

# Tea Retreat

By

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A thesis submitted to the Department of Architecture in partial fulfillment of the requirements for the degree of  
Bachelor of Architecture

Department of Architecture  
Brac University  
January 2024

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## **Declaration**

It is hereby declared that

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4. I/We have acknowledged all main sources of help.

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## Approval

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## **Abstract**

In Bangladesh and many other Asian countries, tea is the second most popular beverage and is prized for its aroma, affordability, and health advantages. With 172 active gardens, Bangladesh's economy is greatly impacted by the tea industry. The cultivation of tea began in the 1840s, when it first encountered difficulties but gained traction with the founding of the Madhupur Tea Estate. To enhance the quality of tea, the Bangladesh Tea Board (BTB) and Bangladesh Tea Research Institute (BTRI) were established after independence. The initiative described in the FYP is centered on building out substations to improve training, outreach, and research in order to create a favorable environment for tea growing. The projected extension intends to further expand and optimize techniques, fostering collaboration and promoting sustainable tea production on the 1845.27 hectares that were committed to tea production in 2016.

**Keywords:** Tea garden; Bangladesh Tea Research Institute; Panchagarh; Flat land Tea; Tea research Institute



## **Acknowledgement**

This project has truly transformed my life. What started as a simple love for tea turned into a deep dive into the intricacies of tea production, understanding everything from soil and climate requirements to grow the tea plant. I also got an inside look at the future plans for northern Bangladesh and witnessed them being put into action. Completing this project was a journey, and I am thankful to Allah for giving me the strength to finish it. My gratitude extends to my parents for their support over the past five years. I owe a lot to my architecture faculty for their excellent guidance, and a special thanks to my studio instructors, Abul Fazal Mahmudun Nobi and MD. Samiur Rahman Bhuiyan, without whom my project wouldn't be complete. Their mentorship has been invaluable. I want to acknowledge the unwavering support, inspiration, and guidance provided by my senior, Tarannum Mahmud. Without her, this project and this journey wouldn't have been possible. Thanks also to my friends Fariyal Ali and Sabrina Afrin for their trust and support. Their encouragement during my toughest moments has been the driving force behind my success. Special thanks to Umma Moriom Mim and Rahmah Islam for her constant support and encouragement. I also want to express gratitude to my juniors, Zinan Haque, Julkar Nain, Hossain Tanim and Sanjida Tasnim, who helped me throughout my entire thesis. Lastly, a big thank you to everyone who played a part in this journey, directly or indirectly—friends, classmates, and professors. Your collective support has been instrumental in my personal and academic growth over the years.

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## **List of Acronyms**

BTRI Bangladesh Tea Research Institute

BTB Bangladesh Tea Board

FYP Five Year Plan

TTRI Tocklai Tea Research Institute

# **Chapter 1**

## **Background of the project**

This chapter provides an introductory overview of the project, including its aims and objectives, as well as an outline of the site and its surroundings. Additionally, it presents a basic program received from the client, setting the foundation for the subsequent sections of this document.

### **1.1 Project brief**

#### 1.1.1 Name of the project-

Tea research and extension center

#### 1.1.2 Project type-

Research center

#### 1.1.3 Client-

Bangladesh Tea Research Institute

#### 1.1.4 location-

Baganbari, Dhamakka para, Panchagarh, Bangladesh

#### 1.1.5 Site area-

19,020 sqm = 4.7 acre

## **1.2 Project introduction**

Tea holds a significant position in Bangladesh and many Asian countries as the second most consumed beverage after water. Its distinctive aroma and affordability make it a popular choice for people from all walks of life. Apart from its taste, tea is also valued for its health benefits due to the presence of antioxidants and essential minerals like potassium, magnesium, calcium, and manganese.

Tea cultivation contributes to the economic growth of Bangladesh, with 172 functioning tea gardens currently in operation. This agro-based industry involves a large number of individuals engaged in various stages, from plucking the leaves to packaging the final product for distribution.

The history of tea cultivation in Bangladesh dates back to the experimental plantation by the Assam Tea Company in the Chittagong Hill Tracts region in 1840. However, challenges such as unfavorable climate and inadequate infrastructure hindered its initial progress. The establishment of the Madhupur Tea Estate in Tangail district by Duncan Brothers & Company in the early 20th century marked the beginning of the modern tea industry in Bangladesh. This success motivated other companies to invest in tea cultivation, particularly in Sylhet, where British-owned tea gardens flourished in places like Sreemangal, Habiganj, and Maulvi Bazar. This laid the foundation for the thriving tea industry in the country.

After the independence of 1971, Bangladesh Tea Board (BTB) was founded in 1977 and from that is has been doing research to make the best quality of tea and making tea approachable for everyone. For which it have developed a research sector which is known as Bangladesh Tea Research Institute (BTRI) and for which over the years it have expanded its substations to Maulvi Bazar, Chittagong, Bandarban and Panchagarh. In 2000 Kazi and Kazi were the first to come to Panchagarh to start cultivating tea with 627 acre of land where they cultivated tea

organically simultaneously over the time Mina tea started to gain popularity for which in 2001 BTB placed one of their substation in Panchagarh.

The expansion of substations for enhanced research and improved outreach to the locals requires a systematic approach outlined in the Five Year Plan (FYP). This project aims to create a conducive environment for research and experimentation, as well as provide training opportunities for small tea cultivators. The goal of this project is to establish a space where individuals moreover the locals can access knowledge and guidance to effectively engage in tea cultivation.

In 2016, a total of 1845.27 hectares of land were dedicated to tea production, highlighting the significance and scale of the industry. The proposed expansion of substations will contribute to further development and optimization of tea cultivation practices across the country. By fostering a collaborative and informative setting, the project aims to support the growth of tea production and promote sustainable practices within the industry.

### **1.3 Aims and objectives of the project**

The project aims to establish an expanded Panchagarh substation for tea research and training in Bangladesh. Its objectives include advancing research, greenhouse, providing training to small tea cultivators, promoting outreach and knowledge sharing, fostering collaboration, a place tea showcasing and exhibition and ensuring sustainability and economic growth. The project seeks to enhance the tea industry by developing innovative practices, empowering tea growers with skills and knowledge, creating a hub for tea-related information, and promoting sustainable cultivation methods. Overall, the project aims to contribute to the growth and success of the tea industry in Bangladesh.

### **1.3 Project summary**

The project's primary objective is to create an enlarged substation dedicated to tea research and training in Bangladesh, with the aim of improving the tea industry. The project entails conducting extensive research, offering training programs to small-scale tea cultivators, and facilitating the exchange of knowledge. The substation will serve as a central hub for tea-related information and resources, fostering collaboration among various stakeholders. Emphasizing sustainability and economic prosperity, the project promotes eco-friendly practices and endeavors to enhance the industry's competitiveness. Ultimately, the project strives to contribute to the growth and prosperity of Bangladesh's tea industry.

### **1.4 Project rationale**

The rationale behind this project is to address the key needs and opportunities within the tea industry in Bangladesh. By establishing an expanded substation in Panchagarh for tea research and training, the project aims to drive industry growth, improve tea quality, empower small-scale cultivators, facilitate knowledge exchange, promote sustainability, and enhance the industry's competitiveness. The project recognizes the economic and cultural significance of the tea industry and seeks to harness its potential for the overall development and prosperity of Bangladesh.

## Chapter 2

### Literature review

#### 2.1 History of Tea



*Figure 1: the origins and history of tea | source: <https://marktwendell.com/historyoftea>*

It has been told by the Chinese legends that the invention of tea can be traced back 5000 years ago and china is the origin of tea. Where it was discovered by the Emperor Shen Nung who lived between 2737-2697 BC (Han, 2007). But in some cases we can see that tea was firstly introduced in northern India but later it was transported in Sichuan province of China (Pettigrew, 2001). By the time of Tang Dynasty (AD 907-60) tea was being produced in large scale over 40 different countries. It was beginning to adapt to people by ritual and its more sophistication than wine. This widespread tea drinking was also a result of popularization of Buddhism. After china it was japan who adapted the habit of drinking tea by importing it from China in the 8<sup>th</sup> century. In the other hand Europe first faced with tea when the Portuguese and Dutch brought it over there in 17<sup>th</sup> century. From there James Tylor and Thomas Lipton exported tea directly from their gardens in Sri Lanka. Which created a direct channel to export tea in the Europe and for thus they are considered as the pioneer of Indian and Sri Lankan tea industry. Eventually it help to the growth of economic conditions to the exporting countries.



## 2.2 Tea in Bangladesh



Figure 2: Srimangal Bangladesh | source: Abu Hanif Khokon

In Bangladesh, tea is the second largest cash crop following jute. It holds a special place in the hearts of the people, who enjoy it throughout the day, from morning breakfast to evening gatherings. As there are saying like “All time is Tea time”. In countries like India, China, Japan, and the United Kingdom Tea is also very popular as well as Bangladesh. In the 18<sup>th</sup> century The East India Company played a vital role in promoting tea cultivation in Bangladesh during its time in the region. They established tea plantations, introduced new varieties and techniques, and supported local farmers. After that Bangladesh has been involved in tea production for over 180 years. Currently, there are 167 commercial Tea Production Estates and Tea Gardens spread across 279,507.88 acres of land, providing employment to approximately 150,000 workers. Notably, Bangladesh contributes 3% to the global tea production. In 2021, the tea industry in Bangladesh had a market size of around BDT 3500 crore (Mamun, 2019).

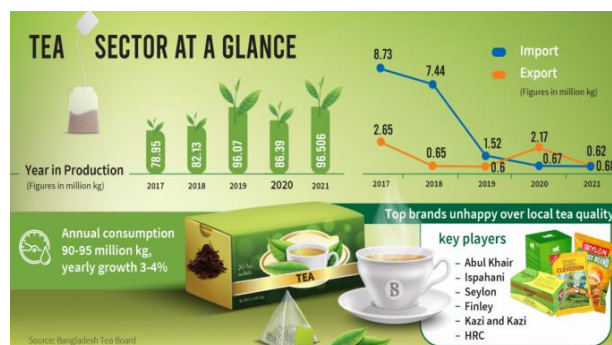


Fig 03: Tea sector in Bangladesh | source: Bangladesh Tea Board

Currently, Bangladesh produces five types of tea: Green Tea, Black Tea, Oolong Tea, Instant Tea, and White Tea. Among the leading tea export companies in Bangladesh, Abul Khair Consumer Products Ltd holds the top position, followed by Kazi & Kazi Tea Estate Ltd., Halda Valley Food & Beverage Ltd., M.M. Ispahani Limited, Meghna Tea Company, and The Consolidated Tea & Lands Co. (BD) Ltd. According to a UNB report from 2021, the top three tea brands in Bangladesh are Ispahani Mirzapur, KK or Kazi & Kazi, and Fresh Premium Tea. Kazi & Kazi tea estate is known for producing organic tea and promoting Green Tea in the country. Other local and foreign brands, including Ispahani, Lipton, Halda Valley, and Finlay, are also actively working to popularize various tea categories in Bangladesh.



Fig 04: tea production cycle / source: BTB

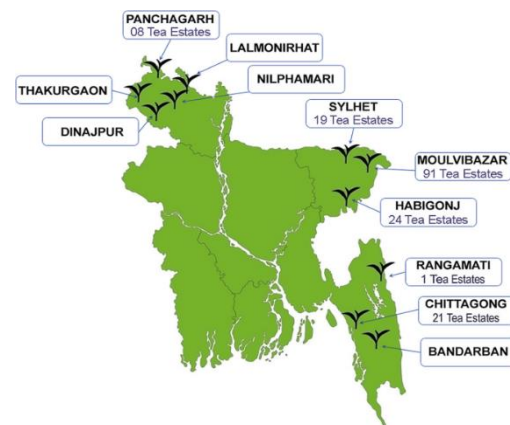


Fig 05: tea production in Bangladesh/ source: BTB

There are two auction centers in Bangladesh where tea is sold to different brands through auctions: the Chittagong Auction Center and the Srimangal Auction Center. These centers play a crucial role in facilitating the trade and distribution of tea within the country (Zohora et al., 2022).

## 2.2.1 Tea in Panchagarh

Tea was introduced to Bangladesh in approximately 1854 and gradually developed into a significant agro-based farming industry that greatly contributed to the country's economy. In recent years, tea cultivation in Panchagarh, situated in the northern part of Bangladesh, has gained notable prominence. While tea has been grown in Bangladesh for more than a century, Panchagarh's involvement in tea cultivation began in 1998. Initially, it was believed that tea could only thrive in hilly regions, but later it was discovered that flatlands could also support tea cultivation (Prodhan et al., 2022).

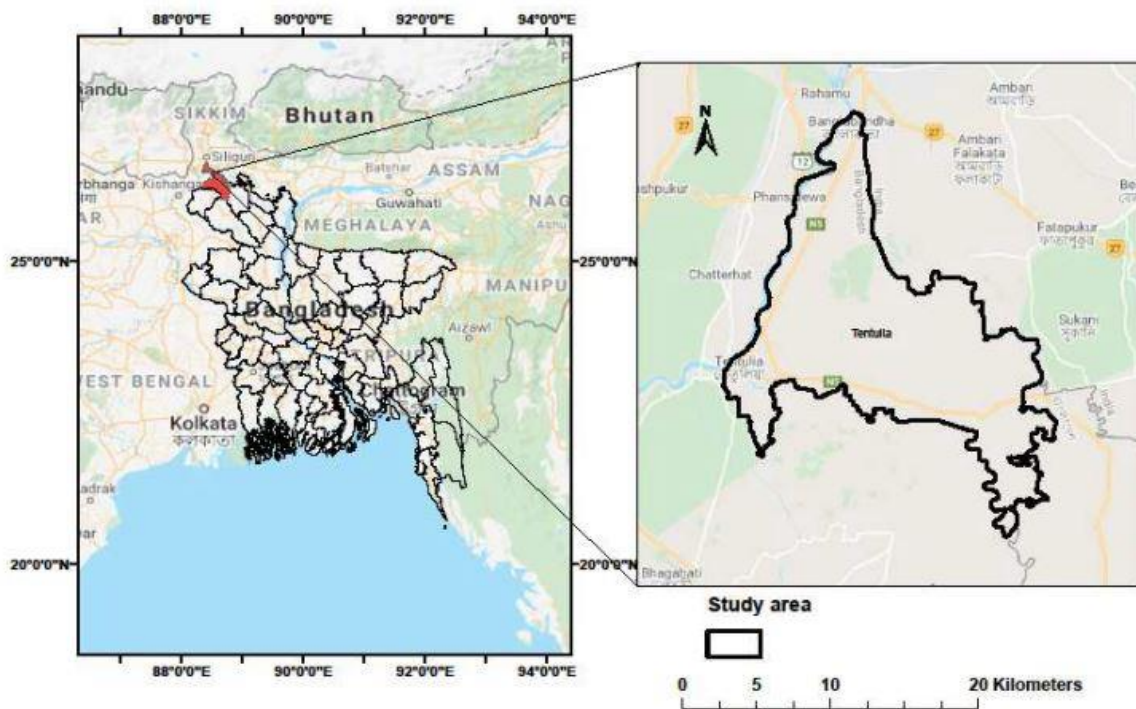


Fig 06: Bangladesh map indication the prospective research region / source: Prodhan, 2022

Despite tea production being a long-standing practice in Bangladesh for over 150 years, Panchagarh's foray into tea cultivation commenced relatively recently. Inspired by the tea gardens of India, industrialist Kazi Shahid Ahmad ventured into tea cultivation after recognizing the untapped potential of Panchagarh's land. Kazi Tea Estate emerged as a pioneering force in organic tea cultivation, leading the way in this field. Alongside Kazi Tea



Estate, other institutions such as Dahook Tea Estate, Salilen Tea Estate, and Tatulia Tea Corporation Limited actively contribute to tea production in Panchagarh (Islam, 2012).

### 2.2.2 Economic prospective in Panchagarh

The tea cultivation industry in Panchagarh has not only bolstered the local economy but also provided employment opportunities for the region's residents. The favorable climatic and soil conditions of Panchagarh, coupled with the expertise of tea growers and producers, have resulted in the production of high-quality tea. Panchagarh's tea gardens have become an integral part of the region's agricultural landscape, garnering attention and recognition both domestically and internationally. The ongoing growth of tea cultivation in Panchagarh is expected to further fortify the region's position within Bangladesh's tea industry. Currently, Panchagarh is home to 200 tea gardens, covering a total land area of 2255.54 acres dedicated to tea cultivation (Prodhan et al., 2022).



Fig 07: Tea production in northern districts of Bangladesh /source: BTB

## 2.3 Current tea harvesting situation in Panchagarh



*Fig 08: Tetuila tea state in Panchagarh*

The local community in Panchagarh, Bangladesh is highly supportive of tea farming, considering it an integral part of their culture and livelihoods. Tea cultivation has not only provided employment opportunities but also boosted the local economy. The community takes great pride in producing high-quality tea, which has also led to the growth of related businesses and tourism in the area. The government plays a crucial role by offering financial support to tea farmers through loans, grants, and incentives. They also invest in research and development programs to improve farming techniques and develop disease-resistant tea varieties. Extension services educate farmers on best practices, while infrastructure development focuses on enhancing irrigation systems, roads, and processing facilities. The government facilitates market access through trade fairs and exhibitions and ensures fair pricing and quality standards through policies. This collaborative effort between the government and the local community has solidified Panchagarh's position in the tea industry of Bangladesh while promoting sustainability and fostering private sector partnerships (Prodhan et al., 2022).

### 2.3.1 Current economic condition of tea exporting

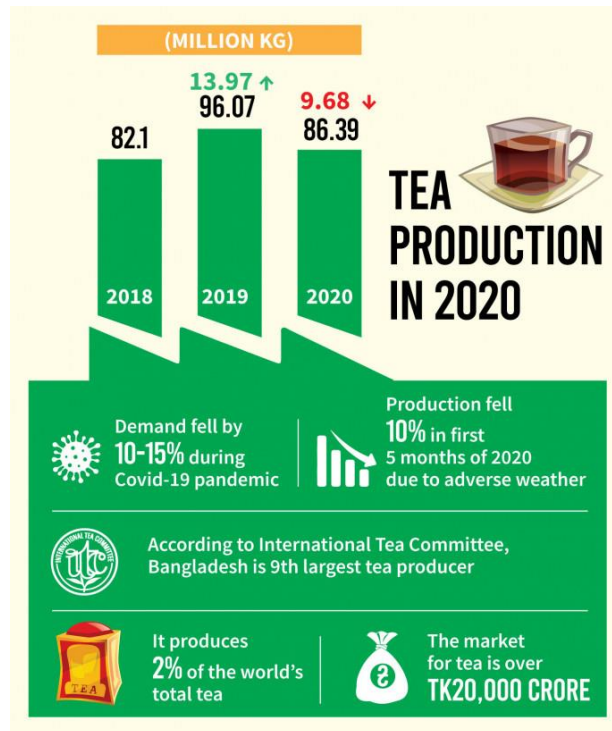


Fig 09: Tea production rate of Bangladesh | source: the business standard

Tea exports in Bangladesh have faced challenges, resulting in a significant decline in quantity over the years. However, efforts are being made to improve the quality and value of tea exports. Focus is on producing high-quality tea that meets international standards. Measures such as promoting sustainable practices, improving processing and packaging, enhancing infrastructure, exploring new markets, and fostering collaborations are being implemented. Despite the current challenges, there is a commitment to revitalizing tea exports in Bangladesh and increasing competitiveness in the global market (Mamun, 2019).



## 2.4 Tea research scope in Bangladesh



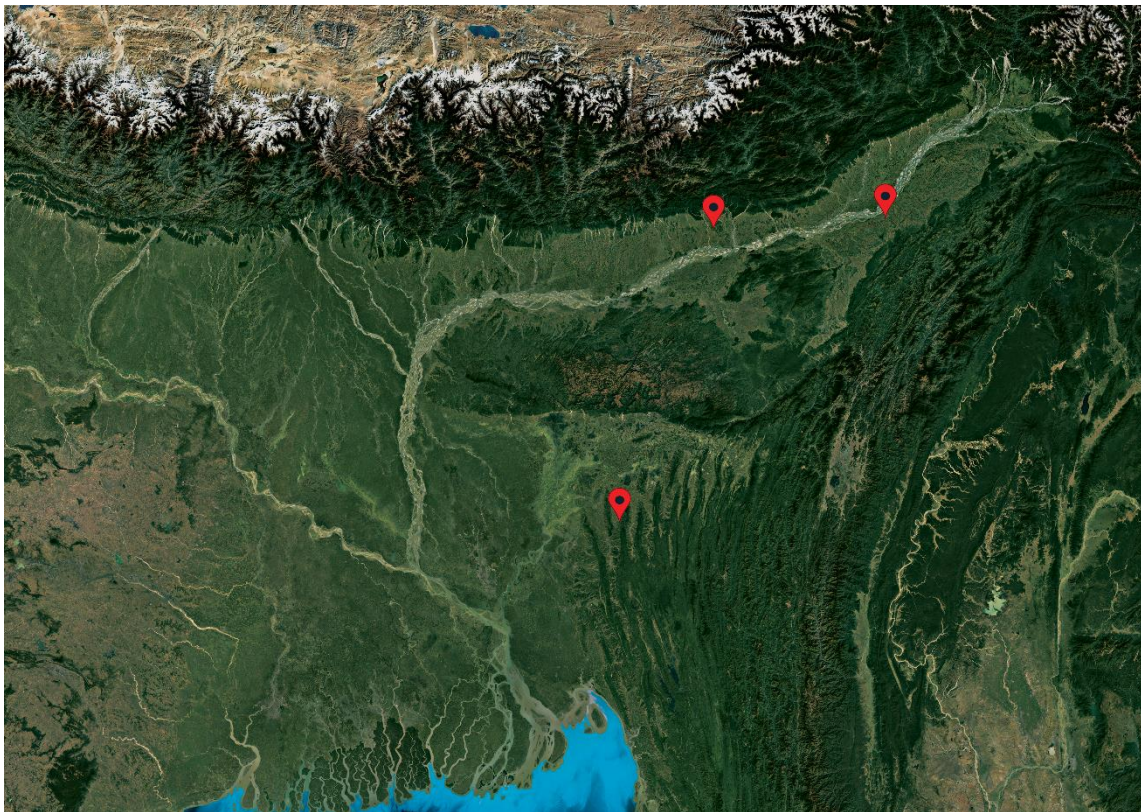
*Fig 10: Tea production in the Himalayan trail / source: author*

Tea research in Bangladesh covers a wide range of areas, including variety development, crop management, processing techniques, organic production, value-added products, sustainable practices, market analysis, and health benefits. The research aims to enhance tea productivity, quality, and sustainability while meeting consumer demands and exploring market trends. The findings contribute to informed decision-making, innovation, and competitiveness within the tea industry, benefiting tea farmers, producers, and policymakers (Rubaiyat, 2021).

The expansion of tea cultivation areas and the utilization of tea clones developed by the Bangladesh Tea Research Institute (BTRI) are the primary factors driving the increase in tea productivity. The BTRI has introduced 23 clones and 5 biclones, which have demonstrated an average yield of 3461.67 kg per hectare. While global tea production, consumption, and exports have seen significant growth, the situation is different in Bangladesh, where there is a negative

correlation between tea production and exports. Between 1980 and 2020, the quantity of tea exports decreased by 92.99%. This underscores the need for the tea industry to explore alternative methods to increase profits from tea cultivation and exports. Consequently, research focused on improving tea varieties is essential for the rapid economic growth and development of the tea industry. Additionally, encouraging tea plantation businesses to boost production to meet domestic demand and deliver high-quality tea is crucial for the flourishing tea business in Bangladesh (Arefin et al., 2022).

## 2.5 Existing research center and its state in Bangladesh



*Fig 11: Existing tea research institutes in Assam and Srimangal | source: author*

The Srimangal Tea Research Center, situated in Srimangal, Bangladesh, is a renowned institution dedicated to tea research and development. It functions as a central hub for scientific investigations and advancements in tea cultivation, processing, and production. The center's primary focus is on improving tea varieties, refining cultivation techniques, and exploring

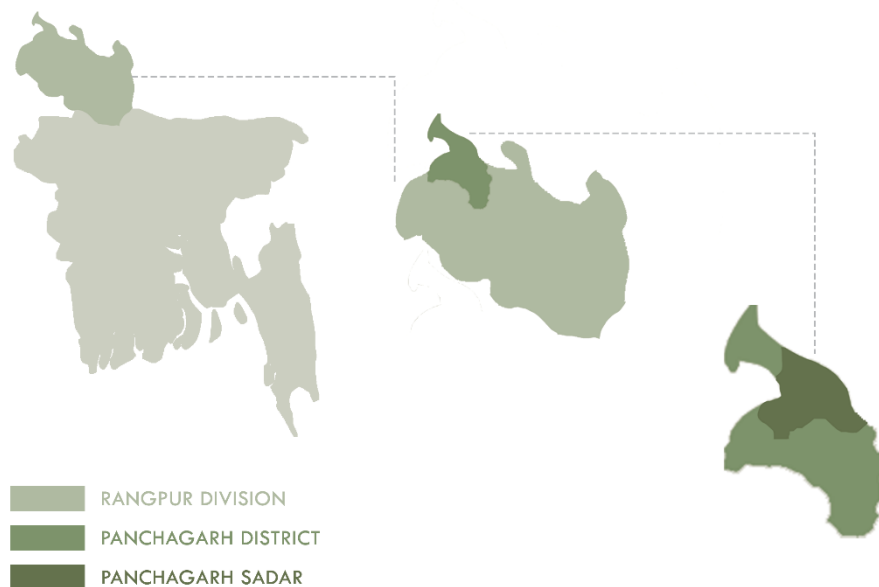


innovative technologies to enhance tea productivity and quality. Its research encompasses areas such as pest and disease control, soil nutrition, irrigation methods, and sustainable farming practices. Additionally, the center has four subsidiary stations, including the Panchagarh station, which aims to expand its research capabilities and serve as a community center, hosting various workshops and research initiatives. The findings and recommendations from the center's research activities contribute to the advancement of the tea industry in Bangladesh and support the growth and success of tea farmers and producers in the region.

## Chapter 3

### Site appraisal

#### 3.1 Site Introduction



*Fig 12: Site location map | source: author*

The site is situated in Baganbari, Dhamakka para, Panchagarh, which is the most northernmost district of Bangladesh.

Situated in the lower foothills of the Himalayas, this land holds the distinction of being the highest point in Bangladesh, with an elevation of 150 feet (46 m) above sea level. Its geographic location places it in the northernmost part of the country, bordered by India on three sides. To the north lies the Darjeeling district, while the northeast is bounded by Jalpaiguri and Cooch Behar districts. The western boundary is shared with Uttar Dinajpur, while the south is bordered by Dinajpur and Thakurgaon districts. Finally, the eastern boundary is formed by the Nilphamari district. The soil composition in this region is unique, characterized by rich sand and stones.

### 3.2 Site surroundings

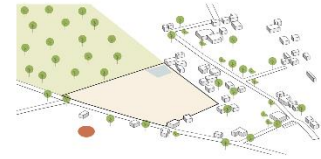


Fig 13: Site surrounding | source: author

The location of the site is at Dhamakka Para, next to CNB More and before entering Panchagarh Sadar. The site is roughly 250 meters from the Karatoya River. Additionally, the property is within a 5-minute drive from bus stops and train stations, making it easier to access.

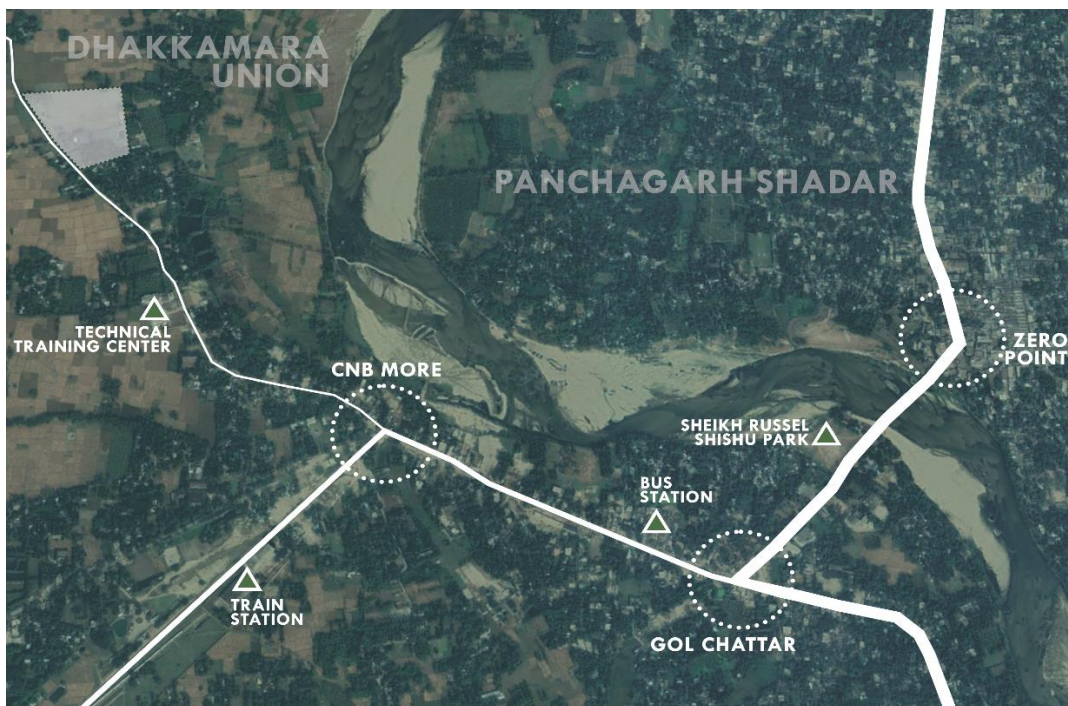
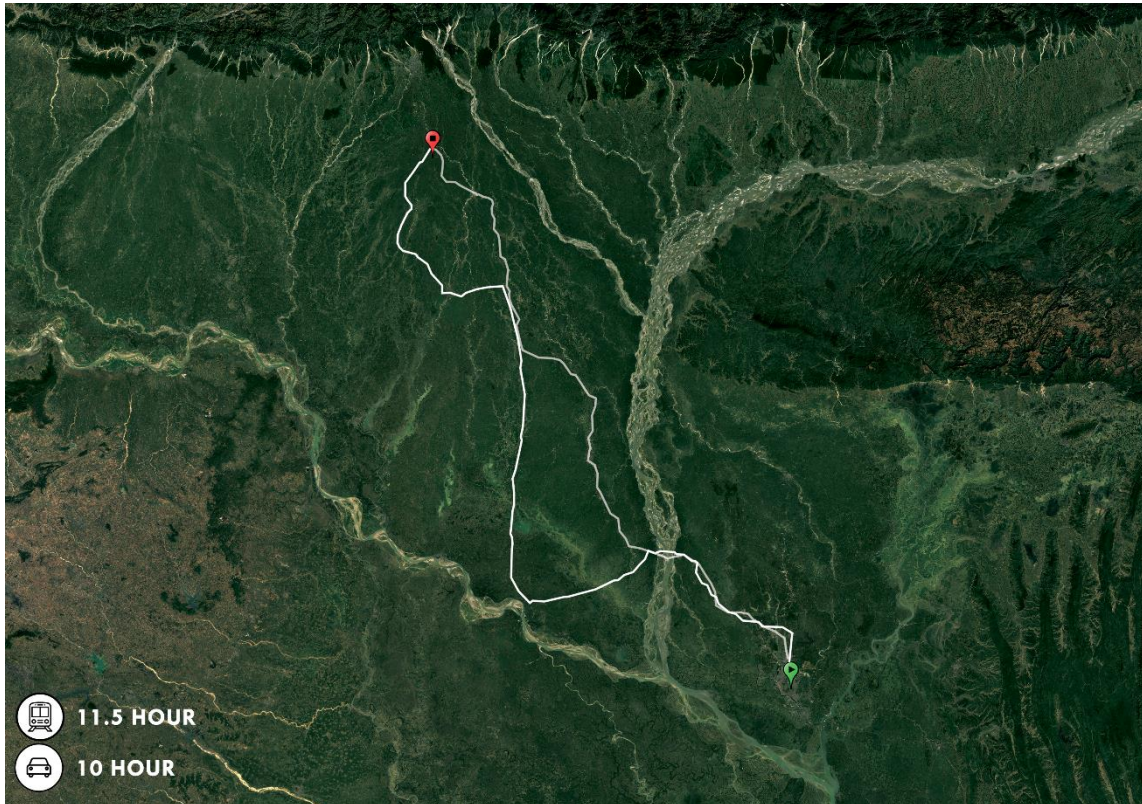


Fig 14: Site introductory map | source: author

### 3.3 Roads and Connections



*Fig 15: Road connectivity from Dhaka | source: author*



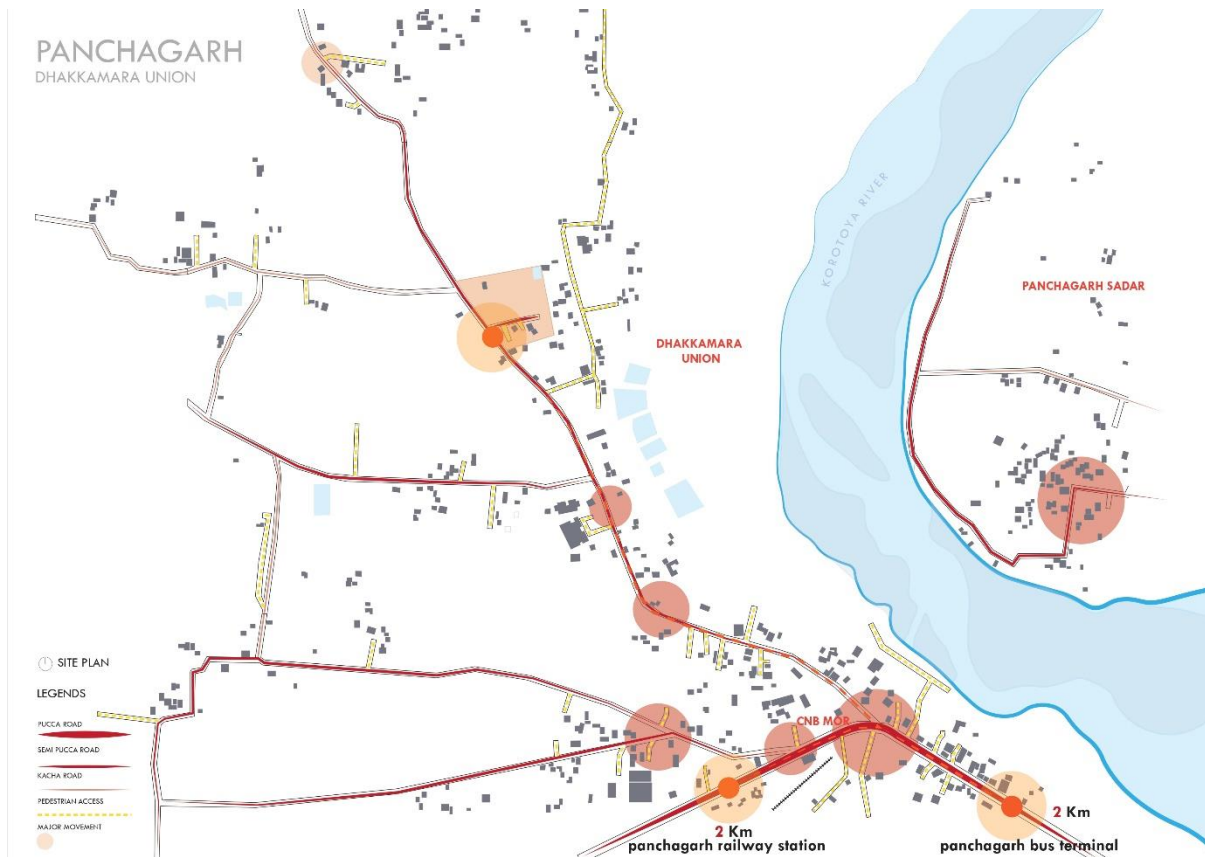


Fig 16: Road connectivity within Panchagarh / source: author

### 3.4 Climatic conditions

Panchagarh has a humid subtropical, dry winter climate (Classification: Cwa), and it is situated at an altitude of 77.41 meters (253.97 feet) above sea level. The district's average annual temperature is -0.23% lower than Bangladesh's averages at 27.51°C (81.52°F).

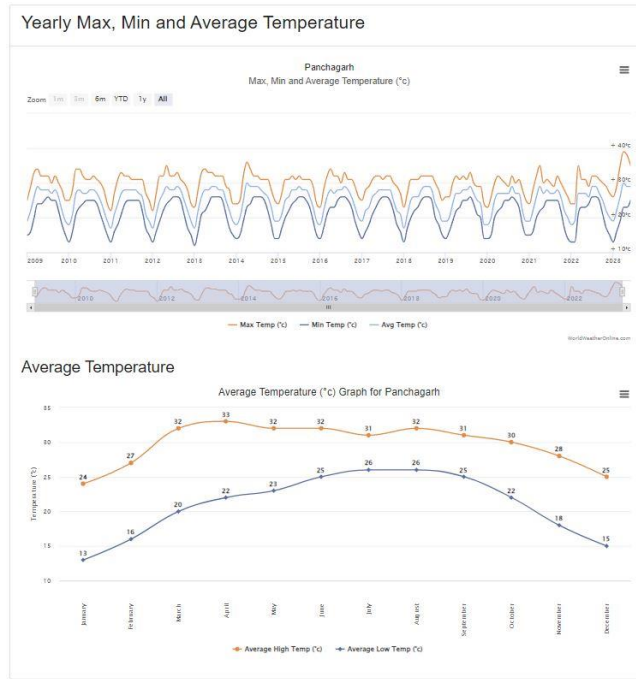


Fig 17: Annual temperature index / source: world weather online

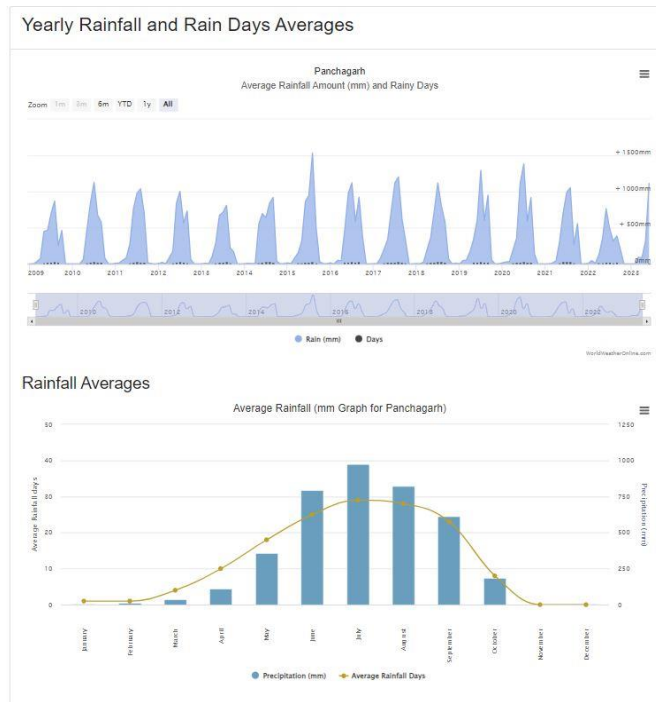


Fig 18: Annual rainfall index / source: world weather online

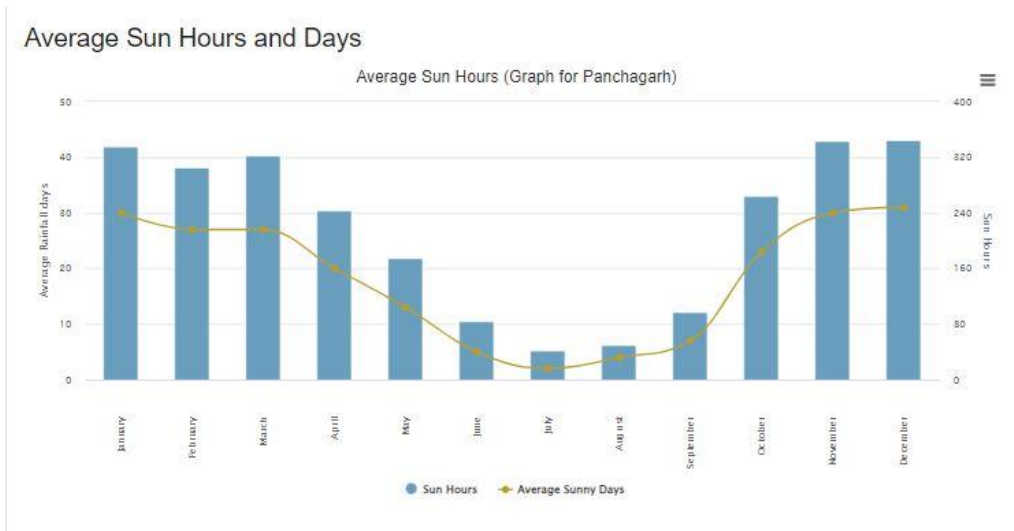
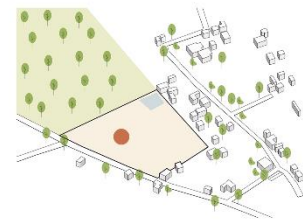


Fig 19: Annual sunny day's index | source: world weather online

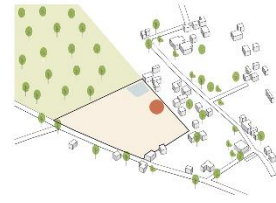
### 3.5 Existing site conditions



#### Existing TEA garden



Figure 20: Existing tea garden within site | source: author



*Fig 21: Existing site condition | source: author*



*Fig 22: Opposite side to the site | source: author*



*Fig 23: Existing buildings of the site | source: author*



## Chapter 4

### Study

#### 4.1 Case study Boh Visitor Center

ZLG Design (2006)

Sungai Palas, Cameron Highland, Malaysia

Site area: 12,168.32 sqm

Built area: 1,233.8 sqm



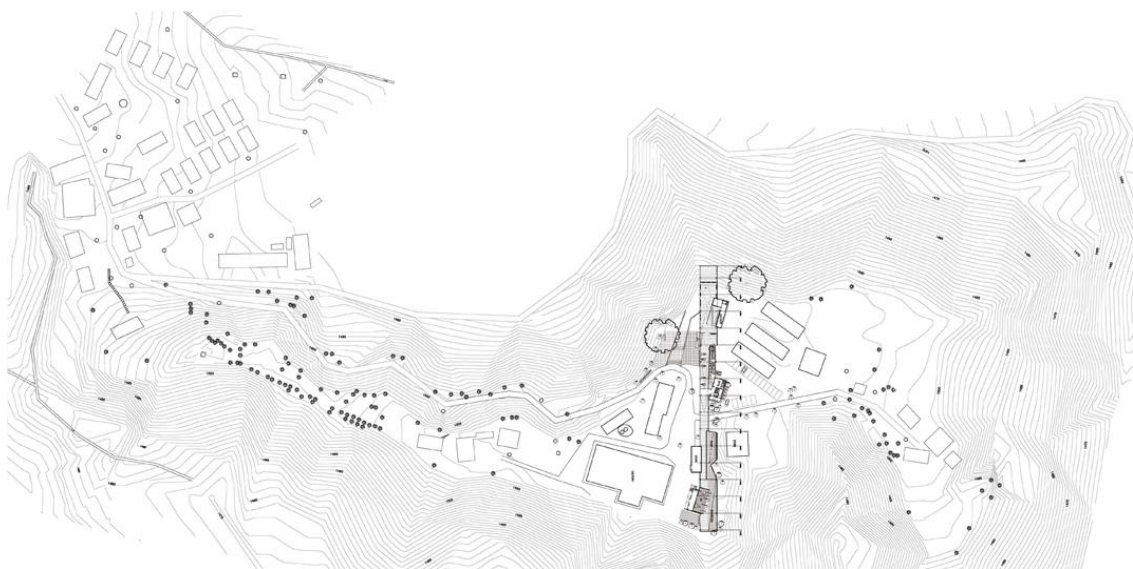
*Fig 24: BOH visitor center | source: arch daily*

The BOH Visitor Center serves multiple purposes, providing visitors with the opportunity to appreciate the landscape while meeting the owner and operator's sales targets. In addition to housing the existing tea shop, the center aims to enhance visitor facilities. Interestingly, the success of the building lies not solely in its detailing or construction techniques, but in the overall arrangement and disposition. The primary focus of the design was to create a simple path that leads visitors from an arrival point atop a hill to the enclosed space at the end, where the old factory showcases the traditional handmade tea-making process. The center's design aims to provide a memorable and immersive experience for visitors. The approach view of the building, measuring 145 meters in length and 9 meters in width, showcases a prominent

feature—the expansive cantilevered balcony that extends over the valley. This architectural element provides a stunning vantage point for visitors to admire the surrounding landscape. Additionally, special care has been taken to preserve a majestic large tree, which serves as a focal point and helps integrate the building harmoniously into its natural surroundings. The preservation of this tree not only adds aesthetic value but also serves as a symbolic connection between the building and the encompassing natural environment.

#### **4.1.1 Site surroundings**

The site surrounding the BOH Visitor Center is characterized by the natural landscape of the estate. It is likely situated amidst lush greenery, with rolling hills, tea plantations, and picturesque valleys. The building itself has been strategically positioned to take advantage of the scenic views, with the large cantilevered balcony of 145 meters offering a panoramic outlook over the valley. The presence of a preserved large tree further enhances the natural ambiance of the site, anchoring the building to its surroundings and creating a harmonious blend between architecture and nature. Visitors to the center can expect to immerse themselves in the serene beauty of the site, enjoying the tranquility and awe-inspiring vistas that the location has to offer.



*Fig 25: Site Plan, BOH visitor center | source: arch daily*

### 4.1.2 Visitor center layout

The BOH Visitor Center's basic layout comprises an entrance area with a reception desk, exhibition space showcasing the estate's history and products, a tea shop or café for relaxation, a viewing balcony offering scenic valley views, a visitor information desk, a gift shop for purchasing souvenirs, and restroom facilities. The design may vary based on the architectural concept and available space, but these essential areas provide a welcoming and informative experience for visitors to the BOH estate.



Fig 26: detailed site plan / source: arch daily

Fig 27: detail plan/ source: arch daily



Fig 28: BOH visitor center / source: arch daily



### 4.1.3 Form derivation

Inspiration for the form of the visitor center may be derived from the nearby tea plantations, taking cues from the undulating landscape. Additionally, the majority of the building is elevated to create a sense of space beneath the structure, aiming to minimize any disruption to the original terrain contours. This elevated design gives the impression of the building "floating" above the ground.

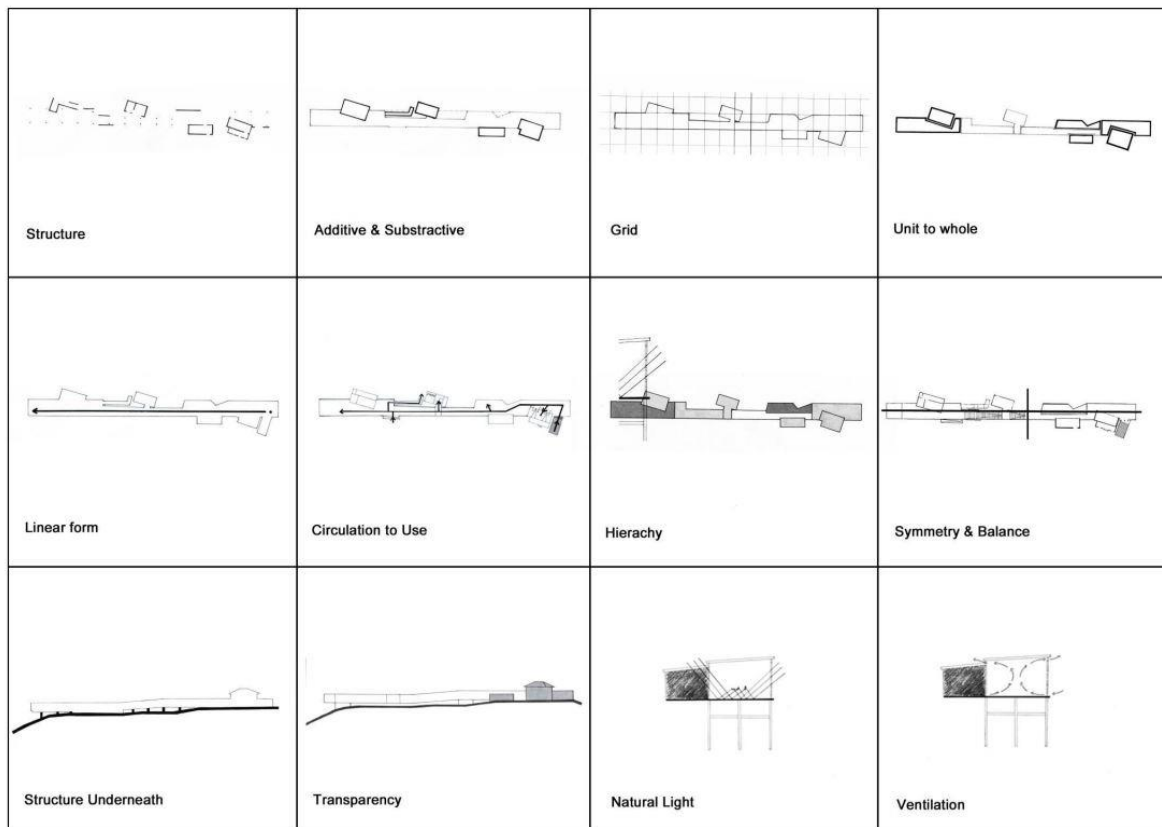


Fig 29: BOH visitor center diagrams / source: arch daily

### 4.1.4 Structure

Structural Elements: The structural framework of the building may be made of materials such as reinforced concrete, steel, or timber, depending on the design requirements.

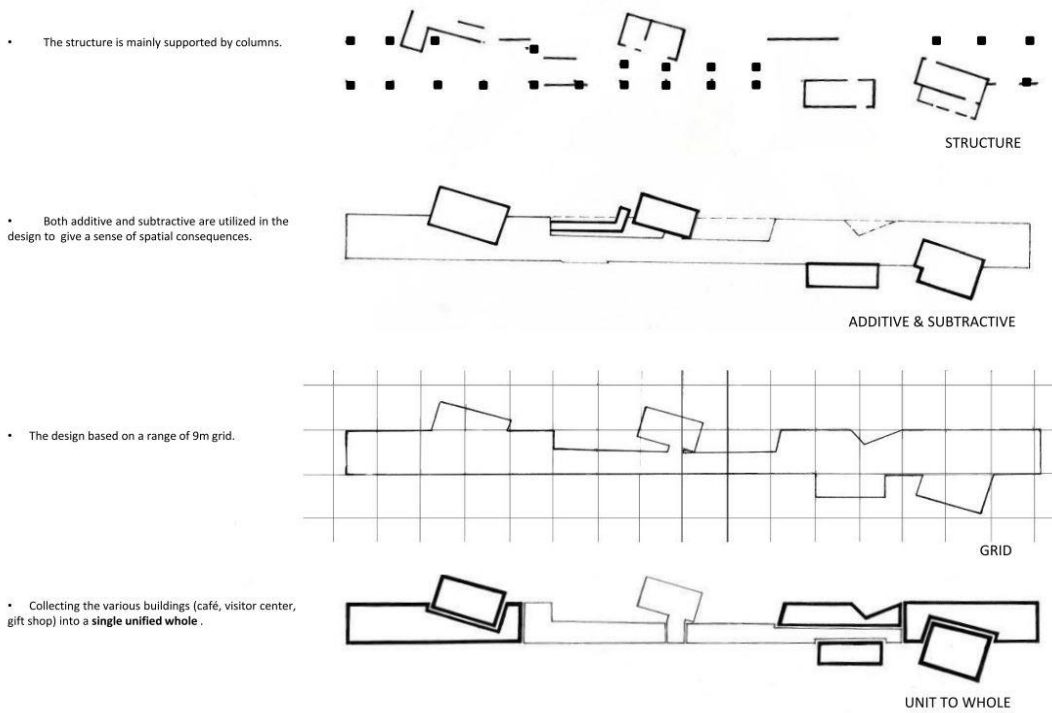


Fig 30: BOH visitor center diagrams | source: arch daily

## 4.1.5 Circulation

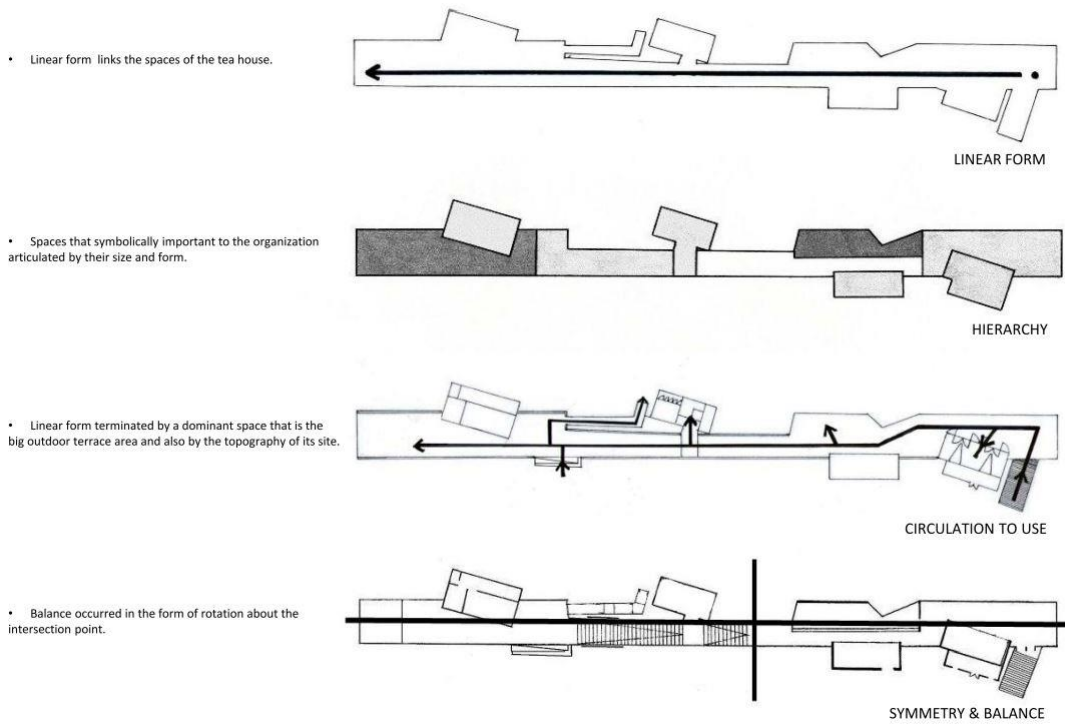


Fig 31: BOH visitor center diagrams | source: arch daily

## 4.1.6 Elevations

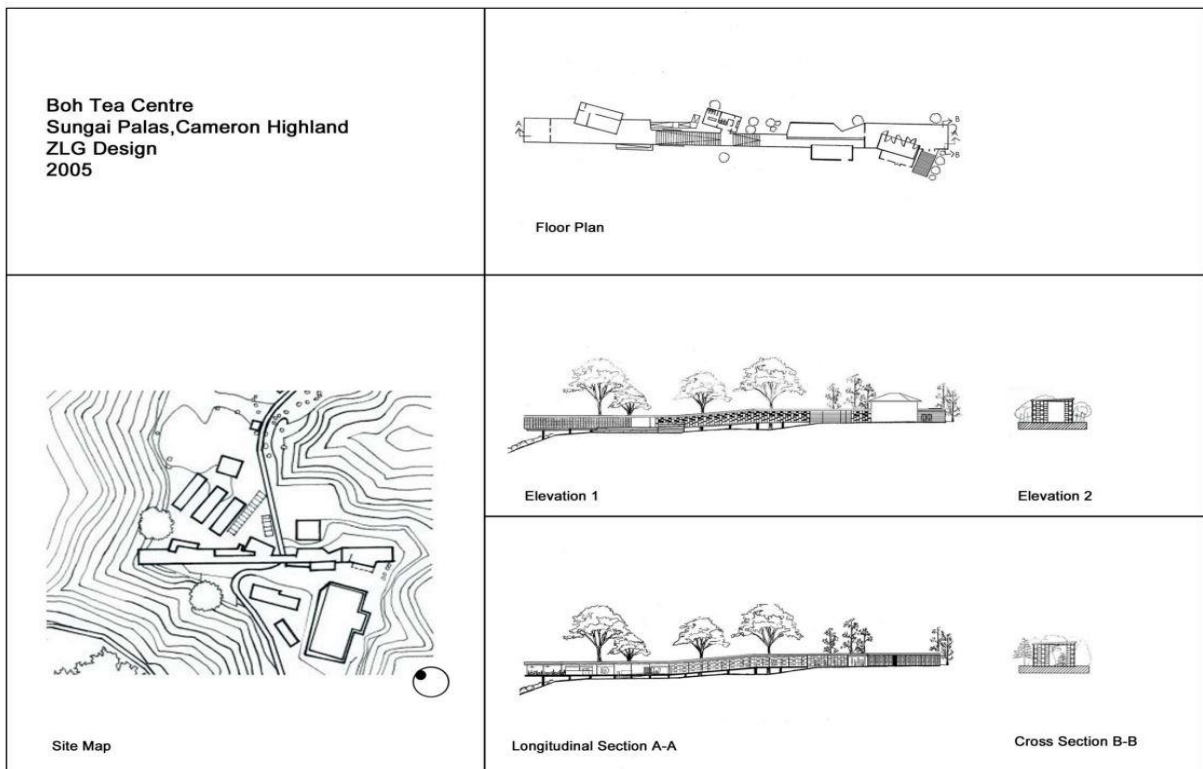


Fig 32: BOH visitor center diagrams / source: arch daily

## 4.1.7 Materials

### Transparency

The design of the visitor center incorporated a significant feature known as the approach, which encompasses the area in front of the main entrance. The designers emphasized the need for a spacious outdoor terrace that serves both as a seating area and a vantage point to appreciate the panoramic views of the estate and the valley. The flooring in this area consists of simple and cost-effective concrete tiles, with grass or loose chippings interspersed between them.



*Fig 33: viewing deck, BOH visitor center | source: arch daily*

### Woods

The budget constraints, though initially seen as a challenge, turned out to be a hidden blessing. The decision to embrace modest and uncomplicated materials provided a distinct character and identity to the project. Had a larger budget been available, the aesthetic of the building would have been drastically different. The commitment to using basic materials and technology contributed to the essence and spirit of the building.



*Fig 34: Entry corridor, BOH visitor center | source: arch daily*

### Roof

The roof of the visitor center is constructed using a straightforward approach. It features mild steel edge capping that is attached to the open trussed metal beams. This design choice reduces

the overall weight of the structure and facilitates the distribution of services within the voids between the trusses. Additionally, the roof has a slight slope towards the back, allowing rainwater to drain towards one side. This simplifies the treatment of the building's elevation and ensures efficient rainwater management.



*Fig 35: Roof materials, BOH visitor center | source: arch daily*

## **4.2 Dusai Resort & Spa**

Vitti Sthapati Brindo Ltd (2013)

55567.90 sqm (site area)

11103.42 sqm (built area)

Dusai Resort and Spa, situated in Moulovi Bazar, Sylhet, Bangladesh, is a destination resort that beautifully combines traditional indigenous tea system bungalows with contemporary technology, incorporating locally sourced materials.





*Fig 36: Dusai resort & spa | source: archello*

Nestled amidst the tranquil green hills of tea plantations in the northeast region of Bangladesh, "Dusai Resort & Spa" stands as a pioneering destination resort in the country. Embodying the spirit of a tribal village, the resort gracefully follows the contours of the sloping hills. Its expansive layout encompasses a variety of amenities, including accommodations, dining venues, a swimming pool, a spa, conference facilities, and both indoor and outdoor sports facilities.

The guest facilities include a main hotel block as well as separate bungalows. The bungalows are available in two types: cottages designed for families in a partially secluded setting, and deluxe cottages offering a more private experience, situated on the slopes of the south-facing hill. The service amenities seamlessly blend semi-private and private areas, catering to the needs of all guests.

## 4.2.1 Site introduction & Masterplan



Fig 37: site allocation, Dusai resort & spa | source: archello

The resort site comprises three gentle hills and valleys. The public area, consisting of the reception and convention hall, is situated on the first hill, while the guest rooms are strategically positioned along the slopes of the hills to ensure convenient movement. Other facilities are located towards the valley. Vehicular circulation is limited to the public area, and from there, guests can continue their journey to the guest area on foot or using electric cars. Internal roads and walkways encircle the entire complex, allowing visitors to explore the entirety of the resort in a circular motion.



Fig 38: Masterplan, Dusai resort & spa | source: archello

The resort offers a range of facilities including a Reception Hall Wing with car drop-off, an open lounge, and a back office. There is a Convention Centre and Motel Wing with 20 rooms, a convention hall for meetings, and dining options. The Main Hotel has 30 rooms, along with back-of-house facilities and a main kitchen. Accommodation options include Suite Villas, Deluxe Villas, and Presidential Villas. The resort also features a spa, thematic restaurants, a boat station, a gym, parking facilities, a children's play area, and a swimming pool with multiple tiers. Additional amenities include a guest maid dormitory, a mosque, GM & Executive Quarters, staff accommodation buildings, an owner's bungalow, a golf lounge and bar, and a utility building for electro-mechanical facilities.

#### 4.2.2 Detailed plan and Contour:

The unique topography of the site presented both challenges and opportunities for the project. The hilly terrain, with its untouched wilderness, called for a design approach that would



preserve the natural setting. Traditional construction methods were employed, breaking down longer structures into smaller ones to align with the contours of the land. This approach deviated from conventional techniques that would have required flattening the site to construct larger, more standardized structures. By embracing the indigenous construction style and techniques, the project successfully integrated with the natural contours of the site, maintaining its authenticity and harmony with the surroundings.



*Fig 39: Blowup plan of villas, Dusai resort & spa | source: archello*

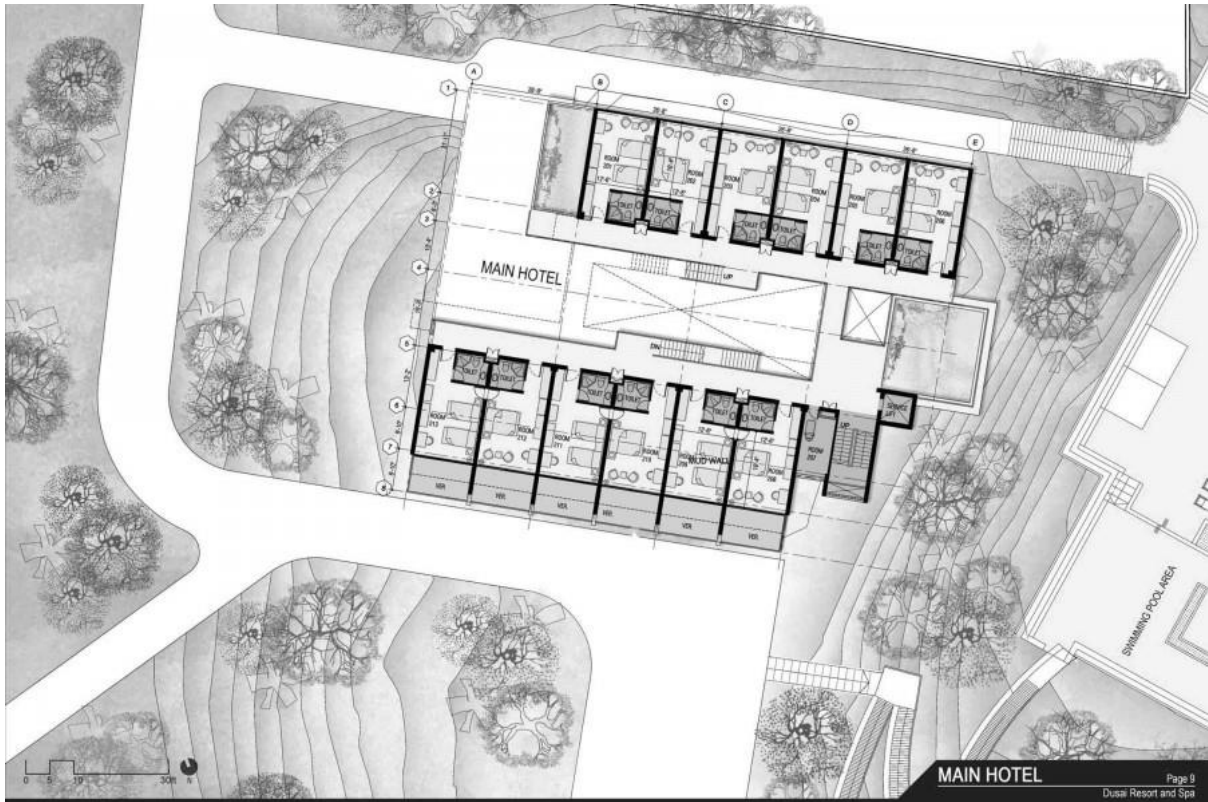
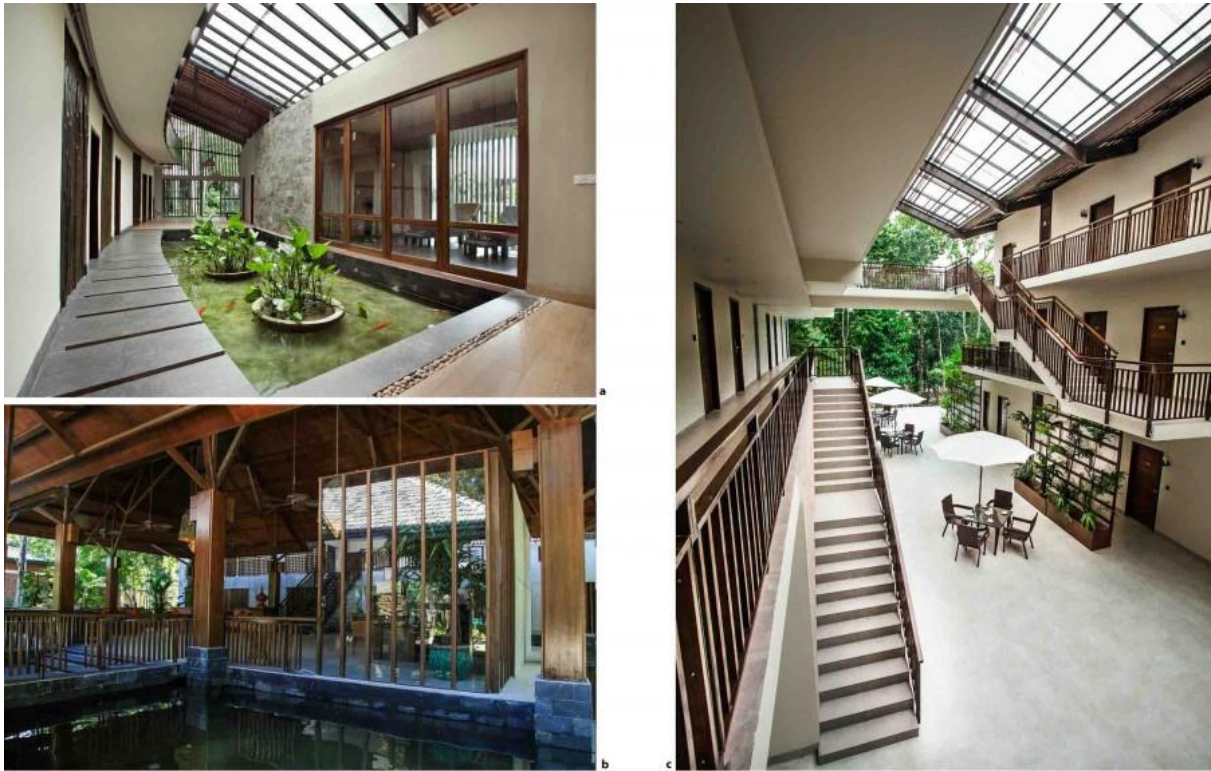


Fig 40: Blowup plan of main hotel, Dusai resort & spa | source: archello



Fig 41: Blowup plan of restaurant, Dusai resort & spa | source: archello

### 4.2.3 Materials



*Fig 42: Interior images, Dusai resort & spa / source: archello*

The construction materials for the project consist of locally available resources and indigenous techniques. Brick walls and concrete infills are used, while the outdoor facade is rendered with fair-faced cement plaster and indoor facades are finished with regular cement mortar plaster. The floors are covered with homogenous matt tiles, except for the villas which have wooden flooring. The ceilings vary from cement plastered and painted to exposed roof structures with bamboo and thatch or wood finishes. Locally acquired aged walnut-colored solid wood is used for handrails, grab bars, and doors. The outdoor surfaces are kept in their natural finish to blend with the surrounding environment. Pitch roofs feature a combination of handmade mud tiles and thatch, designed with a high slope to withstand heavy rainfall during the monsoon.



## 4.2.4 Form derivation

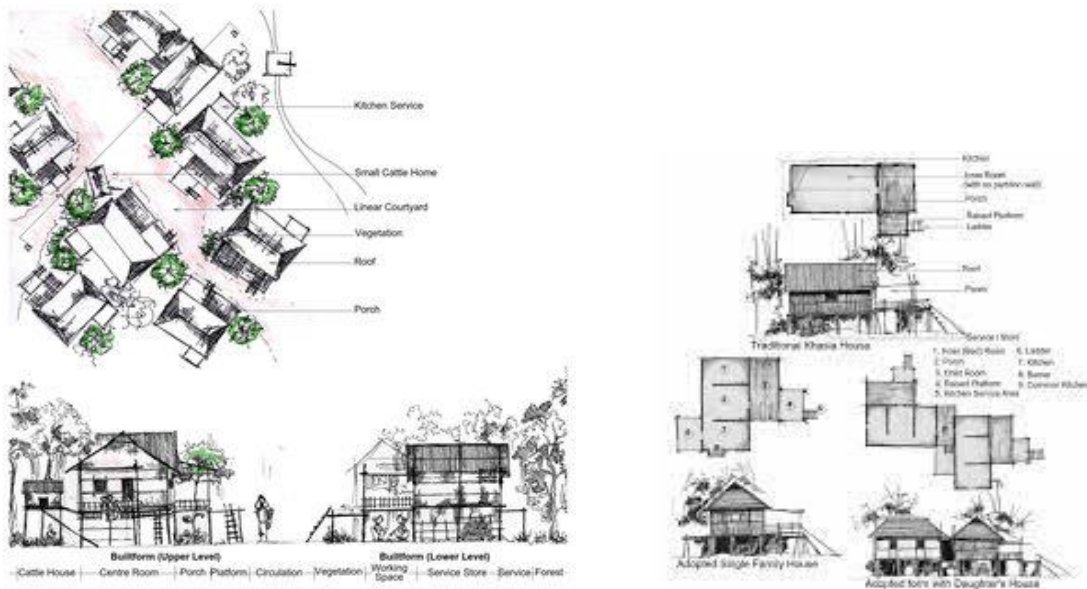
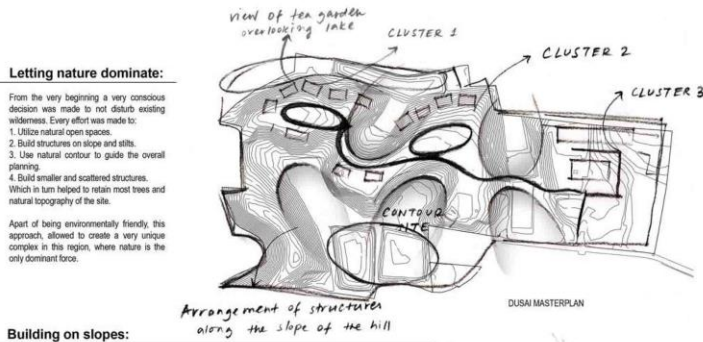


Fig 43: Khasia homestead plans / source: Islam, Shahidul

The study focused on the settlement morphology of the indigenous Khasi community in the Sylhet area. It explored how their traditional forms and architectural elements have evolved and incorporated modern influences. The aim was to understand the fusion of traditional and modern architectural styles within the Khasi settlements. By examining the settlement morphology, the study aimed to uncover the unique characteristics, spatial organization, and design principles that shape the Khasi community's built environment. It sought to highlight the symbiotic relationship between tradition and modernity in the architectural expressions of the indigenous Khasi community in the Sylhet area.



**Building in clusters:**

Vernacular architecture in Bangladesh features courtyards and clusters. Individual houses are built around courtyards, which in turn form clusters.

In Dusai, overall planning follows this principal. Varying functions are grouped around courtyards forming clusters. Connections between the clusters are made through path ways that follow natural contour.

**Building on slopes:**

Bangladesh is a very flat country in general. Some hilly areas exist only in the North-East and South-East region. Formal construction sector here is not very familiar with construction on hills. So they generally follow a very conservative approach. Which is to either remove hill top and build on it or to build at the base of the hill blocking drainage. But informal sector, learning from nature itself, tends to build on slope.

In Dusai, bungalows were built on slope on stilts. Earth was minimally touched to leave its natural balance intact. There were few reasons:

1. Hills were shallow.
2. Removing hill top is not environment friendly. It changes topography and its balance completely.
3. Slopes were very stable so no extra slope protection were needed.
4. Hill base could be left open for paths and natural flow of drainage.

This allowed couple of things to happen:

1. Existing contour was minimally altered, which allowed it to retain its natural balance.
2. Construction on still allowed drainage to remain uninterrupted.
3. Existing dense vegetation could be saved and nature dominated over built structures.

Therefore, Dusai stands considerably apart from formal construction culture and follows time tested techniques of informal sector.

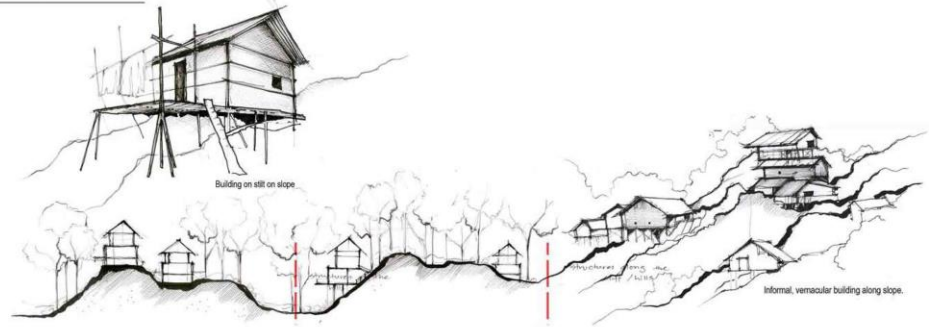


Fig 44: conceptual drawings, Dusai resort & spa | source: archello



Fig 45: Exterior images, Dusai resort & spa | source: archello



## 4.2.5 Structural detail



Fig 46: villa section, Dusai resort & spa | source: archello

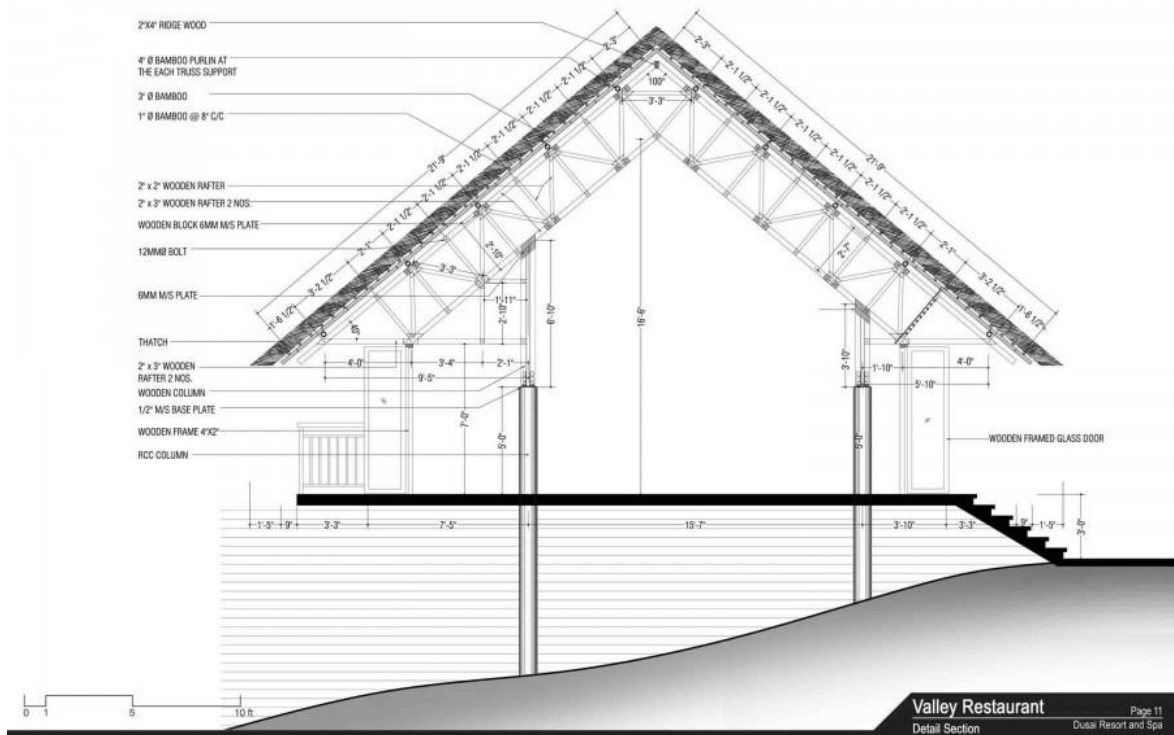


Fig 47: restaurant section, Dusai resort & spa | source: archello

## 4.2.6 Designing with Nature



*Fig 48: Outdoor space, Dusai resort & spa | source: archello*

The resort's design philosophy places a strong emphasis on prioritizing nature over built structures. Intrusion into the surrounding greenery was minimized by carefully placing the structures on the contour site. The buildings were constructed at a low height, allowing the lush green backdrop to take prominence. The existing wilderness to the west was left untouched, with only a minimal number of trees removed and replaced with 300 new plants. Natural grass and shrubs were preserved as ground coverage, and water bodies were re-excavated. Natural ground coverage and water bodies are maintained. The resort blends luxurious facilities with the tea plantation area's ethnic identity, avoiding large buildings to respect the site and harmonize with tree gardens. The linear site layout creates a journey-like experience for guests, starting from the reception and progressing through public, semi-private, and private zones. The path leads to cottages, recreational amenities, dining areas with golf course views, and ultimately to the spa and exclusive residential cottages.

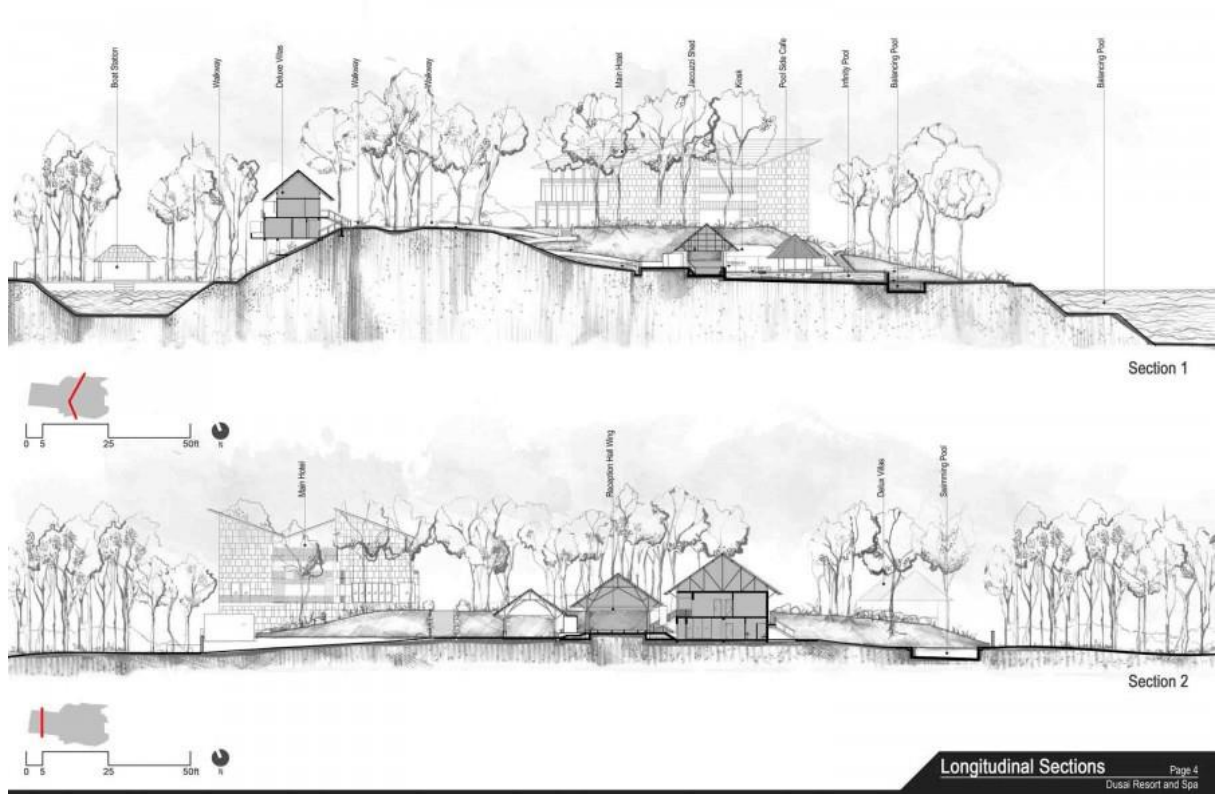


Fig 49: Longitudinal sections, Dusai resort & spa | source: archello

### 4.3 Tea cultivation comparative analysis

Here are some differential analysis of flat land tea and hilly area tea plantation.

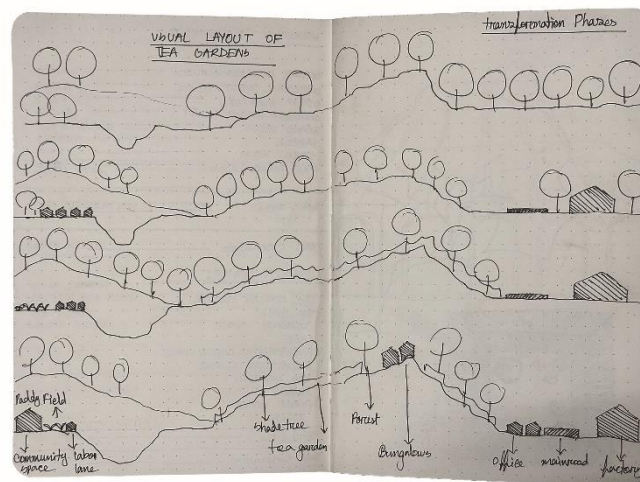


Fig 50: Longitudinal sections of hilly area tea plantation | source: author



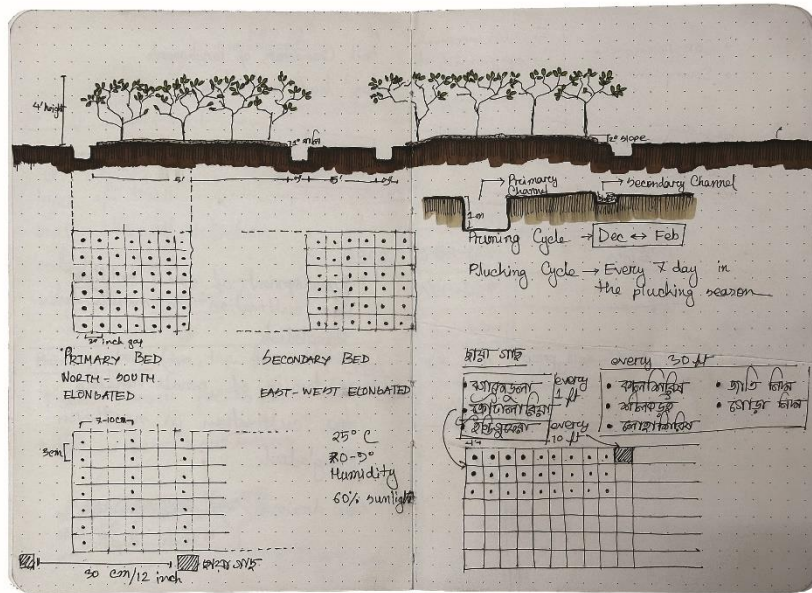


Fig 51: Longitudinal sections of flat land tea plantation | source: author



Fig 52: Longitudinal section of multiple water channels in flat land tea plantation | source: author

### Tea cultivation comparative analysis

	<b>IDEAL</b> (avg)	<b>SYLHET</b> (avg)	<b>PANCHAGARH</b> (avg)	<b>ADAPTATION</b> (avg)
<b>TEMPERATURE</b>	15-23 C	23 C	25 - 30 c	Shade trees which makes the climate cooler (-10) c
<b>HUMIDITY</b>	85%	70% - 90%	60%	-
<b>SUNLIGHT</b>	-	70-80%	60%	Adding more shade trees
<b>PRECIPITATION</b>	2000 mm	2200 mm	1600mm	Regularly watering the plants
<b>ARCHEOLOGICAL ZONES</b>	-	Eastern Surma-Kushiyara Floodplain	Old Himalayan piedmont ridge	-
<b>SOIL pH</b>	4.5- 5.5	4.5-5.5	4.8- 5.4	Up to 1' soil preparation
<b>SOIL TEXTURE</b>	Well drained Laterite soil	Well drained Silty loam soils	Well drained Sandy loam soil	Adding 2 inch sand top of the soil for having well drained soil
<b>SOIL POROSITY</b>	40%	41% - 50%	41% - 50%	-
<b>EFFECTIVE SOIL DEPTHS FOR ROOTING CONDITION</b>	>150 cm	100-150 cm	75 – 150 cm	23 cm of top soil needs to be loosen or turned before sowing tea seeds



<b>NUTRIENT AVAILABILITY</b>	scl, l, cl, sl, sil	c, si, cl, sic	Sandy loam to loam	Adding 2 inch organic topsoil
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Table 1: Tea cultivation comparative analysis / source: author

#### 4.4 Comparison between TTRI and BTRI

	<b>TOCKLAI TEA RESEARCH INSTITUTE</b>	<b>BANGLADESH TEA RESEARCH INSTITUTE</b>
<b>Year of establishment</b>	1911	1957 (east Pakistan) 1973 known as BTRI
<b>Location</b>	Jorhat, Assam, India	Srimangal, Moulvibazar District, Bangladesh.
<b>Research Areas</b>	Various aspects of tea cultivation and processing, including plant breeding, pest and disease management, soil science, and tea processing techniques.	Tea plant breeding, pest and disease control, soil management, and tea processing.
<b>Heritage Museum</b>	Showcasing the history of tea in Assam	–
<b>Number of research departments</b>	14 divisions	6 divisions
<b>Training program</b>	Yes	no (one day “camellia open sky training”)

<b>Diploma course offerings</b>	Yes	No
<b>Total number of Tea clones</b>	211	23
<b>International Collaboration</b>	Tocklai is noted for collaborating with international tea research organizations	–

*Table 2: Comparison between TTRI and BTRI | source: author*

## **Chapter 5**

### **Project Programme**

This section encloses the project aim, objectives and the main functions of the project Programme which is intended.

#### **5.1 Programme Brief**

##### Administration block

- A central admin block containing information center, accounts and spaces for administrative officials.

##### Training center

- Space to train local and small tea state workers and dwellers for better cultivation.
- Spaces for hands on experience and lecture rooms.

##### Research center

- Library space
- Research laboratory
- workstations
- Archives etc.

##### Guest house

- Officials guest house
- Staff quarter
- Senior officer bungalow

##### Nursery

- Permeant nursery
- Nursery house

- Fertilizer house
- Pump house

Exhibition and Community center

- Tea display center
- Tea stall
- Community spot
- Café
- Bangabandhu gallery space
- Exhibition center
- Mosque

**5.2 Detailed Programme layout and area**

Below is the delineation of the functions per square foot.

Administration block:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Lobby	1	1000
Reception	1	200
lounge	1	600
Guest washroom	1	40
Meeting room	1	600
Chief officers office	1	250

Toilet	1	30
Development officers office	1	200
toilet	1	30
Senior scientific officers office	1	200
Senior farm assistant's office	1	100
Accountant's office	1	100
Assistant officer's office	1	200
Register's office	1	100
Clerk's room	1	60
Prayer room	1	120
Wadu space	2	80
Total area		3,910 sqft
Including 30% circulation		<b>5,083 sqft</b>

*Table 3: Administration block sqft / source: author*

Research center:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Reception	1	500
Lobby	1	1000
Lounge	1	600
Canteen	1	1500



Dry kitchen	1	120
Hand wash	1	40
Toilet	8	400
Meeting room	1	600
Lab preparation	1	700
Sampling lab	1	3200
Chemistry laboratory	1	6000
Biochemistry laboratory	1	5000
Plant protection laboratory	1	7000
Botany laboratory	1	4000
Crop environment laboratory	1	3000
Technical support unit	1	5000
Distillation lab	1	2400
Tea testing	1	3300
Library	1	500
Archive	1	1000
Total area		45,860 sqft
Including 30% circulation		<b>59,618 sqft</b>

*Table 4: Research block sqft | source: author*

Training center:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Workshops	3	600
Teachers room	4	400
Staff room	1	400
Office room	1	400
Multipurpose hall	1	6000
Toilet	8	500
Total area		8,300 sqft
Including 30% circulation		<b>10,790 sqft</b>

*Table 5: Training block sqft / source: author*

Green house:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Ware house	1	2000
Fertilizer house	1	400
Pump house	1	400
Green house	1	4000
Total area		6800 sqft
Including 30% circulation		<b>8,840 sqft</b>

*Table 6: Greenhouse block sqft / source: author*

Housing:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Senior officer's bungalow	1	3600
Official guest house	2	6000
Staff quarter	1	3000
Officers housing unit	8	14400 (1800 sqft per unit)
Guard room	1	100
Garage	1	2000
Storage	1	200
Total area		29300 sqft
Including 30% circulation		<b>38,090 sqft</b>

*Table 7: Housing block sqft | source: author*

Exhibition and Community center:

<b>Detail functions</b>	<b>Number</b>	<b>Area (sqft)</b>
Tea display center	1	1200
Community spot	1	4500
Tea stall	1	180
Cafe	1	300
Departmental store	1	200
Laundry	1	80
Bangabandhu Gallery scape	1	700
Exhibition center	1	1200
Mosque	1	700
Wadu space	1	50
Toilet	8	400
Total area		9,510 sqft
Including 30% circulation		<b>12,363 sqft</b>

*Table 7: Communal block sqft / source: author*

Total built area = 1,34,784 sqft

Allocated tea plantation space 1 acre = 43,560 sqft

Allocated space for a pond 0.5 acre = 21,780 sqft

Total land area = 2,04,732 sqft (4.7 acre)

## Chapter 6

### Design Development Stage

#### 6.1 Conceptual Framework

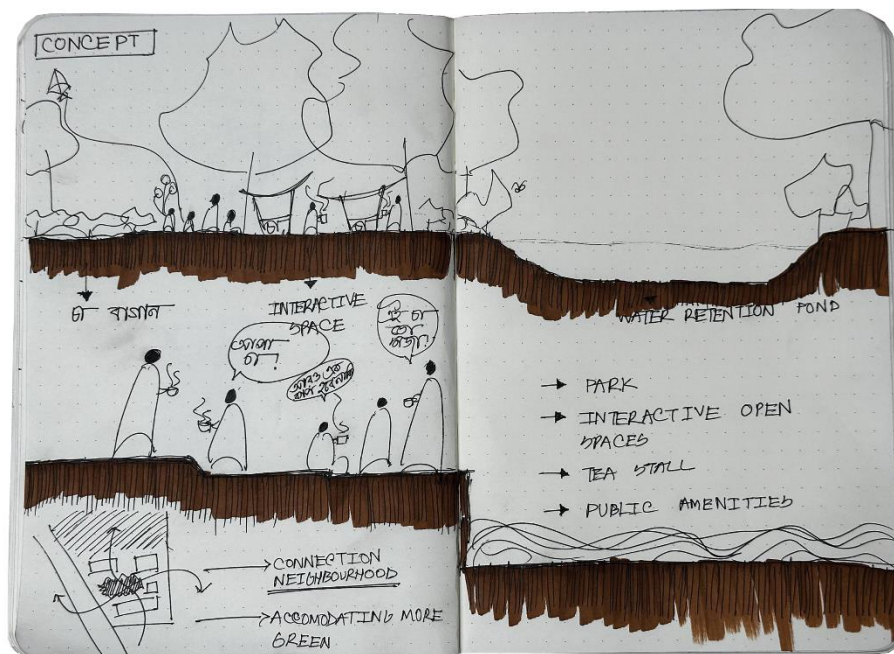
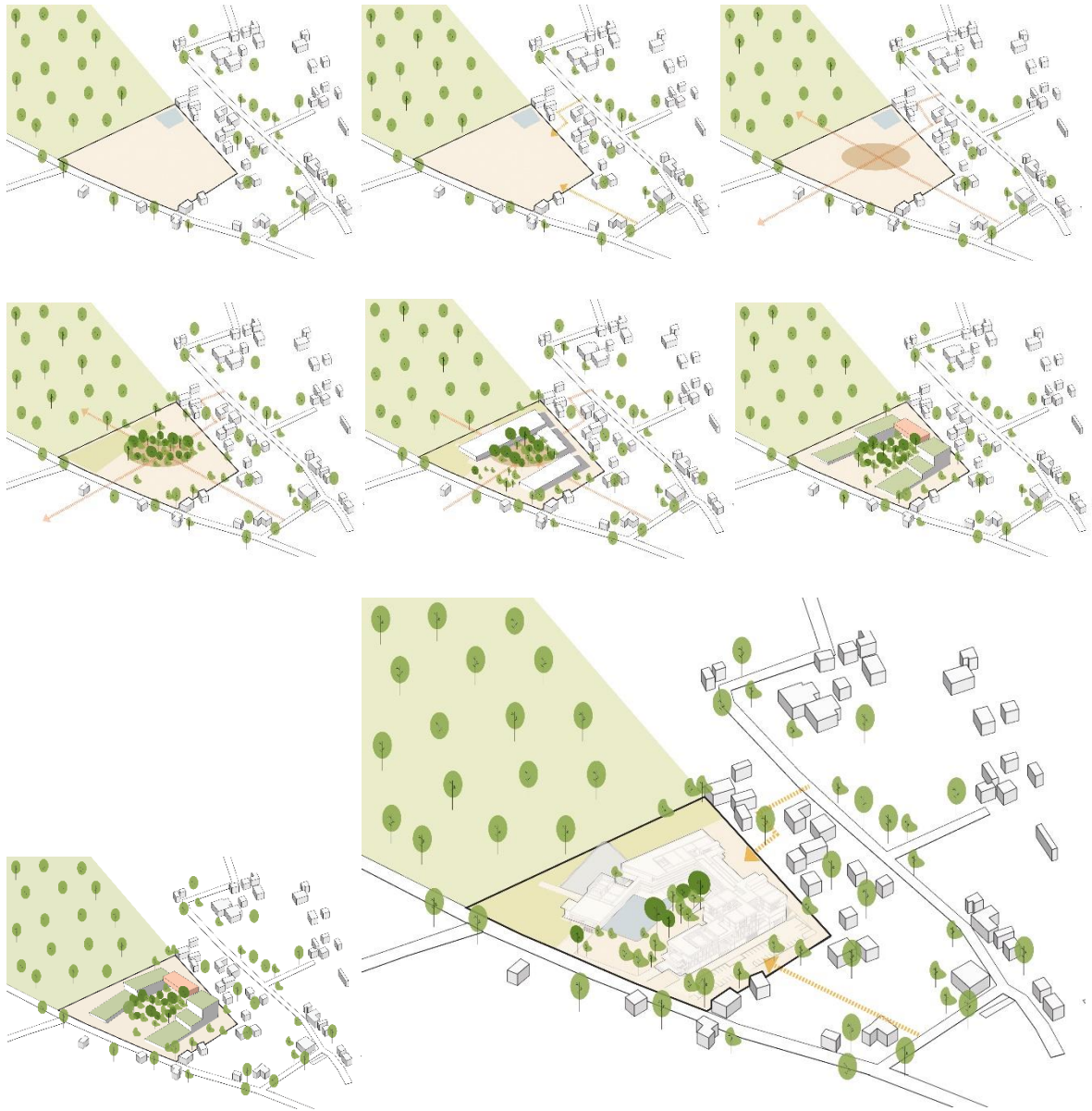


Fig 53: Conceptual framework / source: author

The discussion window explored diverse possibilities for transforming the space into a public area that caters to everyone. One proposal centered on incorporating a green area that doubles as a park, along with outdoor spaces for cafes and galleries. Another consideration involved reimagining the space through the sequential engagement of tea enthusiasts, allowing them not only to enjoy tea but also to partake in an educational experience by witnessing the entire tea-making process.



## 6.2 Form Generation



*Fig 54: Form generation / source: author*

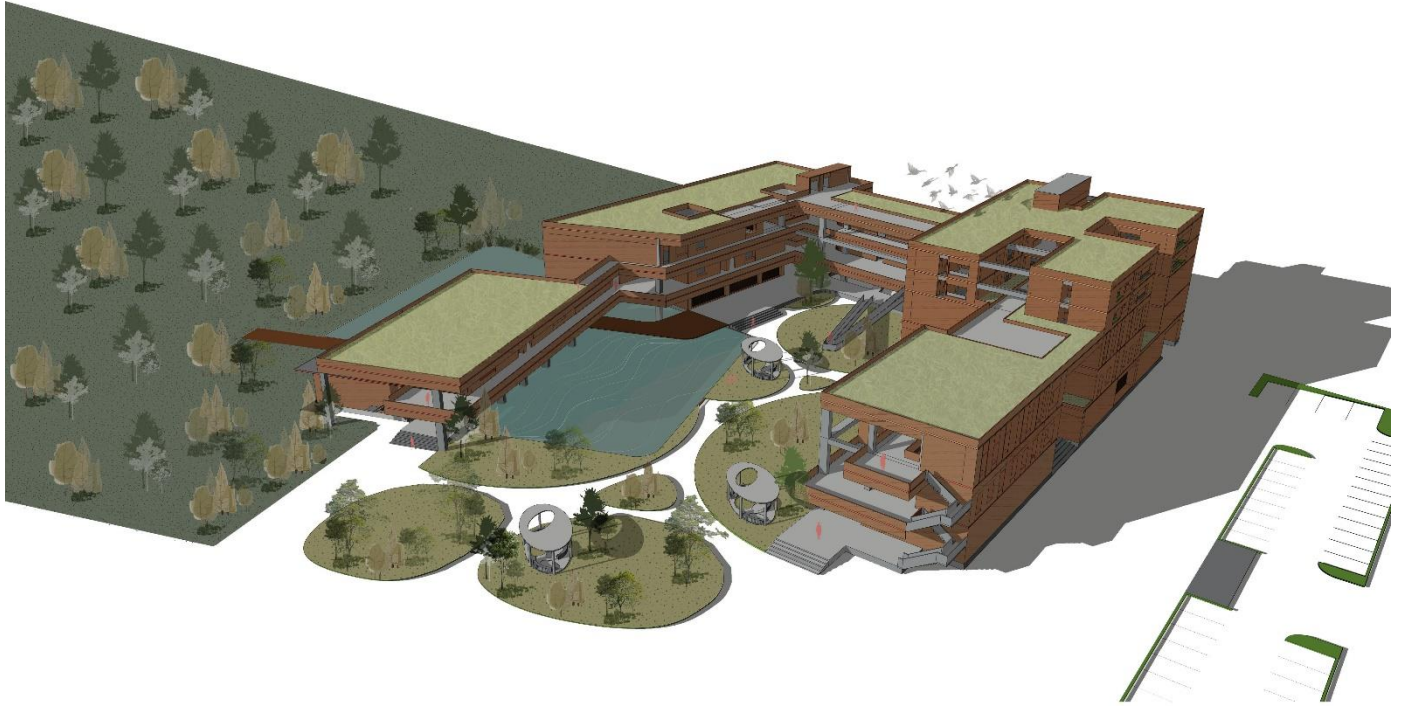
### 6.3 Top view



*Fig 55: Site plan / source: author*



## 6.4 Axonometric view



*Fig 56: Axonometric view | source: author*

## 6.5 Ground floor plan

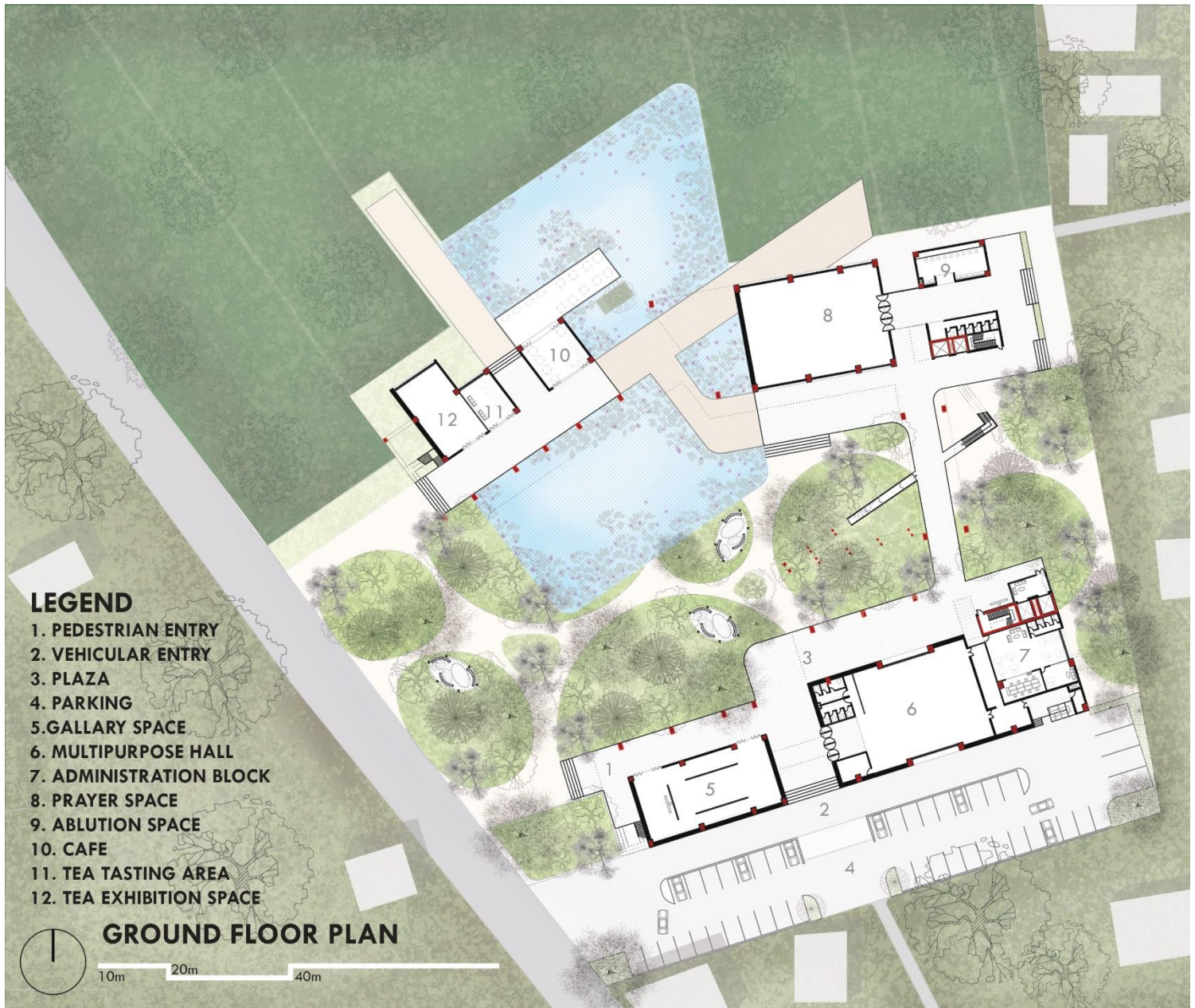


Fig 57: ground floor plans | source: author



## 6.6 First floor plan



Fig 58: First floor plans / source: author

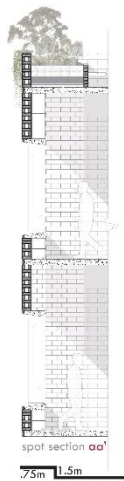


Fig 59: spot section / source: author



## 6.7 Spot section



*Fig 60: spot section | source: author*

## 6.8 Second floor plan

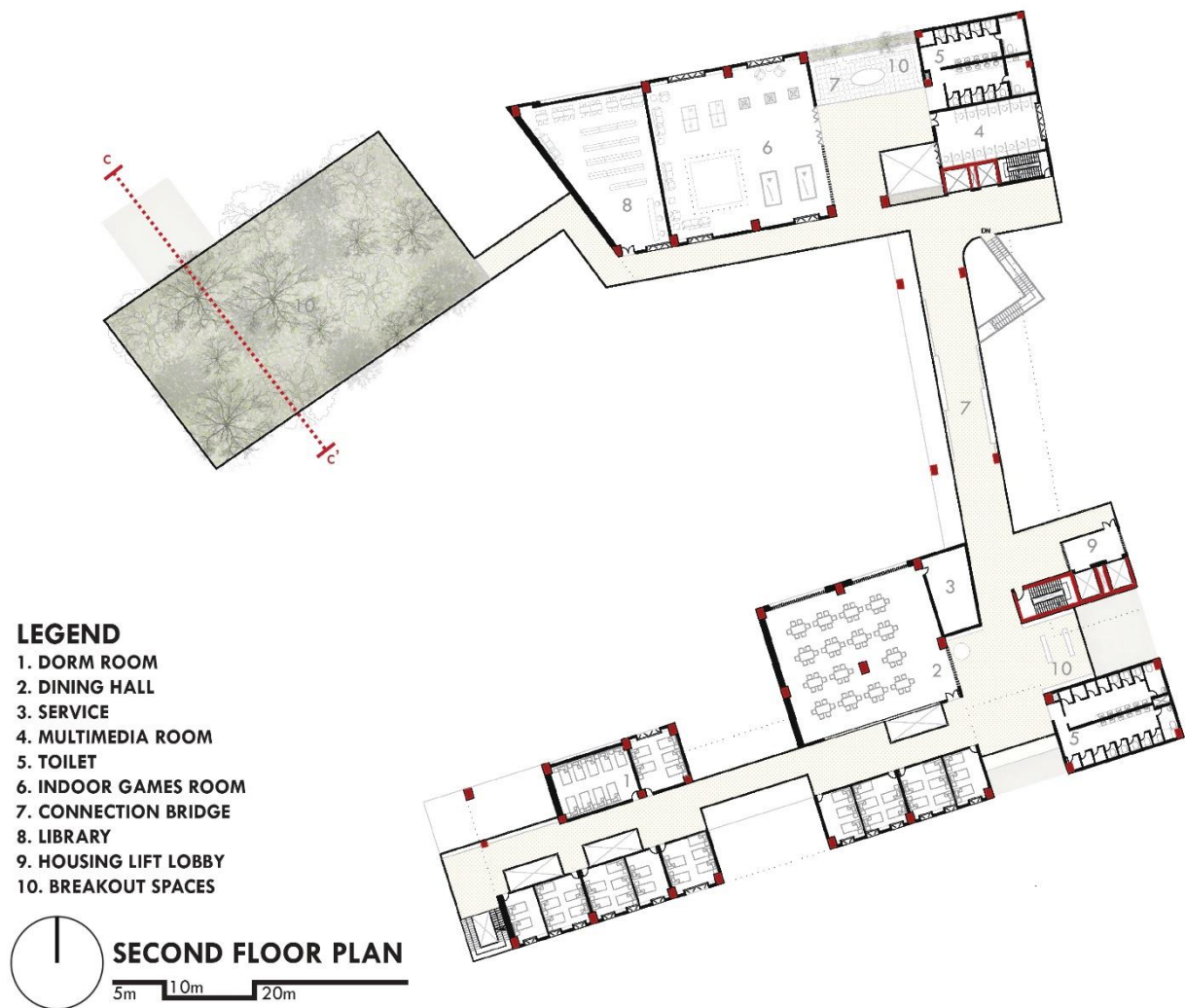


Fig 61: Second floor plan | source: author

## 6.9 Third floor plan



Fig 62: Third floor plan | source: author

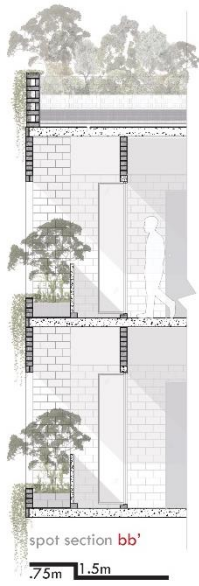


Fig 63: Spot section of wall detail Third floor plan / source: author

## 6.10 Fourth floor plan

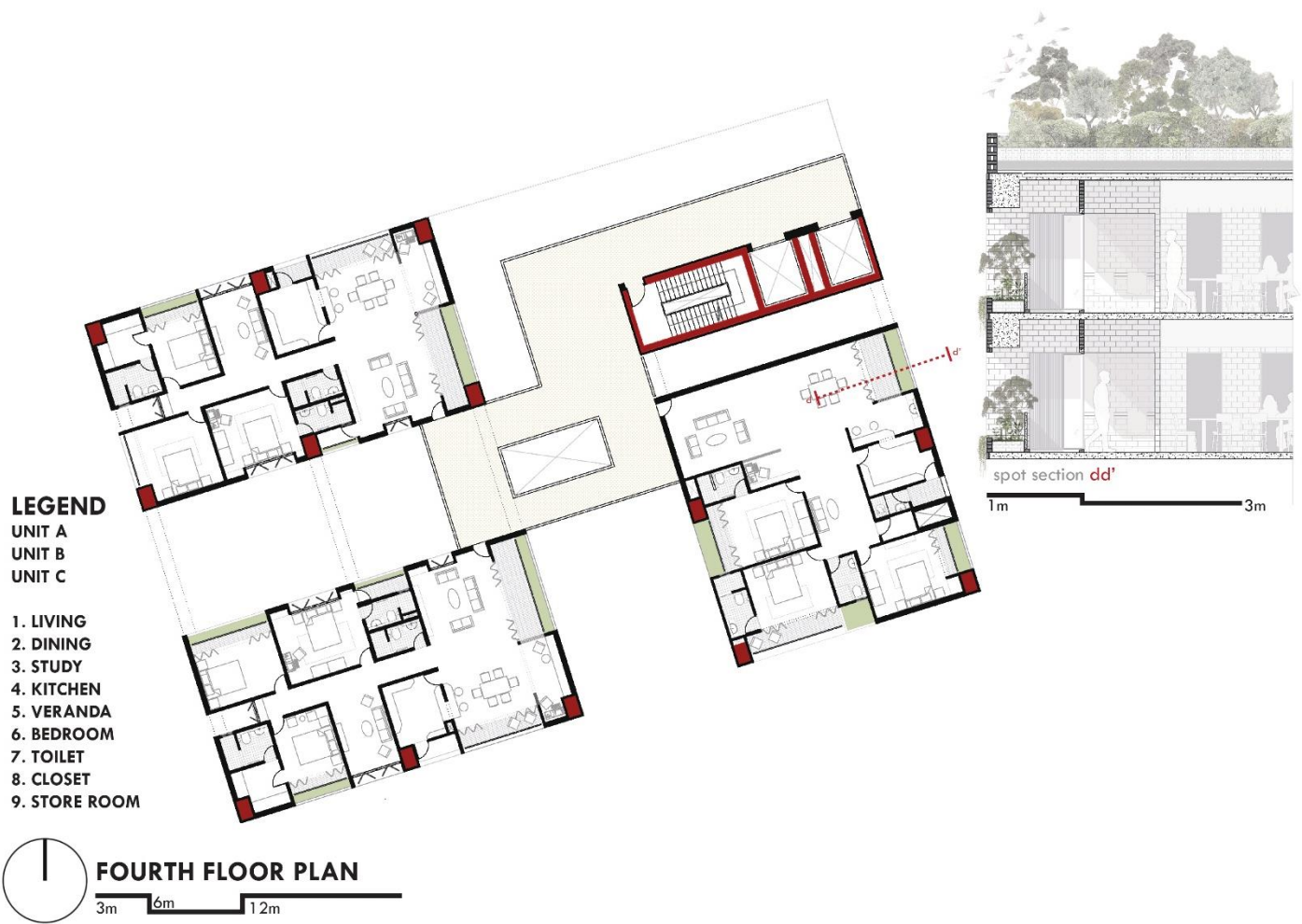


Fig 64: Fourth floor plan / source: author



## 6.11 Landscape detail

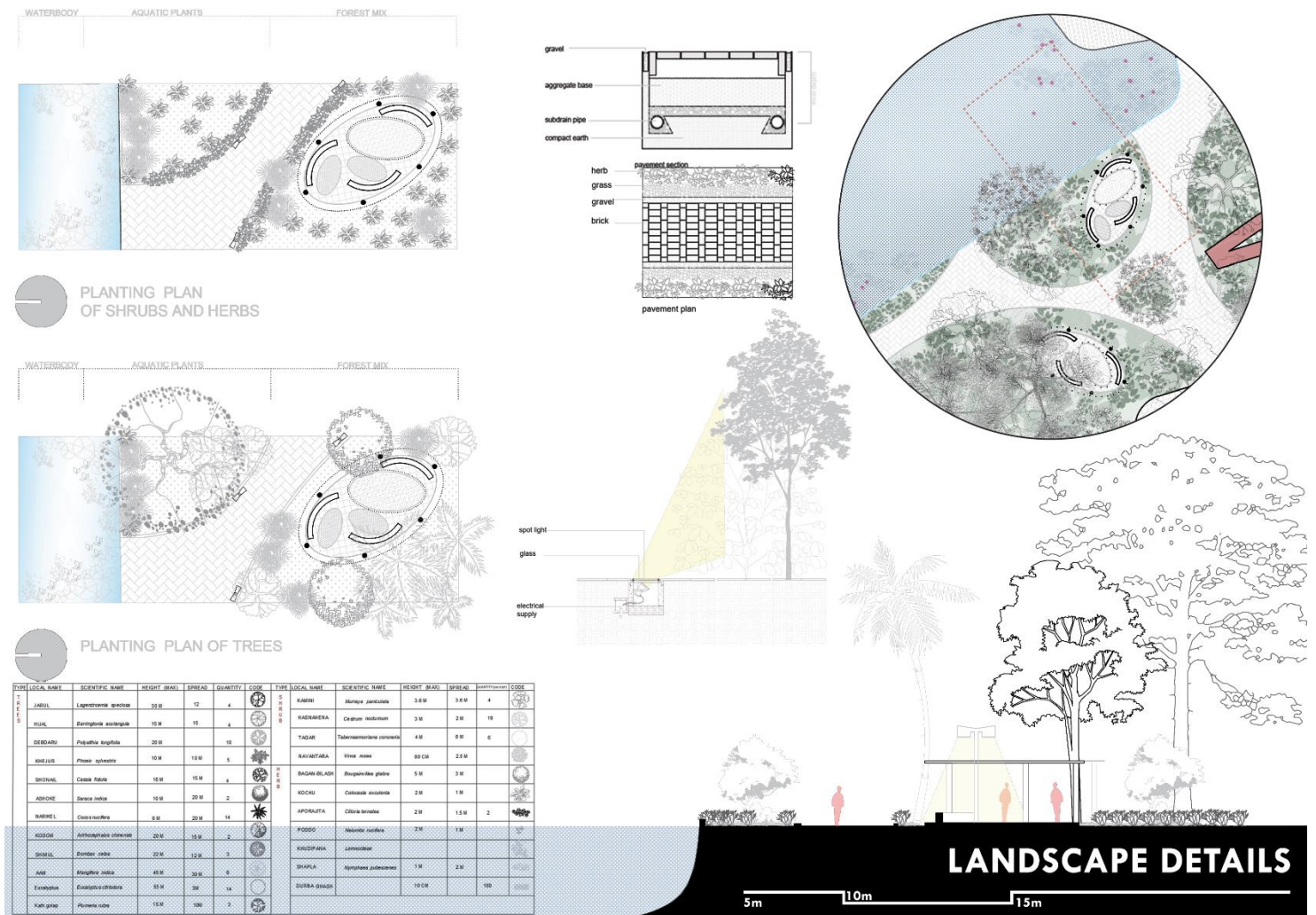


Fig 65: Landscape details/ source: author



## 6.12 Sections



*Fig 66: Section AA' | source: author*

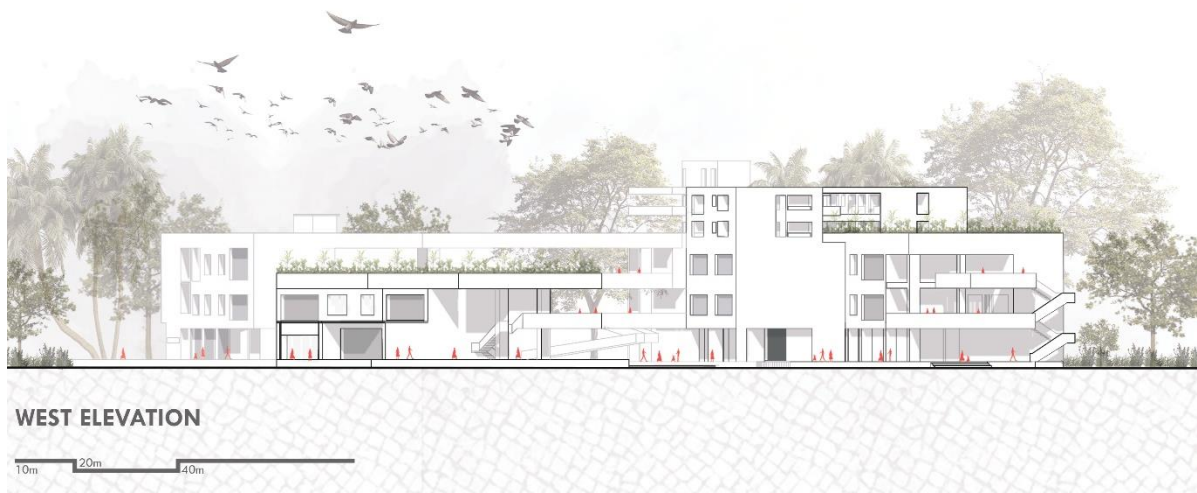


*Fig 67: Section BB' | source: author*

## 6.13 Elevations



*Fig 68: North elevation / source: author*



*Fig 69: West elevation / source: author*



## 6.14 Design visualizations



*Fig 70: Pedestrian entryway from the main road | source: author*

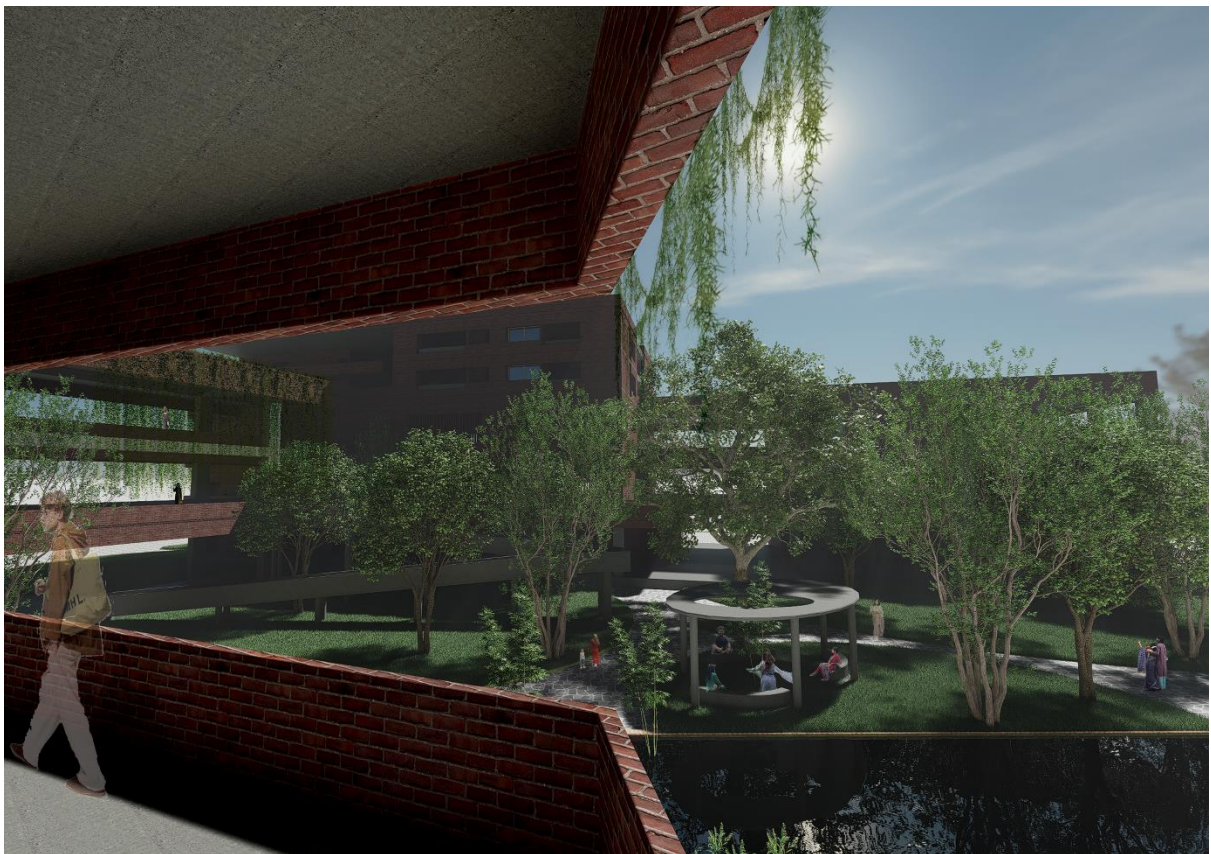


*Fig 71: ground floor corridor | source: author*





*Fig 72: ground floor corridor | source: author*



*Fig 73: first floor corridor overlooking the park view | source: author*





*Fig 74: Entryway building façade | source: author*



*Fig 75: View from the tea garden | source: author*





*Fig 76: Indoor games room | source: author*



*Fig 77: Living room in the units| source: author*





*Fig 78: Prayer space | source: author*

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## Appendix A.



### বাংলাদেশ চা গবেষণা ইনস্টিটিউট

বিটিআরআই উপকেন্দ্র, বাংলাদেশ চা বোর্ড

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স্থাপিত ২০০১



#### পটভূমিঃ

বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) গণপ্রজাতন্ত্রী বাংলাদেশ সরকারের বাণিজ্য মন্ত্রণালয়ের আওতাধীন বাংলাদেশ চা বোর্ডের একটি অঙ্গ প্রতিষ্ঠান হিসেবে চা শিল্পের উন্নয়নে কাজ করে যাচ্ছে। গবেষণার মাধ্যমে উন্নততর প্রযুক্তি উদ্ভাবন ও প্রয়োগের ধারাবাহিকতার লক্ষ্যে ১৯৫৭ সালের ২৮ ফেব্রুয়ারি চায়ের রাজ্যখ্যাত শ্রীমঙ্গলে বিটিআরআই (তৎকালীন পিটিআরএস) প্রতিষ্ঠিত হয়। বর্তমানে এ ইনস্টিটিউটের ৪টি পূর্ণাঙ্গ উপকেন্দ্র রয়েছে। তন্মধ্যে একটি মৌলভীবাজারের কালিটিতে, একটি চট্টগ্রামের ফটিকছড়িতে, একটি বান্দরবানের সুয়ালকে এবং একটি পঞ্চগড়ের ধাক্কামারায় অবস্থিত।

পঞ্চগড় জেলায় ১৯৯৯ ইং সালে চা চাষ করার পরিকল্পনা গ্রহন করা হয় এবং সে মোতাবেক ২০০০ ইং সালে বাংলাদেশ চা বোর্ড তথা বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) এর অভিজ্ঞ বিজ্ঞানীদের সার্বিক তত্ত্বাবধানে পঞ্চগড়ে সর্ব প্রথম কাজী এন্ড কাজী চা বাগান ৬২৭ একর জমিতে অর্গানিক চা চাষ শুরু করে যা পরবর্তীতে মীনা চা নামে পরিচিতি লাভ করে। উত্তরবঙ্গের চা শিল্পের উন্নয়নে ২০০১ সালে আনুষ্ঠানিকভাবে পঞ্চগড়ে বাংলাদেশ চা বোর্ডের আঞ্চলিক কার্যালয়ে বিটিআরআই উপকেন্দ্র স্থাপিত হয়।

পঞ্চগড় এ চা চাষের যে বিপ্লব ঘটেছে তা মূলত বাংলাদেশ চা বোর্ডের অঙ্গ প্রতিষ্ঠান বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) এ নিয়োজিত বিজ্ঞানীদের নিরলশ কর্ম প্রচেষ্টায়। যার ফলে বাংলাদেশের সর্ব উত্তরের এই অবহেলিত অঞ্চল মঙ্গা নামক অভিশাপ্ত শব্দটিকে জয় করতে পেরেছে। এতে করে এই উত্তরের জনপদটি বাংলাদেশের অর্থনৈতিক উন্নয়নের কর্মকাণ্ডে একটি গুরুত্বপূর্ণ ভূমিকা রেখে আসছে তেমনি এই অঞ্চলটি অর্থনৈতিক ভাবে অন্যতম চালিকা শক্তিতেও রূপান্তরিত হয়েছে। পঞ্চগড়ের এই ক্ষুদ্র পর্যায়ের চা চাষকে আরও বিকাশিত ও ত্বরান্বিত করতে বাংলাদেশ চা বোর্ডের অঙ্গ প্রতিষ্ঠান বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) সাম্প্রতি পঞ্চগড়ের চা

চাষীদের মাঝে বিনামূল্যে সিএফসি প্রকল্পের মাধ্যমে চার লক্ষ চা চারা বিতরণ করেছে। যা নিঃসন্দেহে অত্যন্ত প্রশংসনীয়। তাছাড়াও প্রতি বছরই বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) এর অভিজ্ঞ বিজ্ঞানীরা পঞ্চগড়ের চা চাষীদের দক্ষতা বৃদ্ধি ও বৈজ্ঞানিক পন্থায় চা চাষের কলাকৌশল হাতে কলমে শেখানোর জন্য বিভিন্ন প্রকারের প্রশিক্ষণের আয়োজন করে থাকেন। এতে করে চা চাষিরা যেমন উপকৃত হচ্ছেন তেমনি পঞ্চগড়ের চা চাষ আরও বেগমান হচ্ছে। ফলে এর উপকারিতা পঞ্চগড়ে চা চাষে জড়িত প্রত্যক্ষ ও পরোক্ষ ভাবে প্রায় ১২,০০০ লোক সহ হত দরিদ্র প্রায় ২,০০০ নারী ও পুরুষ সকলেই পাচ্ছে। সে কারণে বাংলাদেশ চা গবেষণা ইনস্টিটিউট (বিটিআরআই) এর এই উপকেন্দ্রটি পঞ্চগড়ের লোকজনদের নিকট চায়ের প্রাণকেন্দ্র হিসেবে পরিচিতি লাভ করেছে। ২০১৬ সালে ৯টি চা বাগানের ৭৯৮.৪৩ হেক্টর জমিতে ৫০,১৬,৩৫২ কেজি সবুজ কীচা চা পাতা উৎপাদিত হয়েছে। এছাড়াও পঞ্চগড়ের ক্ষুদ্র টি এস্টেট, ক্ষুদ্রায়তন চা চাষি ও ক্ষুদ্র চা চাষীদের মোট ১০৪৬.৮৪ হেক্টর জমিতে ৯৫,৫৬,৫৮৫ কেজি সবুজ কীচা চা পাতা উৎপাদিত হয়েছে। পঞ্চগড়ে সর্ব মোট ১৮৪৫.২৭ হেক্টর জমিতে ১,৪৫,৭২,৯৩৭ কেজি সবুজ কীচা চা পাতা উৎপাদিত হয়েছে। ২০১৬ সালে ৭টি ফ্যাক্টরীতে মোট ৩২০৪৬,০৬, কেজি তৈরি চা উৎপাদিত হয়েছে।

#### উপকেন্দ্রটির উদ্দেশ্য ও কার্যাবলীঃ

- ১) বিটিআরআই কর্তৃক উদ্ভাবিত বিভিন্ন টেকসই প্রযুক্তির আঞ্চলিক ট্রায়াল সম্পন্ন করা।
- ২) চা চাষীদের জন্য স্বল্পমূল্যে ফ্রেশ কাটিং, শিকড়যুক্ত চারা ইত্যাদি ডিপি নার্সারিতে তৈরি ও বিতরণ করা
- ৩) দক্ষতা বৃদ্ধির লক্ষে উত্তরবঙ্গের বিভিন্ন চা বাগানের ব্যবস্থাপক, সহকারী ব্যবস্থাপক ও ক্ষুদ্র চা চাষীদের জন্য চা আবাদীর উপর দুইদিন ব্যাপি বার্ষিক প্রশিক্ষণ কোর্স এর আয়োজন করা।
- ৪) চা আবাদীর বিভিন্ন বিষয় যেমন- মৃত্তিকা ব্যবস্থাপনা, নার্সারী ব্যবস্থাপনা, প্লান্টিং, পুনিং, প্লাকিং, টিপিং, সার প্রয়োগ, পোকামাকড় ও রোগবালাই দমন, চা প্রক্রিয়াজাতকরণ, চা আন্দান ইত্যাদির উপর মাঠ পর্যায়ের তাত্ত্বিক ও ব্যবহারিক প্রশিক্ষণ ও কর্মশালার আয়োজন করা।
- ৫) উত্তরবঙ্গের চা বাগানসমূহে ও ক্ষুদ্র চা চাষীদের চা আবাদ সংক্রান্ত সেরেজমিনে বিভিন্ন সমস্যার সমাধানকল্পে বিজ্ঞানভিত্তিক কারিগরি সহায়তা প্রদান করা।

#### অর্জনঃ

এ উপকেন্দ্রে ১,৪০,০০০ উন্নত জাতের বিটি সিরিজের চা চারা উৎপাদনের জন্য একটি আধুনিক এইচ ওয়াই ডি নার্সারী রয়েছে। এ যাবৎ পঞ্চগড়স্থ বিটিআরআই উপকেন্দ্র থেকে পর্যাপ্ত সংখ্যক ফ্রেশ কাটিং ও শিকড়যুক্ত চারা চা চাষীদের মাঝে স্বল্পমূল্যে বিতরণ করা হয়েছে। উত্তরবঙ্গের চা বাগান ও চা চাষীদের জন্য চা আবাদীর উপর মোট ১৪টি বার্ষিক কোর্সের আয়োজন করা হয়েছে। উত্তরবঙ্গের চা বাগান ও চা চাষীদের বাগানে সেরেজমিনে ১,৪৪০টি উপদেশমূলক ভ্রমণ করে পরামর্শ প্রদান করা হয়েছে। চা আবাদীর বিভিন্ন বিষয়ে অর্থ প্লান্টিং, পুনিং, প্লাকিং, টিপিং, সার প্রয়োগ, পোকামাকড় ও রোগবালাই দমন, চা প্রক্রিয়াজাতকরণ, চা আন্দান ইত্যাদির উপর ৬৭টি প্রশিক্ষণ ও কর্মশালার আয়োজন করা।

#### ভবিষ্যৎ পরিকল্পনাঃ

আধুনিক ল্যাব ও দক্ষ জনবল সমৃদ্ধ উপকেন্দ্র স্থাপনের মাধ্যমে উত্তরবঙ্গের চা বাগান ও চা চাষীদের বিজ্ঞানসম্মত কারিগরি ও প্রযুক্তি সেবা নিশ্চিতকরণ।

#### জনবলঃ

- ১) ড. মোহাম্মদ শামীম আল মামুন, উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা মোবাইলঃ ০১৭১২১১৯৮৪৩
- ২) মোঃ জায়েদ ইমাম সিদ্দিকী, উর্ধ্বতন খামার সহকারী। মোবাইলঃ ০১৭৩৬০৩৬০৬৫
- ৩) মোঃ এত্তাজুল হক খোকন, অফিস সহায়ক।
- ৪) মোঃ আব্দুল হাকিম, নিরাপত্তা প্রহরী।