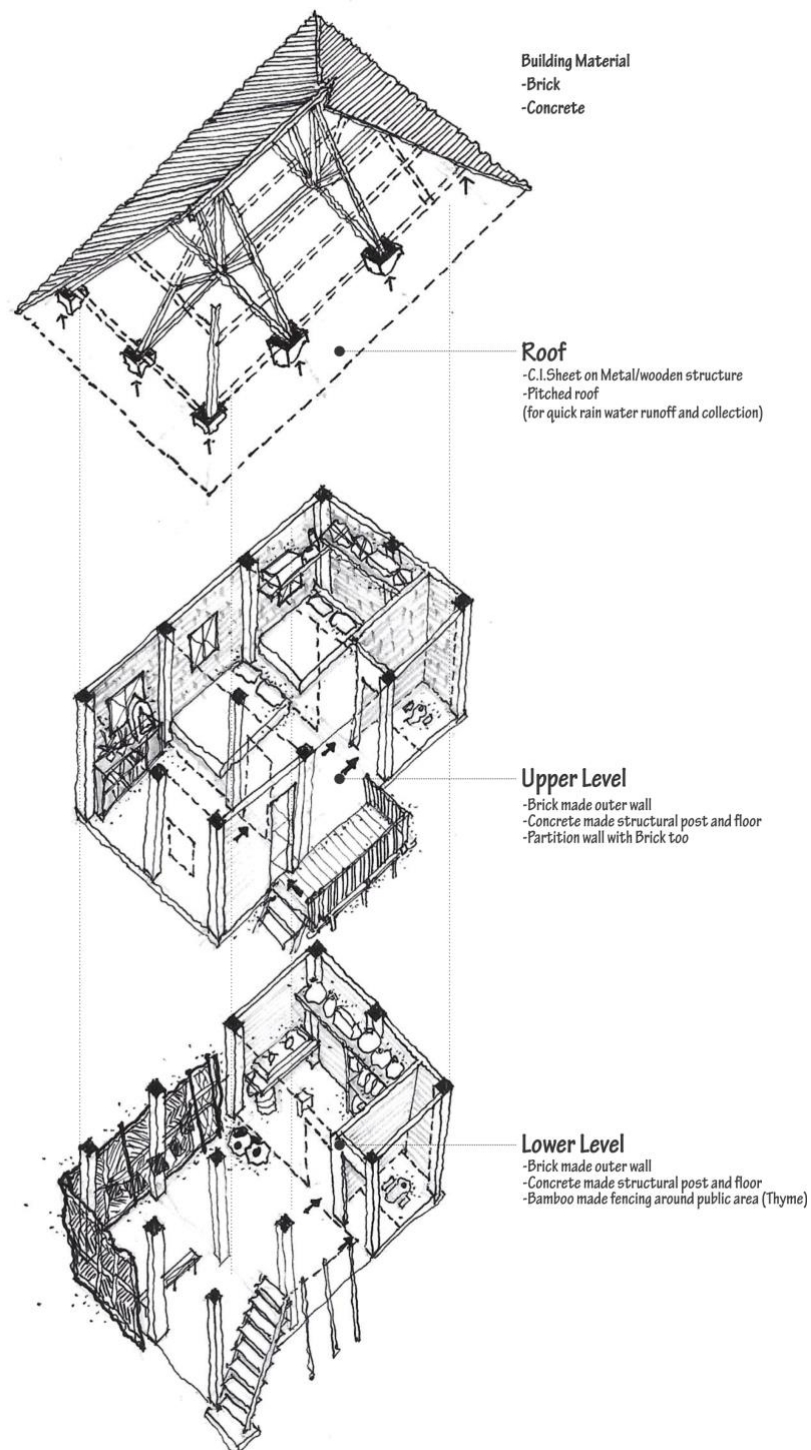
According to the Rakhaine settlement morphology, there was no boundary between two different dwelling units located side by side. There was communication between the houses, and some service functions were shared. However, due to the intrusion of people outside their own ethnic group, the lower tier of dwelling at present is being transformed and presents a conservative and interior-focused nature. Specifically, the *Thyme* is nowadays surrounded by a boundary fence. As a result, this distinct semi-outdoor space is being converted into a private space due to the need for social privacy. Moreover, as the number of family members living in one dwelling is increasing, due to the limitation of land for horizontal extension, the private space is being extended in these spaces with the need for new functional space.

As this new house is built on a modern rigid frame structure, the architectural constituents of the middle tier are also changing. Although the openings are still small, brick walls are taking the place of the previous light and perforated enclosures which is clearly evident in the comparison of figures 2 and 4. The grid layout of the rigid frame guides the size and configuration of the different rooms in the indoor space. As load-bearing limitations are reduced, the range of furniture and accessories used in private spaces is increasing. On the third tier, the position and configuration of the roof are unchanged except for the material. It is also observed in the dwelling unit that, although it is built with a modern outlook, the roof is still pitched.

Since the Rakhaine settlement is located in the coastal belt of Cox's Bazar, different local climatic variables and vulnerabilities are playing a major role in the adaptation measures of the vernacular dwelling. The inflow of new construction processes not only act as a catalyst, but the durability and disaster adaptability of housing structures remain core concerns. To prevent salinity intrusion, people are turning to brick and concrete houses. However, there is no alternative construction structures to prevent the damage caused by cyclones, tidal surges, and floods from the nearby sea. Even as disaster-adaptive construction methods are incorporated into dwelling design, climatic comfort is being negotiated. Due to the increase in the use of corrugated sheet or tin instead of thatch roofing, unbearable heat is experienced in the middle tier's indoor spaces during the summer. Moreover, due to the high heat capacity of brick and concrete heat flows inside the house through convection. The lack of permeability of these materials means heat transmission is low and unsuitable for ventilation. Additionally, the corrugated tin sheet of the roof rusts quickly due to the high frequency of rain in the monsoon season.

Like other built environmental aspects, the use and activity spaces of dwellings are also changing. This change is particularly noticeable in the public activities that took place in the lower tier of the previous dwelling (figure 2). The social and income-generating activities of the semi-outdoor *Thyme* are moving inside the boundary fence due to the increase in the populations of people from different cultural orientations. Moreover, changes in culture towards individualization, means the communal social life system is becoming narrower. The cultural conservativeness of Rakhaines is manifesting in increasing privacy in their lives. Moreover, due to the conservative lifestyle of women in the surrounding Bengali society, nowadays Rakhaine women also do not feel comfortable working in an open environment.

Figure 5. Axonometric View of Transformed Vernacular Dwelling



Hybridized Vernacular Dwelling (D2)

Added portions with main dwelling and transforming functions

Building materials and construction technology of transformed vernacular dwelling. Source: Authors.

Changes in building materials and construction techniques are highly noticeable. The extent and availability of industrial materials has encouraged everyone to adopt new materials. Simultaneously, the footprint of the built environment has increased so much in recent decades due to the tide of development that indigenous material is scarce or not available. Thatch for roofing is less available as a by-product of agricultural yield due to reduced dependence on farming. A ban on illegal logging has been imposed due to deforestation and timber prices have skyrocketed per cubic foot (Cft). Above all, the durability of these materials is no longer efficient due to the different dynamics and vulnerabilities of the coastal belt of Bangladesh. In this situation, the previous load-bearing wooden piles and beams are being replaced by concrete columns and beams, respectively. Brick walls are being used instead of wooden planks and bamboo fences to make enclosures. However, availability is not the only determinant; to increase social status, people are moving towards using industrial materials.

In figure 5, the transformed vernacular Rakhaine dwelling is illustrated where the use of rigid frame structures instead of wood-based construction techniques is noticeable. As with earlier spatial practices, the lower plinth is still made of clay. The middle-tier floor and loft are made of concrete slabs. The roof structure remains pitched, but is made of corrugated tin sheet with the rafter purlin method and placed directly on the concrete beam, column and brick enclosure. By adapting the rigid frame structure, the opportunity for vertical extension of the Rakhaine dwelling has been created to meet future functional needs.

Attributes of Dwelling Hybridization

Based on the findings stated above, different indicators are explored that are responsible for the changes in Rakhaine vernacular dwellings. In the following table, the study summarizes the changes in the dwelling, the indicators for the change, and attributes in relation to the changes explored in the previous empirical data. The left column in Table 1 represents the changes in the dwelling which are indicators of hybridity, identified in the transformed dwelling of the Rakhaine ethnic group of Chaufaldandi. The middle column lists social and physical indicators in the surrounding social and environmental milieu. The right column in the table lists the social, cultural, political, geo-climatic, economic, and resource factors attributed to changes to the vernacular dwelling.

Table 1. Attributes of Hybridized Dwelling

Changes of Dwelling	Indicators for Change	Attributes
<u>Space crisis:</u> • Solid walls are used as enclosures for social privacy and the need for more private space, rather than transient partitions. • Semi-outdoor areas are converted into private areas for arbitrary safety reasons. • Decreased transparency of the dwelling units through reducing openness, rendering them introverted by nature. <u>Commercial pressure:</u> The continuous conversion of social spaces into indoor income-generating space. <u>Change in beliefs:</u> Modern construction (permanent material selection) maintains status by inducing changes in the localized construction material and labour market.	• Privacy • Cultural Difference • Conservativeness • Heterogeneity • Social status	Socio-cultural Hegemony
<u>Space crisis:</u> • Limited space and cultural distinctions for horizontal extension lead to densification and an increase in the enclosed area of a domicile. • Due to the depletion of natural resources, a growing population increases the risk of climatic hazards rises political stakes over cultural domination. <u>Physical transformation:</u> As needed, random porches were added to meet additional functional needs.	• Limited Territory • Density • Outsider Intrusion • Future Extension	Political Intuition
<u>Climatic menace and risk:</u> • As a resident of a coastal community, transitioning to a durable structure has today become a requirement for materialistic adaptation. • Rigid structure withstands all wind-related disaster threats push them to make strong structure. • A sloping roof for water runoff and rainfall collection elevates the use of CI sheet above thatch. • Flexible orientation adapted to accommodate required density.	• Durability • Coastal vulnerability • Response to local climate • Disaster Adaptation	Local Geo-climatic Variables
<u>Scarcity of resource:</u> • Unable to purchase timber due to its high cost and limited availability; wood may no longer be considered a local material. • They are unable to acquire new land because their land allocation is predetermined by an external body.	• Land price and scarcity • Material cost • Lower Income	Economic Limitation
<u>Market dominance:</u> • Industrial materials are gaining significance as they become more accessible and affordable. • Wood collection is restricted to some specific region. • Less utilization of indigenous materials, as they are deemed vulnerable and require maintenance frequently.	• Availability • Permanence	Indigenous Material Scarcity

Attributes are identified by the indicators of transformed dwelling. Source: Authors.

Conclusion: Decoloniality, Tropicality, Hybridity

This study's initial findings depict the Rakhaine vernacular dwelling's morphology, which is an in-depth portrayal of their cultural origins as they have been adapted to an alien environment. The spatial sequence, tropical climate responsiveness, and use of eco-friendly indigenous materials have given this dwelling a unique position in the South Asian vernacular architecture typology. This early morphology later contributed to the second phase of the study which explored and situated the transformation and hybridity of the Rakhaine dwelling.

Through a decolonial perspective the comparison of earlier and later phases of the Rakhaine vernacular dwelling avoided binary hierarchies that envision vernacular architecture as static and resistant to change and in opposition to modern buildings. This research, instead, demonstrates how vernacular architecture is dynamic, multi-faceted, and adaptable to contemporary circumstances. In this study, the tropicality of the site of the dwellings is a significant factor, which includes: the tropical climate and impacts of climate change on the vulnerability of the coastal area, the deforestation of the tropical environment, and changes in agricultural practices. Environmental impacts and socio-cultural changes including modernity, development and demographics, have in turn effected changes in the typology of the Rakhaine vernacular dwelling. This transformation can be understood through the postcolonial theory of hybridity.

Changes in the culture of the Rakhaine are tangibly evidenced in the transformations of their material culture and seen in their architecture. Changes in the use of industrial construction materials are influenced by the materials' comparative cheapness and ready availability, and their reduced maintenance costs. Rakhaine people are leaning towards these materials to ensure the durability of the house, considering the environmental variables of the area. In addition, the modern outlook is chosen to maintain their own position and social status while acculturating within the surrounding mainstream Bengali population.

Therefore, the socio-cultural hegemony and political intuition of neighbouring communities, geo-climatic factors of the local context, poor economic status, and indigenous material scarcity are identified as major attributes responsible for Rakhaine vernacular dwellings' continuous hybridization. These attributes are extended from hegemonic power structures to anti-hegemonic modalities and realities of the studied context. These attributes can be usefully employed to assess the hybridity of vernacular architecture in other studies. While, most of the time, transformations in vernacular architecture are assessed negatively, this study – through the concept of hybridity – demonstrates how these changes can be assessed through a more

complex and multi-faceted analysis. As the study area of this research is limited to Madhyam Rakhaine Para in Chaufaldandi, these attributes may vary in other places where Rakhine have settled and for any other communities that are represented as displaced ethnic minorities.

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