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BRIDGING TRADITION AND MODERNITY: BRICK ARCHITECTURE AND CRITICAL REGIONALISM IN CONTEMPORARY VILLAGE RESIDENCE IN BANGLADESH

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ABSTRACT

Traditional brick has been the most preferred construction material in the Bengal region since 300 BC. During the renaissance of modern architecture in Bangladesh, which began in the early 1950s, brick architecture was revived through large-scale national projects as well as smaller private projects. This trend has continued and evolved into various experimental approaches integrating brick with other contemporary materials. This paper aims to illustrate the application of brick as a sustainable and contextual material and its use in different architectural elements to achieve climate-responsive architecture in a single-family residence. Moreover, it explores how contemporary brick architecture can blend seamlessly into the rural context of Bangladesh without disrupting the existing rich rural fabric and lifestyle. Adopting a qualitative approach, the paper presents a brief literature review on the chronological development of critical regionalism through brick architecture. Additionally, architectural drawings of the case study residence are analysed to demonstrate the application of critical regionalism in contemporary architecture in rural Bangladesh. The findings show that incorporating conventional materials that can be locally sourced provides flexibility in terms of available expertise while enabling architecture to blend into the existing socio-cultural context. This approach supports the advancement of the architecture industry in contemporary times.

Keywords: Brick architecture, Critical regionalism, Climate-sensitive architecture, Bangladesh.
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INTRODUCTION

This study explores the use of conventional construction materials such as brick and associated architectural elements—such as brick *jaali*, vertical louvres, tilted louvres, integrated rainwater harvesting for plant maintenance, and strategically placed openings to enhance natural ventilation—in order to achieve sustainable, contextual architecture through the approach of critical regionalism in the rural region of southern Bangladesh. Critical regionalism, which emerged in the late 20th century, is an architectural theory that emphasises local culture and architectural identity while balancing global trends. It was developed as a response to the place-lessness and lack of identity in the International Style (Frampton, 1993; Lefaivre & Tzonis, 2003). The approach gained prominence through the works of architects such as Kenneth Frampton, Alvar Aalto, Tadao Ando, and many others. In the Indian subcontinent, architects such as Balkrishna Doshi and Charles Correa in India, Minnette de Silva, Geoffrey Bawa in Sri Lanka, and Mazharul Islam, Bashirul Haque, and Saiful Haque in Bangladesh adopted this approach in the mid-1900s. Since then, the architecture of this region has been primarily influenced by this philosophy, carried forward by later generations of architects.

In today's world, the dynamics of the architecture industry have witnessed a recent shift toward reconnecting with the origins of place, appreciating local building culture and traditions.

This paper aims to provide insight into this topic, specifically examining the architectural development of Bangladesh through history by analysing the design of a rural residence as shown in Figure 1..

Figure 1: An amalgamation of contemporary architecture within the traditional vernacular context of rural Bangladesh.

LITERATURE REVIEW

Brief chronology of brick architecture in the Bengal region

The geological location of Bangladesh within the Bengal Delta has ensured an abundance of clay as a construction material since the first millennium BCE. The Bengal region, encompassing modern-day Bangladesh and West Bengal, saw ancient brick and terracotta architecture (Figure 2) reach its pinnacle between the 8th and 12th centuries during the Pala Empire, continuing through the Bengal Sultanate period (14th to early 16th centuries) (Hasan, 2014; Sharmeen, 2021).

Unlike other regions of the Indian subcontinent, Bengal lacks substantial stone resources suitable for building. Consequently, clay-based products like brick, terracotta, and tiles become the primary building materials, often mimicking the vernacular style of timber detailing and thatched roof shapes (Hasan, 2014). During the Bengal Sultanate period, numerous mosques were erected featuring intricate brick detailing (Figure 3) and a fusion of Indo-Persian Islamic elements such as domes, vaults, and pointed arches (Hasan, 2011).

Figure 2: Ruins of the central Buddhist stupa (800 AD), a UNESCO World Heritage Site (Source: https:https://en.wikipedia.org/wiki/Architecture_of_Bengal/)

The colonial era (1757–1947) also witnessed extensive use of brick for government buildings of various scales in Bengal. In addition to brick as the primary construction material, spatial layouts became more responsive to the climate for both public and domestic buildings (Afzal, 2018). Features included long verandas protecting inner habitable spaces from direct sunlight, allowing airflow while shielding from monsoon rains; inner courtyards for privacy and ventilation; thick masonry walls acting as thermal barriers; and linear organisation of rooms facilitating cross ventilation (Ahmed & Khan, 2024).

The pre-independence period (1947–1971) marked the early arrival of modernism in the region through the works of local and international architects. Notably, modernist architects like Louis I. Kahn and Paul Rudolph adopted brick as their primary construction material for various projects across Bangladesh (Figure 4). This adoption included climate-responsive spatial layouts and architectural elements, sowing the seeds of critical regionalism alongside pioneering local architects (Asiatic Society of Bangladesh, 2021; Morshed, 2017; Scotto, 2018).

Figure 3: Darasbari Masjid (1479), remnant of Bengal sultanate architecture with intricate brick work. (Source: https://en.wikipedia.org/wiki/Bengal_Sultanate)

Throughout the history of Bangladesh and the Bengal region, brick architecture has evolved with technological advancements, yet the appeal of traditional burnt clay brick remains constant (Rumana & Bin Ahmed, 2013). This enduring appeal is evident in the works of various contemporary architects. A comprehensive discussion of prominent local architects will be presented as case studies in the next section to provide better insight into the application of brick in contemporary architecture of Bangladesh.

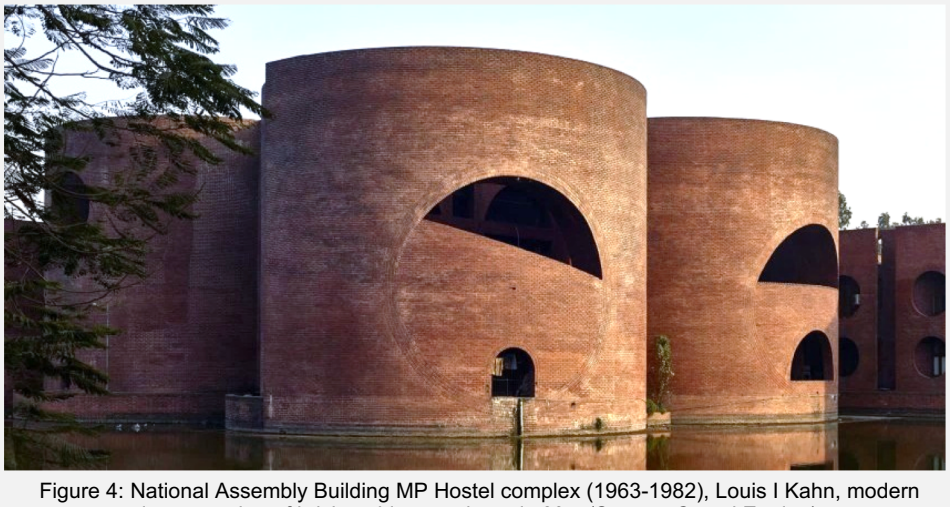

Figure 4: National Assembly Building MP Hostel complex (1963-1982), Louis I Kahn, modern interpretation of brick architecture in early 60s. (Source: Cemal Emden)

CASE STUDY 1: ARCHITECT MAZHARUL ISLAM'S RESIDENCE

Overview

Architect Muzharul Islam's residence (as shown in Figure 5) in Dhanmondi is a testament to his modernist approach, deeply influenced by Le Corbusier's philosophy. Inspired by Corbusier's *Villa Shodhan*, the house features a parasol roof, an architectural element that provides shade and protection while defining the overall structure. Constructed primarily with brick and reinforced concrete, the residence embodies Islam's mastery in climate-responsive design, structural clarity, and proportion.

Figure 5: Exterior view (3D) of Architect Mazharul Islam's residence
(Source: Wahiduzzaman Ratul & Shihan Karar)

Site Context

Despite its urban setting, the residence is surrounded by ample open spaces, including a south-facing lawn, gardens, and a small water feature, reflecting the traditional Bengali rural courtyard (*uthan*). These outdoor spaces foster a connection with nature while enhancing thermal comfort.

Orientation

The house is meticulously oriented to optimise climate responsiveness:

- West Side: Solid brick walls shield the interiors from harsh sunlight and heat.
- South Side: Open and permeable, allowing natural ventilation and daylight, with shaded outdoor spaces mitigating heat gain.

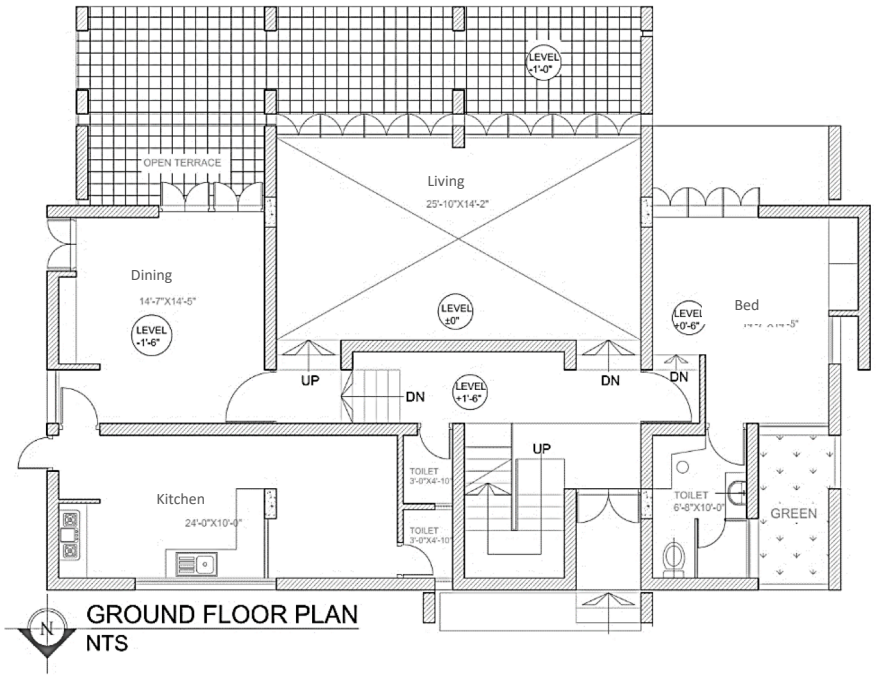

Figure 6: Ground floor plan of Architect Mazharul Islam's residence
(Source: Wahiduzzaman Ratul & Shihan Karar)

Layout

The house follows an open-plan concept, with flexible spatial interconnections between levels (Figure 6). There are few level variations within the floor to define spaces without the interruption of walls. The void in the living space links the upper floors with the ground as well as enhancing natural ventilation within the house.

- Ground Floor:
  - Entry through a lobby, leading to a double-height living area, fostering social interaction and visual connectivity.
  - Spaces for guest accommodations, dining, and kitchen are seamlessly integrated.
  - Level variations and a step-down design emphasise transitions between spaces.
  - The south-facing lawn extends the living experience outdoors while reinforcing traditional courtyard typology.
- First Floor:
  - A central lobby connects all bedrooms, ensuring privacy while maintaining openness.
  - A study room and verandas provide shaded outdoor spaces, protecting from monsoon rains and summer heat.
  - The upper level houses a library, visually linked to the lobby through the double-height void.

Architectural Elements

- Parasol Roof: Inspired by Corbusier's *Parasol House*, the floating slab on RCC columns provides climatic protection while defining the architectural language.
- Verandas and Openings: Designed to extend indoor spaces outdoors, ensuring cross-ventilation and thermal comfort.
- Staircase and Vertical Voids: Create a multi-layered spatial experience, enhancing both visual and physical connectivity.

This residence is an exemplary model of modernist tropical architecture, integrating regional elements, climatic responsiveness, and contemporary spatial planning.

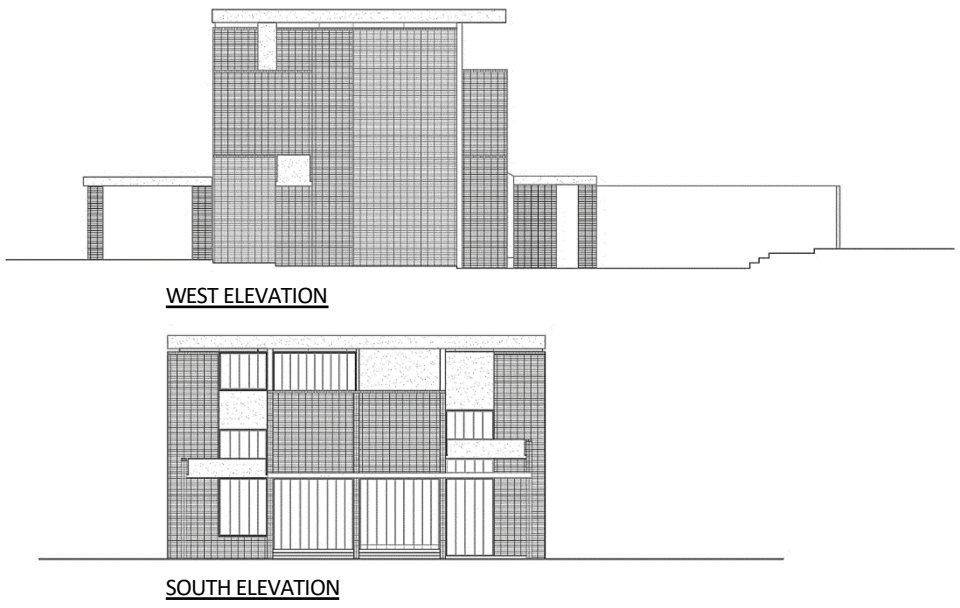

Figure 7: West elevation with minimal openings to reduce heat gain versus south elevation with ample openings for maximising natural ventilation.
(Source: Wahiduzzaman Ratul & Shihan Karar)

Climatic considerations

As seen from the layout and elevations, this residence is designed in response to the solar orientation and wind direction. Additionally, internal spatial layout illustrates the open planning for maximising natural ventilation and daylighting. To protect the users from the west sun, the design provided layers of ancillary spaces such as veranda, staircase and toilets. While, the southern side has large terrace and ample openings to bring in the prevailing wind from south-east. Kitchen, dining and the master bedroom is located on the east side to capture the desired early morning sun. As north light is the best option for reading, the study room is placed on north side.

This thoughtful climatic approach reflects the principles of critical regionalism in early modern Bangladeshi architecture, where modernist ideals were adapted to local climate and cultural contexts to create responsive and sustainable built environment.

CASE STUDY 2: BHATSHALA COMPLEX

Overview

Bhatshala Complex, located in the rural landscape of Brahmanbaria, Bangladesh, is a two-storey private residence designed by Architect Bashirul Haq. Built in 1989, the house follows a climate-responsive approach, integrating traditional architectural elements with passive design strategies to ensure comfort and sustainability (Figure 8). Its L-shaped configuration embraces a central courtyard, fostering a spatial relationship between built and open areas.

Figure 8: Bhatshala Complex showing beautiful exposed brick work on exterior façade.
(Source: Bashirul Haque Architect)

Site Context

The house is situated in a rural setting characterised by low-lying lands with small hills and red soil. The design respects its context by employing locally available materials such as sunbaked bricks and wood, allowing it to blend seamlessly with its surroundings. The spatial organisation follows a traditional homestead layout, where the courtyard serves as the heart of the residence, supporting both social and climatic functions (Figure 9).

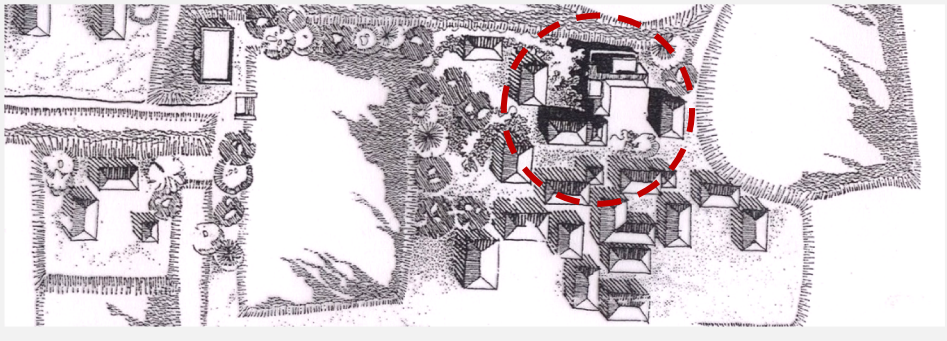

Figure 9: Bhatshala Complex within its rural context surrounded by open lands and vernacular village houses.
(Source: Bashirul Haque Architect)

Orientation

Oriented to optimise climate responsiveness, the house strategically places openings and shaded outdoor spaces to regulate indoor temperatures. The west and north facades are partially enclosed to protect against excessive heat gain, while the southern and eastern sides feature open corridors and terraces to maximise cross-ventilation and daylighting. This arrangement ensures thermal comfort by allowing prevailing winds to pass through, cooling the interiors during summer while also providing warmth during winter.

Layout

The layout consists of functional spaces distributed across two floors (Figure 10). On the ground floor, a corridor connects primary living areas, including bedrooms, a semi-covered terrace, and common spaces. The first floor, lighter in structure, integrates shaded spaces with wooden louvered windows and doors, maintaining airflow while ensuring privacy. The corridor acts as a transitional space, influencing internal temperature regulation by serving as a thermal buffer between rooms.

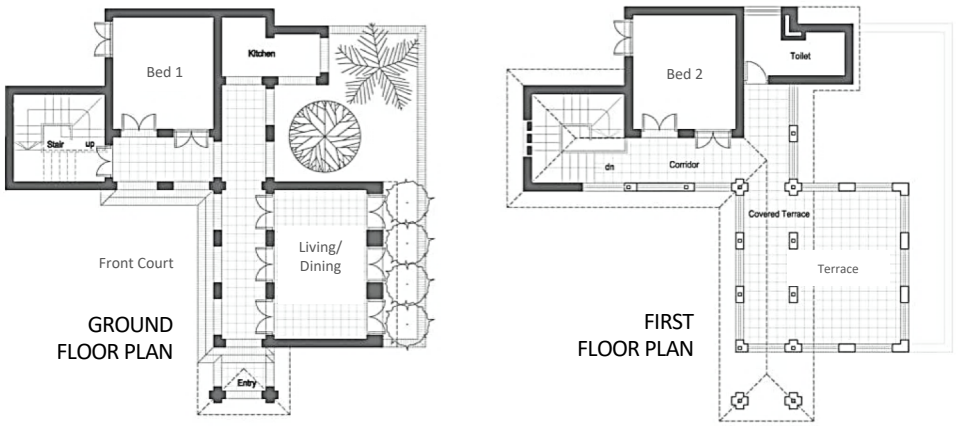

Figure 10: Ground floor plan and first floor plan of Bhatshala Complex
(Source: Bengal Institute)

Architectural elements

Architectural elements such as brick arches, exposed brickwork, and wooden details contribute to the house's vernacular identity. The use of Flemish bond brickwork, arched brick columns supporting the RCC roof, and wooden structural elements highlight the fusion of tradition with modern building techniques.

The inclusion of an extended veranda and corridor enhances connectivity between indoor and outdoor spaces, reinforcing the house's openness while offering protection from monsoon rains and summer heat (Figure 11).

The provision of front court instead of a courtyard illustrates the conventional practice of rural homesteads in Bangladesh. Conventionally front yard is used for daily household chores like drying crops, raising chicken and outdoor informal meeting place.

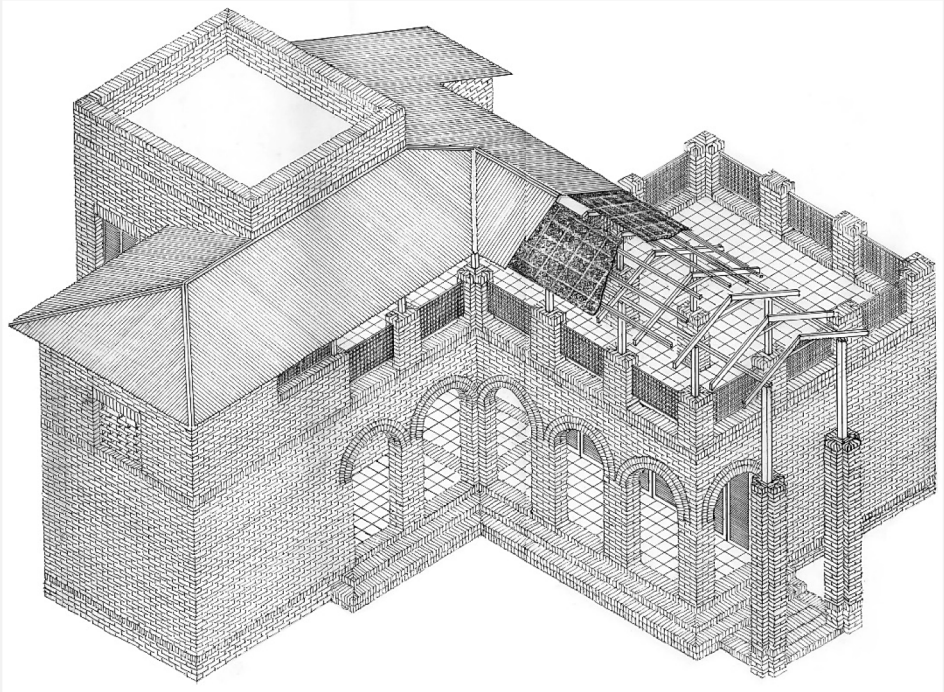

Figure 11: Axonometric view of Bhatshala Complex
(Source: Archnet)

Climatic considerations

The design of the Bhatshala Complex demonstrates a deep understanding of climatic considerations. The interplay between shaded outdoor spaces, ventilated corridors, and strategic material choices ensures that the residence remains thermally comfortable throughout the year. By incorporating regional construction methods and passive cooling techniques, the house stands as a significant example of climate-responsive vernacular architecture in the rural regions of Bangladesh.

Figure 12: Layered façade to protect the house from heat gain during summer.
(Source: Bashirul Haque Architect)

SYNTHESIS OF THE CASE STUDIES

This section presents the findings from the two case studies and synthesise the elements of critical regionalist brick architecture in the context of Bangladesh.

Contextual Considerations

In the rural context of Bangladesh, the placement of a house within a site is crucial, as it is influenced by several factors. These include the location of existing ponds, the connected front yard shared with neighbouring houses—often belonging to close relatives—the positioning of the animal shed to minimise odour, the presence of existing fruit trees, as well as considerations of access and privacy (Das et al., 2021). Once the ideal location for the house is determined, its spatial layout is then guided by its orientation.

Orientation and climatic consideration

Table 1 shows the basic design responses according to the orientation of the building.

Table 1: Building orientation and design considerations.

Direction	Climatic Considerations	Design Response
North	Receives soft north light, ideal for study and living areas.	Large openings, placement of living spaces to capture light.
South	Main source of prevailing wind; receives low-altitude sun in winter.	Openings for ventilation, bedrooms placed here, horizontal louvres to reduce heat gain and channel wind.
East	Receives early morning sunlight and prevailing wind.	Kitchen and some bedrooms placed here, vertical louvres for shading.
West	High heat gain from afternoon sun.	Minimal openings, veranda as buffer, vertical louvres, double or hollow brick walls to reduce heat.
North-East	Strong seasonal storm winds.	Trees and vegetation as wind barriers.
South-East	Most desirable side—receives year-long prevailing wind and winter sun.	Optimal placement for main living spaces.

Among the six seasons in Bangladesh, summer is characterised by extreme heat, a lack of rain, and seasonal storms. The monsoon season typically brings prolonged rainfall and seasonal floods. Winter is generally mild, except for cold waves from the northeastern side, which can lower the temperature to 5°C.

Throughout the year, the most crucial factors for human comfort in residential architecture include ample natural ventilation and adequate daylight while ensuring protection from thermal gain on the west side. Both case studies serve as good examples of these considerations.

Architectural elements

Table 2 lists down the climate responsive architectural elements for both case studies.

Table 2: Climate responsive architectural elements

Architectural Element	Climate-Responsive Function
Parasol & Pitch Roof	The parasol roof provides shade and reduces heat gain, while the pitch roof aids rainwater drainage and natural ventilation.
Exposed Brickwork	Enhances durability, regulates indoor temperature, and improves breathability with Flemish bond brickwork.
Semi-Open Corridors	Promote cross-ventilation, natural light, and seamless spatial connectivity.
Front Court	Acts as a thermal buffer, improves airflow, and integrates natural elements into the living environment.
Louvres, Openings & Verandas	Facilitate ventilation, minimise heat gain, and enhance indoor-outdoor interaction.
Brick Arches & Columns	Provide structural stability, increase airflow, and enhance thermal regulation.
Vertical Voids & Staircase	Improve air circulation, reduce heat buildup, and enhance spatial layering.
Extended Roof Overhangs	Protect against rain and direct sunlight, ensuring cooler interiors.
Wooden Structural Elements	Add warmth, flexibility, and improve insulation against temperature fluctuations.

Internal Layout

For both case studies, the open-plan layout enhances ventilation and daylight, reducing reliance on artificial cooling and lighting. The double-height spaces and voids facilitate airflow, preventing heat buildup in the tropical climate. While corridors and verandas are primarily for connectivity among the living spaces, they also act as thermal buffers, ensuring comfort through passive cooling. Shaded terraces and wooden louvers regulate indoor temperatures while allowing airflow. Courtyards and south-facing spaces integrate traditional layouts with climate-responsive design.

Both projects exemplify the early critical regionalism approach among the modernist architects of Bangladesh in their materiality, contextuality, cultural sensitiveness and climate responsive design.

METHODOLOGY

This study adopts a qualitative approach to explore the evolution, adaptation, and application of critical regionalism in brick residential architecture in Bangladesh. The historical background of brick architecture in the Bengal region is examined through a literature review. Two case studies were selected to analyse the early adoption of critical regionalism in the context of modern residential architecture in Bangladesh. The synthesis of these case studies identifies key climatic considerations and architectural elements for designing climate-responsive residential buildings using brick masonry as the primary construction material.

The derived elements from the case studies are applied to a contemporary residential project, illustrating architectural strategies for designing a two-story family residence in the rural context of Bangladesh (Narail district of the Khulna division). The total built-up area for the house is 220 sqm. The findings reveal how the application of climate-responsive brick architecture, guided by the principles of critical regionalism, informs building placement, orientation, façade articulation, spatial organisation, and the integration of elements such as louvres, pergolas, rainwater spouts, and built-in planter boxes (Figure 13).

This methodological framework enables a contextual understanding of how traditional materials and regional strategies can be meaningfully reinterpreted in present-day architectural practice.

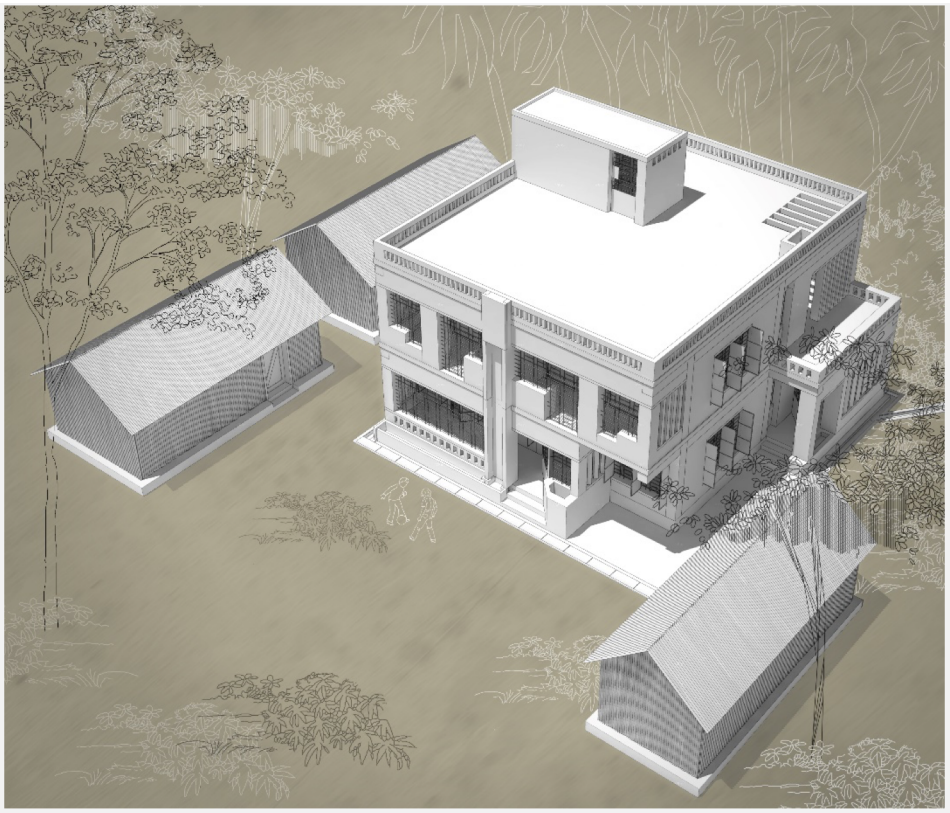

Figure 13: The proposed project within the surrounding rural settings.

FINDINGS AND DISCUSSION

Macro Climate and Seasonal Variation

The project is situated in the rural context of southwestern Bangladesh, in the Narail district of the Khulna division. This region is characterised by agricultural flatlands, crisscrossed with canals and rivers. There are six seasons, including summer, monsoon, and winter. During summer, temperatures can rise to 34°C around April. Seasonal cyclones also occur, primarily due to low atmospheric pressure in the Bay of Bengal.

The monsoon season (June–October) brings continuous rainfall for several days, often causing seasonal floods. In winter, temperatures drop to around 13°C, with occasional cold waves from the northern region lowering the temperature to as low as 5°C (Diebel et al., 2025).

The prevailing wind across most of Bangladesh comes from the southeast. The west side of buildings receives low-altitude afternoon sunlight, which can significantly increase indoor temperatures if not properly screened. The east receives morning sunlight, which is desirable, especially during cold winter mornings. The north side receives the least daylight, requiring sufficient openings for adequate daylighting and ventilation. However, during seasonal summer cyclones, strong winds of up to 260 km/h strike the coastal areas, primarily from a north-easterly direction (Diebel et al., 2025).

Site Context

- Water Bodies and Drainage

In rural Bangladesh, domestic water bodies such as ponds, ditches, and canals are significant landscape elements traditionally used for bathing, washing, fish farming, and rainwater retention. As village areas lack central drainage systems, these water bodies play a crucial role in flood protection. The project site features a pond on the north-eastern side, with rainwater drainage from the residence linked to it.

- Front Yard

The front yard is an integral part of rural homesteads, frequently used throughout the day for animal rearing, drying seasonal crops, welcoming guests, and circulation (Rahman, 2019). This contrasts sharply with urban dwellings, where courtyards are preferred for maintaining privacy instead of a front yard. For this project, the existing front yard has been retained, with an additional side access from the kitchen to enhance accessibility and functionality.

- Vegetation

The northern side of the site has a row of existing palm trees with tall trunks that act as an effective wind barrier against seasonal cyclones while allowing filtered light to pass through. Around the front yard, existing fruit trees have been preserved. Additional plantations have been integrated into the building façade for both climatic and aesthetic benefits.

For example, the western side features *bougainvillea*, a vine creeper that provides shade from the afternoon sun while offering vibrant purple blooms. The eastern side includes a two-layer terrace: the first level is covered with a pergola for seating, while the second is open to the sky with potted flowering plants. The front façade also has planter boxes connected to the rainwater drainage system for easy maintenance.

Internal Layout and spatial organisation

The design is organised into two primary zones: a living area (bedrooms and living spaces) and a service area (kitchen and toilets), with vertical circulation placed in the central shared space to connect both floors efficiently. This layout ensures functional clarity while supporting airflow and spatial connectivity, aligning with principles of climate-responsive design (Figure 15).

Passive cooling strategies and visual connections were explored to enhance indoor comfort, though these aspects were primarily conveyed through drawings. Initially excluded, front verandas were later incorporated at the client's request—an addition that proved beneficial. They contributed to climatic protection, enhanced security in the rural context, and enriched the building's spatial and visual character. Their inclusion also enabled greater flexibility in elevational articulation, reflecting a regional sensitivity embedded in the design.

Figure 14: The west façade showing slit openings and vine creeper as a protection from the low altitude afternoon sun.

Figure 15: Ground floor plan (left) and first floor plan (right) showing the internal layout of the two-story residence.

Figure 16: Sectional perspective and photographs showing the double height space connecting the ground floor with the first floor visually for enhanced daylighting, visual connectivity and natural ventilation.

Climate Responsiveness Through Sectional Design

The section design integrates climate-responsive strategies rooted in critical regionalism, balancing innovation with contextual sensitivity. A central double-height space is utilised to generate a stack effect, enhancing natural ventilation (Figure 16).

Solar heat absorbed by the stair core roof promotes the upward movement of warm air, which exits through ventilated brick *jali* screens. This process draws in cooler air from the south and southeast-facing windows and verandas, particularly effective due to dense vegetation on the east side that moderates ambient temperatures even during peak summer when the temperature can reach up to 34°C.

Additionally, the spatial arrangement of the semi-private zone—comprising dining and family living areas—supports both visual and physical cross-connections, allowing abundant daylight to penetrate the interior and minimising reliance on artificial lighting until late in the day. Planter boxes are strategically positioned to offer green views from multiple vantage points, contributing to year-round thermal comfort and sensory well-being.

The three images above illustrate the naturally lit double-height space that vertically connects the dining area on the ground floor with the family living space on the upper level. Captured during mid-day, all images demonstrate effective daylight penetration without the use of artificial lighting. The first image (A) highlights the dining area illuminated by northern light and filtered rays entering through narrow slit openings on the west façade.

The second image (B) focuses on the west façade, where sunlight is diffused through vine creepers, offering consistent, softened daylight to both the dining and stair areas.

The third image (C) presents the upper-level family living space, which benefits from a visual and spatial connection to the double-height volume and two eastern terraces. The first terrace is semi-enclosed, featuring glass doors and vertical brick louvres that mitigate harsh morning sunlight, while the second, open terrace is designed for pot planting, contributing to visual comfort and climatic moderation.

These semi-private spaces surrounding the double-height zone enable spatial fluidity while safeguarding the privacy of more intimate functions such as bedrooms which are connected to the common space and have their own verandas for relaxation.

Figure 17: (A) Vertical brick louvre on west façade; (B) Tilted vertical brick louvre on east façade allowing the winter morning sun; (C) Vertical brick louvre on the upper floor veranda providing privacy from the neighbouring houses while allowing ventilation.

Architectural Elements

- Vertical Brick Louvres and Tilted Brick Louvres

The west façade incorporates vertical brick louvres to reduce heat gain from the afternoon sun. On the east façade, however, the design encourages morning sunlight, particularly during the cold winter season. Since the sun's path tilts towards the south by approximately 47.3° from the vertical during winter, the east-facing vertical louvres are tilted at 45° to optimise exposure to morning sunlight (Figure 17).

- Slit Openings

Although the total window width on the east and west façades is the same, their design differs in response to climatic needs. The west façade features narrow slit openings acting as vertical louvres to minimise solar heat gain. In contrast, the south-facing façade includes wide openings to allow prevailing southeast winds to enter the residence and flow through openings on the other façades, facilitating effective cross ventilation (Figure 18-19).

Figure 18: (Left) Slit openings on the west façade from the exterior; (Right) The afternoon sun has been filtered through the slits to protect the bedroom from heat gain.

- Pergola, Veranda, and Open Terrace

The residence includes five verandas. Three are attached to bedrooms to enhance views while maintaining privacy and offering rain protection, allowing windows to remain open for ventilation. These verandas also serve as extended living spaces, suitable for seating or drying clothes. Another veranda, located adjacent to the kitchen, supports local practices such as washing dishes and other chores typically performed outdoors (Figure 20). It also serves as a transitional zone providing access to the back of the house, pond, and front yard—without passing through the living room—thus maintaining privacy. The final veranda, or open terrace, is attached to the first-floor family living area. This space accommodates seating, relaxation, and informal gatherings. A semi-open zone with a pergola overhead connects the terrace to the interior, enhancing natural lighting and spatial aesthetics.

Figure 19: Cropped view of the veranda through the sliding glass door of the upper floor bedroom.

- Double-Height Space

As discussed in the sectional analysis, the double-height space acts as a central hub for vertical and horizontal circulation. It enhances natural ventilation through the stack effect and supports daylight penetration to adjacent spaces.

Figure 20: The kitchen veranda (ground floor) with tilted louvres and access door towards the front yard and the open terrace (upper floor) with a 270° view towards the pond and front yard.

- Planter Boxes, Rainwater Spout, and Drainage

The residence features a flat roof, reflecting the regional modernist tradition. Two drainage systems manage rainwater runoff. One includes a rainwater spout, designed as an aesthetic element of the front elevation. Water is discharged into a planter box at ground level; overflow is directed to a drain that leads to a retention pond at the rear (Figure 21-23).

The second system is located on the east side, where a rainwater downpipe runs through the toilet core, directing water to the same retention pond via underground drainage.

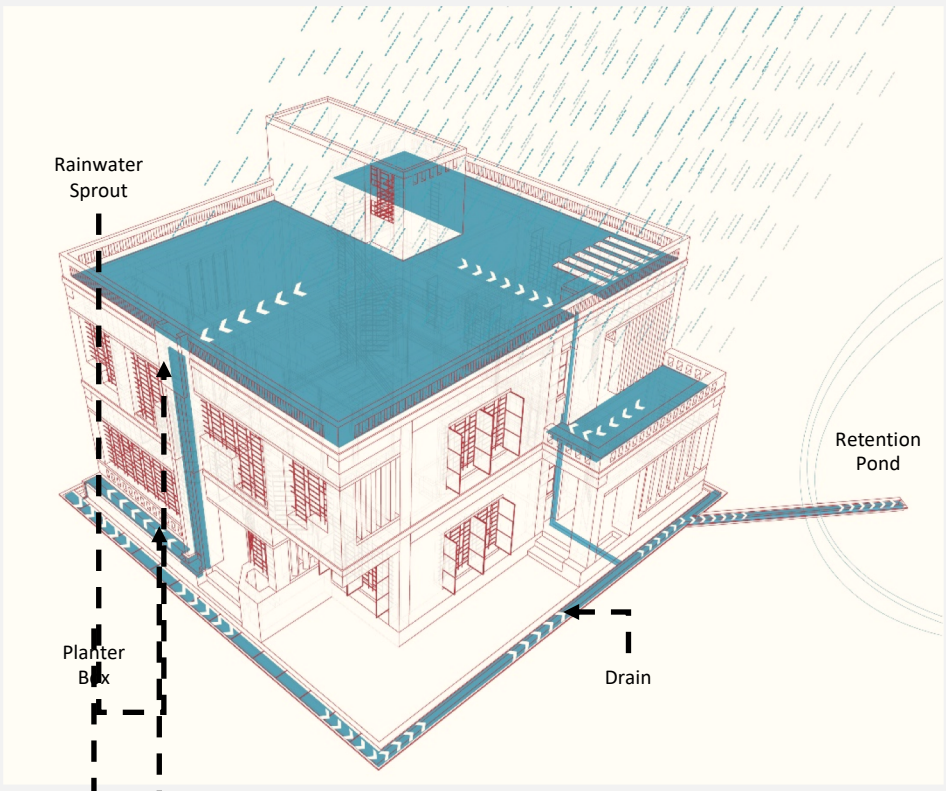

Figure 21: Integrated rainwater drainage and planter box for easy maintenance of landscaping.

Figure 22: Integrated rainwater sprout on the front façade of the building. The water coming down nourishes the bougainvillea plant on the ground floor planter box.

Figure 23: Planting and vegetation (A) at the entrance, (B) on the west façade and (C) north side of the building, enhancing aesthetics and privacy, filtering sun light to reduce thermal gain and blending the house into the context.

Table 3: Summary of the design considerations from the critical regionalism perspective

Contextual Parameters	Architectural Considerations	Design Responses
Macro Climate	- Hot summers (~34°C), heavy monsoon (June–Oct), cold winters (~13°C, sometimes down to 5°C) - Prevailing southeast wind - Cyclones up to 260 km/h	- Orientation and facade treatments address seasonal sun and wind patterns - Double-height space enhances ventilation and daylighting - Dense east-side vegetation cools microclimate
Site Context	- Rural site with nearby pond, no central drainage - Vegetation (palm trees, fruit trees) - Cultural uses of front yard	- Rainwater channelled to pond for drainage and retention - Existing trees preserved for wind protection and shade - Front yard and kitchen-side access retained for traditional rural use
Building Orientation	- West receives harsh afternoon sun - East gets soft morning sun - Southeast wind is desirable	- Bedrooms placed on south side for warmth - Services placed on east side for shading - Wide openings on south and southeast enhance cross ventilation
Internal Layout	- Needs airflow and daylight across all zones - Climatic comfort and functional clarity	- Zoning into living and service areas - Central double-height space connects floors and promotes stack ventilation - Verandas added later to improve comfort, privacy, and aesthetics
Architectural Elements: *Openings*	- Need for morning sun (east), protection from afternoon sun (west), and ventilation from southeast	- West: narrow slit windows as shading - East: larger, well-positioned windows for morning light - South: wide openings for wind and light - North: openings to increase daylight where it is least available
Architectural Elements: *Vertical Louvres and Pergola*	- Sun tilts ~47.3° south in winter - Protection from afternoon sun - Desire for natural light, shade, and aesthetics	- West: vertical brick louvres for shading - East: 45° tilted louvres for winter morning sun - Pergola over semi-open space enhances daylighting and adds aesthetic quality
Architectural Elements: *Planter Box, Rainwater Spout*	- Need to manage rainwater during heavy monsoons - Desire to integrate nature and greenery into living environment	- Two drainage systems: spout to planter box and underground pipe to pond - Planter boxes used in front facade for aesthetics and cooling - Vegetation integrated into terraces and facade for thermal and visual comfort

CONCLUSION AND RECOMMENDATIONS

This study highlights the potential of traditional brick as a sustainable and contextually relevant material in the architectural landscape of rural Bangladesh. By examining a single-family residence through the lens of critical regionalism, the paper demonstrates how brick, rooted in centuries of vernacular wisdom, can continue to play a vital role in contemporary climate-responsive design as summarised in Table 3. The integration of passive cooling techniques, context-sensitive planning, and thoughtful architectural elements reflects a deep sensitivity to climate, culture, and local lifestyle.

Moving forward, architects and designers are encouraged to draw inspiration from vernacular traditions and reinterpret them within modern architectural frameworks. Sensitivity to the specific climate, culture, and context of a site should guide key design decisions such as building orientation, spatial layout, and material selection.

The thoughtful integration of natural features—such as vegetation, water bodies, and open spaces—can enhance the environmental performance and livability of a project. Prioritising the use of locally available materials and skilled labour not only supports the local economy but also ensures construction methods remain rooted in the region's cultural and technical heritage.

The recommendations outlined in this paper advocate for a grounded and sustainable architectural practice, where traditional knowledge and modern innovation coalesce. This approach offers a resilient path forward for architecture in Bangladesh, one that respects its rich heritage while addressing contemporary needs. Further exploration on this topic may look into the use of brick in other typologies with larger scale, as well as the amalgamation of brick with other modern construction materials to carve out the path of the future of architecture in the context of Bangladesh.

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