



URBAN GENDER JOURNEY

A GENDER-BASED APPROACH TO AFFORDABLE URBAN HOUSING DESIGN

TU Delft Bouwkunde - Graduation Report

MSc3/4 Architecture, Urbanism and Building Sciences, 2023-2024

Global Housing Graduation Studio:
Architecture of Transition in Bangladesh

Research Supervisor

Rachel Lee

Design Supervisors

Dirk van Gameren
Marina Tabassum
Nelson Amorim Mota
Rohan Varma

Building Technology Supervisor

Rocio Conesa Sánchez

Author

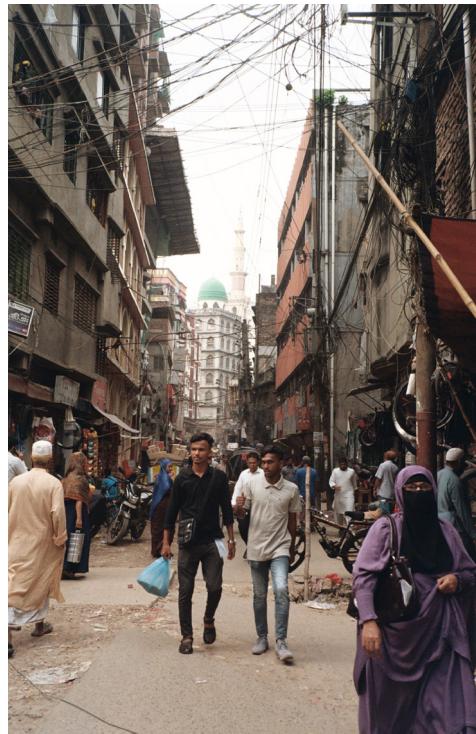
Marion Achach (5633478)

TABLE OF CONTENT

INTRODUCTION - URBAN MIGRATION	004
Problem Statement	006
Research Question	014
Theoretical Framework	016
Methods	022
RESEARCH - HOW DOES THE OTHER HALF (LIVES) 024	
Book of Patterns	026
Case Studies	054
DESIGN APPROACH 080	
Site Analysis	082
Affordability	106
Managerial Strategy	116
Building Technology Approach	124
DESIGN 138	
Construction & Details	140
Unit Design	170
Cluster Design	188
Urban Strategy	212
Water Management	222
Gender-Based Approach	230
A Synthesis of a Journey	244
REFLECTION 248	
REFERENCES 256	

INTRODUCTION

URBAN MIGRATION



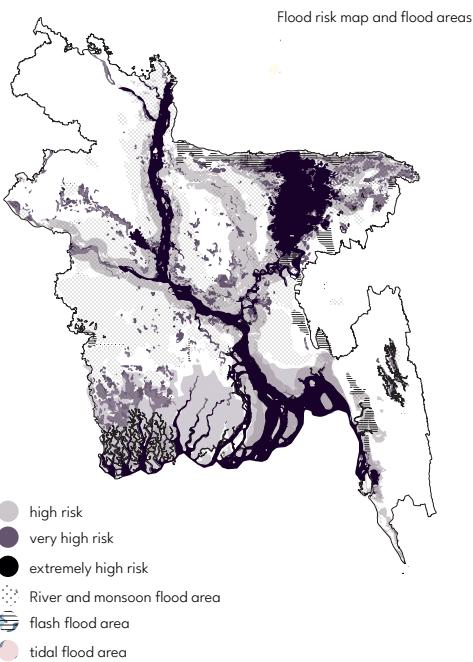
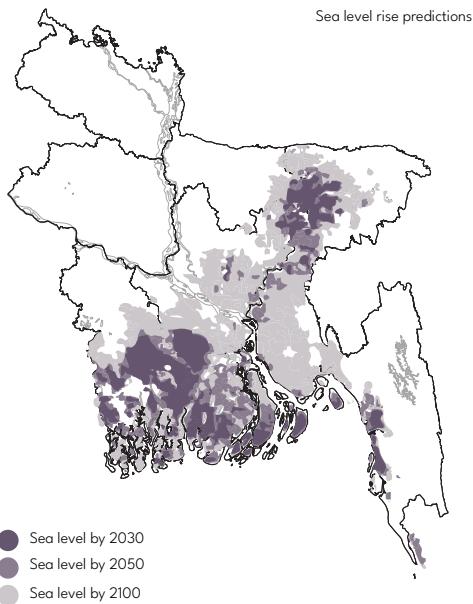
© Bazaar Dhaka (Author, October 2023)

PROBLEM STATEMENT

**MIGRATION,
VULNERABILITIES
& GENDER DISPARITIES**

In an increasingly urbanized world, the global challenge is to ensure that cities provide safe and healthy living environments, thriving economies and social benefits for diverse groups for generations to come. Today, more than half the world's population lives in urban areas, with almost 90% concentrated in Asia and Africa. The trend towards urbanization is set to continue, with city dwellers expected to account for 68% of the world's population by 2050. In addition, it should be noted that 24.2% of the world's urban population lives in slums, mainly concentrated in three regions: Central and South Asia (359 million), East and Southeast Asia (306 million) and Sub-Saharan Africa (230 million) (UN, 2020). When examining the drivers of urban growth, one of the main factors to consider is urban migration. The United Nations defines urbanization as the process by which people move from rural areas to cities in search of economic, social, political and environmental opportunities. The decision to migrate is a multi-faceted one, shaped by both "push" factors associated with conditions in the country of origin and "pull" factors associated with the perception of life in the destination country, as described by Lee in 1966.

Today, in Bangladesh as in global migration trends, economic factors such as employment opportunities and social considerations such as marriage and education are the main drivers of migration. However, the influence of climate change and the resulting alterations will amplify the emergence of an ongoing trend, characterized by environmental



migration. Pender's 2008 research highlighted the changes expected in Bangladesh as a result of climate change, including rising temperatures, increased rainfall and flooding, intensified cyclones, prolonged droughts and rising sea levels. These changes will affect the country's food security, water resources and biodiversity, with serious consequences for agriculture and ecosystems.

Meanwhile Bangladesh is already highly vulnerable to climate change, with 171 devastating natural disasters between 1970 and 2005 (WEDO, 2008), the consequences of climate change are unprecedented and will have socio-economic repercussions. The Centre for Global Change (CGC) (2008) lists six main impacts. Firstly, an increase in the number of socio-economic disasters, including loss of life, increased hardship for vulnerable populations and significant damage to human settlements and national infrastructure. Secondly, increased threats to agriculture, fisheries and livestock have a detrimental effect on the nation's livelihoods and food security. In addition, the rural exodus is reducing income opportunities and productive activities. In fact, while for Khatun et al. (2021) migration can be presented as a "strategy to find desirable livelihoods in a new destination by escaping the environmental risks and vulnerabilities of origins", the challenges in terms of adaptation in the place of destination should not be overlooked. (Rana and Ilina, 2021). In addition, the consequences of rural exodus are affecting the rapid expansion of urban areas, in particular the access of the urban poor to drinking water and sanitation, affecting the accessibility of resources and the effectiveness of aid programs and safety nets. Finally, global warming and increasing heat waves will aggravate health risks, particularly for children and the elderly. (World Bank, 2000).

Urbanization and Impacts on Cities

As a result, these impacts underline the urgent need to address the consequences of natural and

man-made disasters on human settlements and access to housing. This situation affects millions of people every year, with no end in sight. With the increase in the world's population, the escalation of economic and social crises and climate-related disasters, millions of people have become refugees and internally displaced persons. This situation can be observed all over the world, and particularly in the Global South. Many current events illustrate this situation. For example, in Latin America, with the migration of populations from rural to urban areas due to economic conditions and the search for better living conditions, or in Asia, with the impact of climate change on housing conditions, forcing populations to move to safer locations. Closer to home, in Europe, the consequences of Russia's invasion of Ukraine in February 2022 have led to an escalation of the Russo-Ukrainian war and the movement of Ukrainians across Europe to seek refuge. The list goes on. Continuously and repeatedly, we can observe a common trend of displacement towards urban areas, seen as places where better living conditions can be offered and where more people can be accommodated. However, urban areas do not have unlimited resources, and global urban growth is increasing the need for suitable, affordable housing.

In Bangladesh, internal migration predominantly revolves around districts like Dhaka, Gazipur, and Narayanganj, attracting over 20% of migrants. People from rural areas flock to these urban centers in pursuit of better opportunities while seeking refuge from vulnerabilities in their places of origin. Meanwhile, the Sylhet Division has recently witnessed a notable shift in migration patterns.

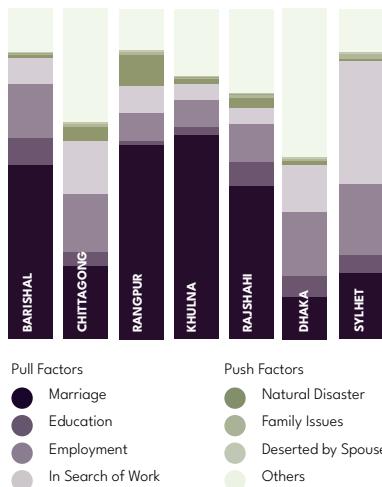
Gender disparities are pronounced, with men mainly driven by economic prospects, while women and girls migrate primarily for marriage. Push factors, including natural disasters and family issues, also play a significant role. Sylhet Division's status as a regional economic hub is evident, driving a high rate of internal migration

for economic prospects.

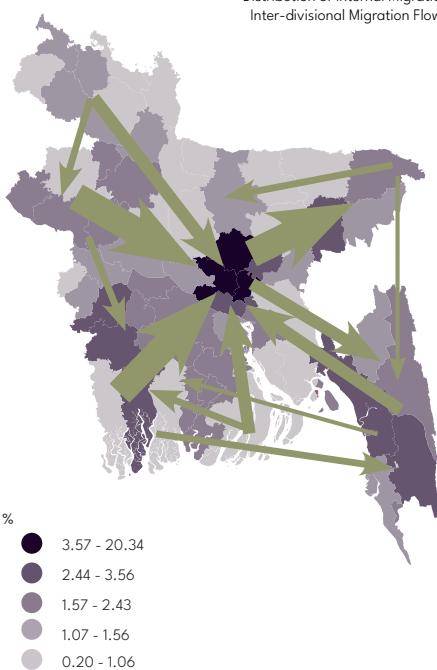
Recent data shows Sylhet District experienced a substantial 10% increase in internal migration over the past decade, while other districts in the Sylhet Division remain relatively stable. These trends contrast with Dhaka's migration patterns. In external migration, Bangladesh has seen a remarkable surge in overseas employment, with Comilla District leading the way. Notably, gender disparities persist, with only 20% of overseas workers being female. This dynamic landscape underscores the complex interplay of factors shaping migration in Bangladesh.

Global urbanization has led to more than half the world's population living in cities, bringing economic and social opportunities but also intensifying challenges related to living conditions, poverty, and sustainable development, disproportionately affecting marginalized groups, particularly women and girls. The existing gender-based disparities in urban contexts, perpetuated by unequal access to resources, educational disadvantages, limited employment opportunities, and cultural norms, exacerbate the living conditions of vulnerable groups and their access to affordable, adequate, and secure housing. Therefore, providing adequate and affordable housing for urban populations is a pressing challenge in Bangladesh, where the current system relies mainly on private land ownership, while government-provided social housing remains limited and inaccessible for many. This lack of government-provided housing has stimulated the growth of private housing structures, contributing to middle-class income generation but at the expense of the poorest communities, leading to the emergence of informal settlements in the urban landscape and on the outskirts of the city, where people face inadequate living conditions with limited access to resources and services.

Reasons of Internal Migration, 2011



Distribution of Internal Migration and Inter-divisional Migration Flow, 2011



“Gender is one of the most significant indicators of vulnerability”
 (Alston 2013; Lane and McNaught 2009; FAO 2007b; Neumayer and Pluemper 2007).

Because everyone is different in terms of knowledge, skills, power relations, gender roles, health, wealth, race/ethnicity, age, physical abilities and disabilities, migration and its impacts have disproportionate consequences (GSC, 2008). Thus, the ability to anticipate, cope with, resist and recover from the impact of a natural hazard or an economic-induced migration depends on one’s vulnerability. The term vulnerability is used to define the variable impacts of life. In her book (2015), Alston characterizes vulnerability indicators by gender, poverty, educational disadvantage, reduced access to services, lack of employment options and other aspects of socio-economic disadvantage. In this research, I refer to the vulnerabilities that Enarson (2000) calls “social vulnerability”, defining that people’s differential access to and control over resources are closely linked to their ability to survive and recover from change. As such, women and girls are disproportionately affected by urbanization challenges due to their economic, social, and health vulnerabilities. Urbanization has exacerbated gender disparities in urban contexts, limiting women’s and girls’ access to resources, education, employment, and services.

Women and Girls, a Vulnerable Group

Over the 57% of the world’s population living in urban areas, 26.8% of them are women and girls. (World Bank, 2015) Yet, despite being half of the world’s population, women and girls are often marginalized. In 2013, two-thirds of the world’s illiterates were women and girls, who at the same time earn 10% of the world’s income and make up 70% of those living in extreme poverty (UNICEF, 2013; Global Poverty Project, 2013). In addition, according to the UN Women, UNDP and Pardee Center for International

Futures prospective report, it is estimated that by 2030, 416 million women and girls will be living in extreme poverty, compared to 401 million men and boys. Although the gender gap narrowed over the past decade, a substantial gap remains in many parts of the world, particularly in the least developed countries (LDCs). In fact in 2022, 388 million women worldwide will be living in extreme poverty, 62.8% of them in sub-Saharan Africa, followed by Central and South Asia (20.9%), Latin America and the Caribbean (5.3%), North Africa and West Asia (5.1%), East and Southeast Asia (4.8%), and less than 1% in Europe, North America and Oceania (UN Women, 2022). On top of that, major events such as COVID-19, natural disasters and wars severely affect the informal economy, which employs the vast majority of the working poor. In addition, women’s vulnerability is exacerbated by the loss of control over natural resources such as water, means of production, information and decision-making, the collapse of educational and employment opportunities, and increased exposure to hazardous conditions. (Dankelman, 2010).

“Bangladeshi women are lagging far behind than their male counterparts. Women’s and men’s responses to these crisis situation, as well as their abilities to cope with them to a very large extent reflect their status, roles and positions in society: because of gender based inequalities, girls and women are typically at higher risk than boys and men” (UN, 2004; Enarson, 2002).

In Bangladesh, gender disparities and related problems persist in various aspects of life, from education and healthcare to violence against women and early marriage. These problems are deeply rooted in cultural practices and societal norms. Men have a stranglehold on land ownership, decision-making roles, production, leadership and trade, while women face constraints linked to restrictions on their mobility known as Purda, cultural norms, legal

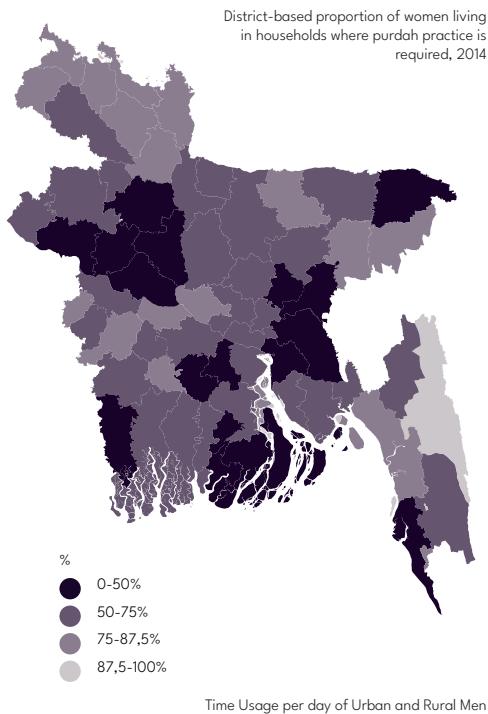
constraints and the dominant influence of the Islamic faith. Purdah is a religious and social practice of female seclusion prevalent among Muslim and Hindu communities. The practice of purdah is common across Bangladesh. Zooming into the Sylhet division, Sylhet district stands out as particularly conservative.

There is a significant link between the practice of purdah and women's labor force participation (LFP). Despite substantial progress in female education in Bangladesh, this has not translated into a comparable improvement in gender gaps in LFP. Women remain largely in the informal sector or in unpaid work. Access to paid jobs has a positive impact on women- smaller family size, increased age at first marriage age, female autonomy, and career aspirations. Yet due to community norms surrounding purdah, women are kept out of the labor market despite increases in education or household income.

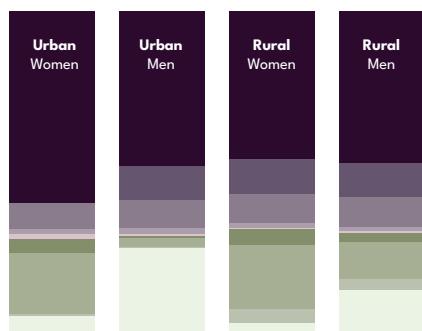
There is a stigma against the employment of educated women in lower-level work, coupled with the slow growth of employment in sectors appropriate for educated women. Additionally, the gender division of labor within marriage constrains women further. There is also concern for women's safety in public spaces and restrictions to outside mobility. Both push and pull factors impact women's LFP decisions. Women can be pushed into paid work during economic crises, and pulled by greater demand for female labor in the industrial sector.

In the 2021 Time Use Survey, the 24-hour day of urban and rural women and men were recorded. One of the largest disparities is the number of hours women spend doing unpaid care/domestic work as compared to men, regardless of the setting.

Unpaid work affects almost all aspects of a woman's life critically, irrespective of the woman's economic status, family type, profession, number and age of children, and level of education.



Time Usage per day of Urban and Rural Men and Women, 2021



- Self-care and maintenance
- Culture, leisure, mass-media and sports practices
- Socialising, community and religious practices
- Learning
- Unpaid volunteer, trainee and other unpaid work
- Unpaid caregiving services for household and family
- Unpaid domestic services for household and family
- Production of goods for own final use
- Employment and related activities

Considered the duty of a woman despite her being employed, this unpaid work goes unacknowledged and adversely affects women's ability to participate in the labor market. This increases women's economic dependence on their husbands, thereby reducing their decision-making power in the family. Furthermore, this gender gap results in a vast economic and competitive loss for the development of Bangladesh.

In addition, the acceptance of violence against women, dowry practices and early marriage perpetuate gender disparities. As Connell (2011: 7) notes, "men and boys play a central role in shaping gender equality". Moreover, strong limitations are embedded in the sexist social customs of Bangladesh, where women are expected to conform to practices such as wearing saris, nose rings bearing the symbol of their husband's family, and being submissive. They often have to be accompanied by a male member of their family outside the home and, unfortunately, violence is considered commonplace. Purdah, the custom of protecting women from the sight of unrelated men, is particularly widespread in rural areas. As a result, women in Bangladesh face problems related to nutrition, infectious diseases and access to healthcare, with purdah customs often requiring the presence of a male escort during medical visits.

From Rural Areas: Adapting to Climate Change

Haor regions of Bangladesh are vast wetlands teeming with life. Nearly 20 million people call these floodplains home, heavily reliant on agriculture and fishing for survival. However, climate change is disrupting the natural rhythm, bringing more frequent floods and harsher droughts. Sylhet contains 105 of the 373 Haors of Bangladesh.

The livelihood of the people of the Haor basins relies largely on nature-dependent sectors like farming and fishing. With climate change, these

wetland areas are facing increasingly frequent flash floods and increasingly severe droughts, forcing adaptation strategies for continued livelihood. During natural disasters and economic crises, women face more acute challenges than men due to traditional gender roles. (Ministry of Water Resources, 2012)

Younger women tend to be involved in pre-and post-harvest activities, as well as duck rearing, homestead gardening, the rearing of cattle and poultry, earth cutting, small-shop keeping, making traditional fishing gear, net weaving, and collecting and selling fuel wood.

Older women carry out more caregiving and household maintenance work. They ensure food availability, make portable stoves, fetch water, preserve fuel and fodder, make jute nets (shika), clean and repair the house after floods, raise homesteads, and make bamboo fencing. Many of the older women are extremely knowledgeable and experienced with the rhythms of life in Haor basins, and so are responsible for disseminating early warning messages.

Women of Haors play a key role in generating household income and are effective agents of disaster reduction and adaptive strategies, yet their contributions often go unacknowledged.

Furthermore, women's burden increases disproportionately to men in the event of natural disasters. There is a loss of household essentials like coal and firewood, and resources like cattle and chicken, all necessary for women's income. Since a lot of men migrate in search of alternative employment, all the responsibility of the household falls on the shoulders of women. Women and children's health

In all the Haor districts, women have less assistance during delivery from skilled health personnel (13.4%) compared to the national average (18%). Additionally, infant mortality rates in all haor districts excluding Brahmanbaria are much higher (57 per 1000 infants and 76

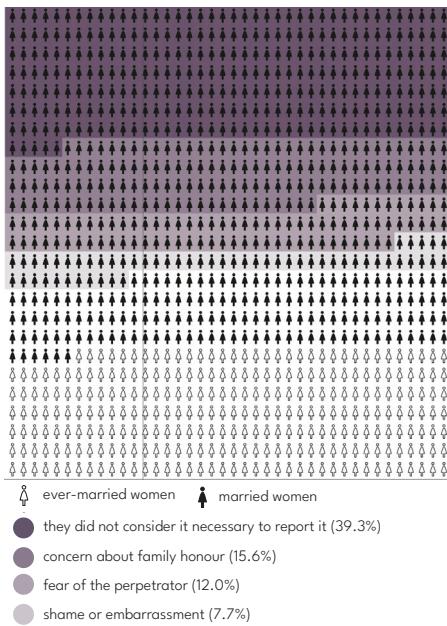
per 1000 children) than the national average (49 and 64 respectively). Due to the remote location, poverty, and frequent migration of households, healthcare developments lag behind the rest of Bangladesh. (Fatema Akhter Hiramoni, 2023: 973-980).

Many women in Haor areas have found an alternative source of income in duck rearing after losing their crops to recurrent floods.

“After losing Boro crops last year, our six-member family including my sick husband faced starvation. Anxious to save my family, I bought seven ducks including their feed with Tk 2,000 that I borrowed from someone. Now I have 70 ducks,” (Mintu Deshwar, 2018)

Duck rearing is considered low-cost, highly productive, and adaptable to environmental conditions. (Sawon Istiak Anik and Mohammed Abu Sayed Arfin Khan, (2012): 879-896.) The eggs and meat are sold, and women can take the lead since it is home-based. This has provided women with more economic independence and improved livelihood, leading to their empowerment. (Romaza Khanum and Muhammad Salim Al Mahadi, 2016)

Infographic on intimate partner violence rates and reporting, 2015



RESEARCH QUESTION

**FOSTERING URBAN DEVELOPMENT
THROUGH WOMEN'S EMPOWERMENT
IN MID-TIERS CITIES**

As urban environments evolve, it is essential to explore the positive effects of a gender-based approach to urban design on social integration, economic growth, and sustainability for all. This research seeks to investigate the potential benefits and challenges of such an approach, its impact on gender disparities, and its overall effect on urban well-being. As such, following Charles Correa's statement to promote land redistribution and social reform in villages, in order to increase their retention capacity (Correa, 1989), **this research focuses on the dynamics and impacts of migration from rural areas to the urban settlements of Sylhet City and how can gender-responsive urban and housing design contribute to habitat improvement of urban poor migrants in growing second-tier cities like Sylhet, Bangladesh?**

This research question can be broken down into sub-questions:

Migration

How are the living conditions in migrants' places of origin carried over to their place of refuge in the city, necessitating adaptation to their new living conditions?

To what extent is the degree of trauma experienced by migrants influenced by their reasons for migration and how design should carefully respond to individual needs?

Gender-based Issues

What vulnerabilities did women and girls face in their place of origin, and how were they transferred to their destination?

What vulnerabilities do women face in second-tier cities?

To what extent do gender-based inequalities exacerbate vulnerability?

Development & Urban Integration

To what extent could contributing to habitat improvement in terms of livelihoods, social integration, access to housing and infrastructure benefit poor urban migrants, and could consequently benefit the whole?

How can flexible and adaptive design in response to ongoing crisis better address the need for income generation in urban housing?

How can gender-responsive design benefit the whole, in terms of:

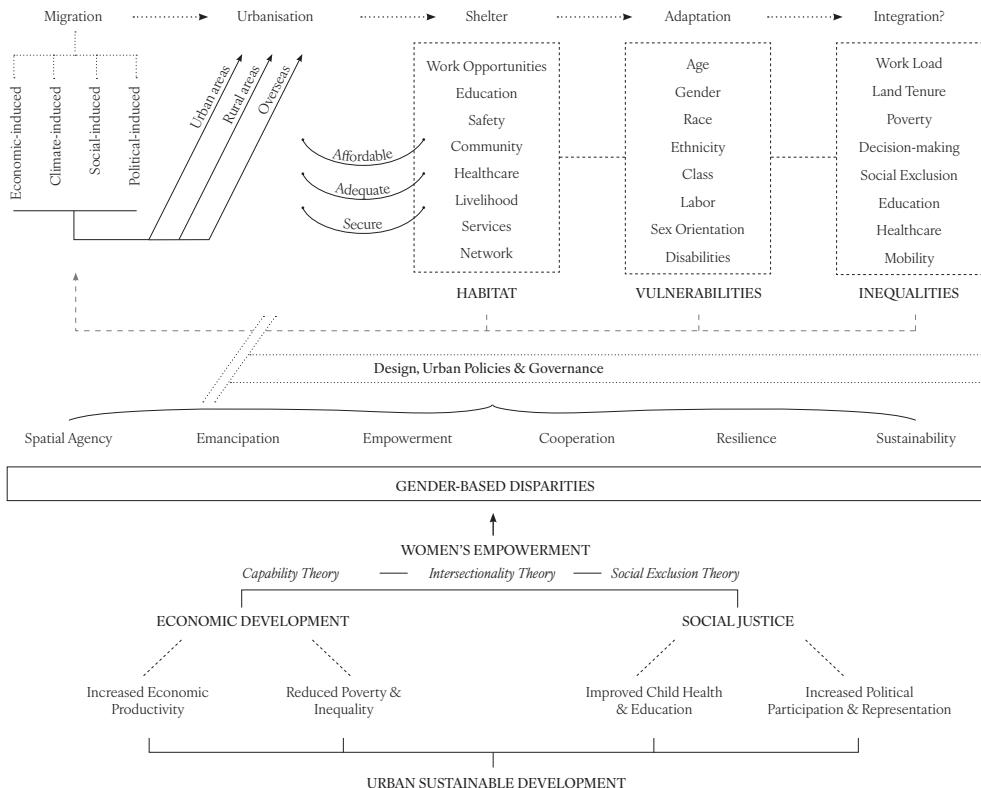
improving the quality, affordability, and accessibility of housing for urban poor migrants
promoting social integration and community building in urban settlements

improving access to employment and economic opportunities for urban poor migrants
supporting the development of small businesses, informal enterprises through entrepreneurship in urban poor settlements

ensuring access to inclusive social services and education for all

THEORETICAL FRAMEWORK

**LIVING CONDITIONS
IN URBAN AREA
& GENDER-BASED THEORIES**



Few articles and studies focus on the living conditions of different categories of migrants (climate-induced, social-induced, and economic-induced), and rare are the ones dealing with the specific conditions of women and girls in informal urban settlements in the city of Sylhet, Bangladesh. However, a large number of articles worldwide deal with the topic of migration more generally, sometimes focusing on migrants' settlements in informal urban settlements in the city of Dhaka and Sylhet. It has to be noted that articles discuss the conditions of women economic migrants in slums because of their wider presentation, but few focus on climate-induced, political-induced, and social-induced migrants. This section presents the knowledge

gathered through the literature review that has helped define the framework of this research. Articles present different information on slums of the city of Sylhet, such as the origins of migrants and their pull and push factors, the living conditions of the urban poor, the economic situation of women in these areas, as well as their health status and hygiene behavior. In addition, the analysis of case studies enables an understanding of the impact of women's empowerment on economic development and social justice in different locations.



© Living Conditions of the Urban Poor, Dhaka, Bangladesh (Author, October 2023)

The Impact of Migration on Urban Living Conditions: Case Studies of Bangladesh's Urban Settlements

First of all, the reasons for migration today concern unemployment in rural areas, coupled with job opportunities in the city, which drive impoverished rural residents to migrate to the city of Sylhet, resulting in a gradual influx into the city's slums. Sylhet's settlements differ from those in other regions in that they are relatively recent, most being less than two decades old. Notably, urban slums and squatter settlements in Bangladesh generally occupy public land, but in Sylhet they are mainly located on private property (Islam et al. 2016). The majority of migrants engage in informal employment and

reside in various slums. Around 97,676 people, or 27% of the city's population, currently live in 756 slums and squatter settlements (BBS, 2022). Overall, the population density in Sylhet's slums is particularly high, at 831 people per acre, which has a significant impact on living conditions.

According to surveys by Khan et al. (2014) and Islam et al. (2016), slums face problems such as limited access to education, overcrowded and unhealthy living conditions, high population density and inadequate housing. Families often share overcrowded, one-room homes and communal bathrooms, with no separation by gender. Although progress has been made in slum drainage and garbage disposal, problems persist, leading to unsanitary conditions and the transmission of disease.

In addition, slum dwellers are made aware of family planning, but religious beliefs sometimes raise doubts about these methods. Improving general conditions in the slums and overcoming religious barriers to family planning are essential steps forward. Poverty is widespread among slum dwellers, mainly due to illiteracy and a lack of motivation to improve their situation. Dependence on government aid perpetuates this cycle, hindering self-sufficiency. Moreover, the health care situation in Sylhet's urban slums is challenging, with issues related to sanitation, clean water, and reproductive health. These challenges are compounded by limited education and economic instability. Efforts to improve health and hygiene practices in these areas are crucial.

In fact, Islam et al. conducted a survey in the urban slums of Sylhet in 2016 involving 93 participants from Ward 10, an area with a high concentration of slums out of a total of 151, revealed several health-related challenges faced by women in these slum areas. These challenges include inadequate sanitation, lack of clean drinking water, and limited access to reproductive health facilities. Lack of education and economic instability further compound the

issues. The study also found that the majority of slum dwellers allocate a significant portion of their income for food rather than prioritizing health and hygiene. Women in these slum areas often suffer from various diseases due to poor living conditions, lack of clean water, and unhygienic practices.

An other study from 2014 by Raihan et al. showed that the health care situation of migrant slum women in Sylhet, particularly in areas like Sheikhhgat, Bagbari, and Kadamtali, is dire. Only around 16% of the slum residents have access to sanitary latrines, and basic facilities like sanitation, clean drinking water, and reproductive health services are scarce. Malnutrition, poor water quality, and inadequate sanitation lead to health issues among pregnant women and girls, including intestinal worms, anemia, and other complications. The majority of slum women lack education, and there is limited access to health care services, leading to various health problems.

In addition, Hussain et al. (2019) survey focus on adolescent girls in slum areas the health challenges they are faced to. These girls often do not practice proper personal hygiene and are not well-informed about vaccinations and

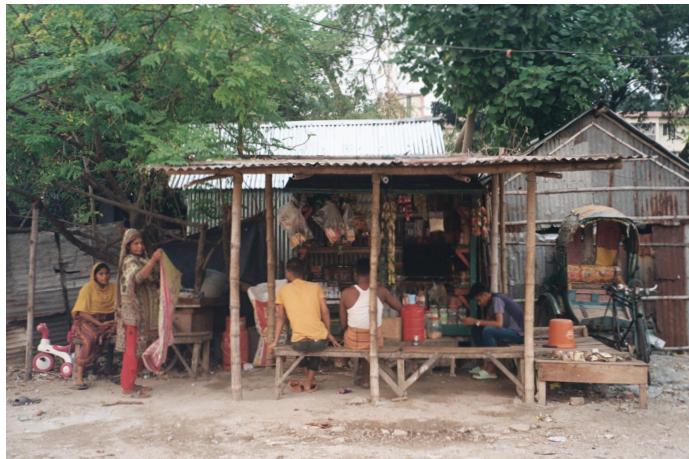
other health care aspects, including adolescent pregnancy. Access to modern health care services is limited due to cost and long waiting times, leading many to opt for local pharmacies or traditional healing methods. The study suggests that coordinated efforts by government departments, city authorities, and NGOs are needed to improve the health care and hygiene practices of slum-dwelling adolescent girls.

Gender-based Theory on Women's Empowerment

The concept of gender was theorized by researchers in the late 70s, when the differences between women and men were no longer represented on the basis of their sex, but based on inequalities socially constructed by patriarchal norms and expectations. Gender refers to the socially constructed characteristics associated with being a woman, a man, a girl or a boy, encompassing norms, behaviors and roles that can vary from one society to another and evolve over time. (World Bank, 2023). By understanding the socially constructed place of women and girls in society, it provides a framework for understanding the needs and challenges of women's empowerment. The empowerment

© Women of the Sweepers Colony, Dhaka, Bangladesh (Author, October 2023)





© Man gathering at a Tea Shop, Women behind, Dhaka, Bangladesh (Author, October 2023)

of women encompasses economic, social and political determinants (S. Dhar, 2023). It involves the process where women acquire knowledge and skills, overcome challenges, and access valuable resources (Cornwall, A., 2016). The intertwined relationship between women's empowerment and gender equality is often considered essential, with progress toward one contributing to the other. In their research W. Wei and T. Sarker (2021) associate women's empowerment with five indicators, such as household decision-making power, gender attitudes and beliefs, physical mobility, control over resources and relative freedom from family domination. Consequently, women's empowerment is seen as a dynamic process in which women need both resources and a sense of agency such as decision-making power, financial control and freedom of movement to achieve better equality.

“As women gain more equality in the economic sphere, the effects of poverty on families can also be reduced. The World Bank (2007) states that studies from developing and developed countries “consistently show that when mothers have greater control over resources, more resources are allocated to food and to

children's health (including nutrition) and education.”.” (Women Watch, 2009)

Numerous papers have proven the beneficial impacts of women's empowerment for economic development and social justice worldwide (McKinsey Global Institute, 2015; World Bank, 2007; J. Njuki, S. Eissler et al., 2022; Inter-Parliamentary Union, 2019). The literature on Bangladeshi context bring a framework of possibilities for the development of this research. Indeed, a fairly recent trend has emerged in Bangladesh since 2006, where the percentage of women migrating overseas has been rising steadily, with around 19% women among Bangladeshi migrant workers in 2015. In most cases, migration is motivated by the need to escape poverty and limited employment opportunities in their home countries. Interestingly, despite earning less than men, women tend to send a higher percentage of their earnings back to their families. Studies from the UN Women Policy Brief (2013) show that even low-skilled female workers send between 70% and 80% of their income, surpassing men's contributions. Moreover, remittances provide social capital such as ideas, skills and networks, which contribute to socio-economic

development, human rights, gender equality and women's empowerment in their home countries. At the same time, they have beneficial effects on the household by improving educational opportunities and healthcare for migrants' children, which can open up new prospects for the next generation (UN Women, 2018).

In addition to that, Bangladesh has made significant progress in women's economic empowerment in recent years. More women are participating in the labor market, migrating to cities, and becoming visible in public spaces. This has led to some breaking down of job market segmentation and narrowing of the wage gap between men and women. F. Jhuma(2023) has written an article on the role of microcredit in the suburban areas of Sylhet in relation to women's empowerment. From this article, it emerges that the microcredit program offers support for overdue payments and was launched in Bangladesh in the mid-1970s. Microcredit programs have experienced remarkable growth, particularly among female beneficiaries, motivated by the desire to empower women in male-dominated households and prevent the misuse of money. While these programs have had a positive impact on women's tangible gains, such as education, property and spousal support, they have also led to intangible developments in areas such as women's empowerment, voice and gender relations. Microcredit has enabled women to pursue their chosen professions, leading to financial stability and social mobility. However, women still face obstacles, such as the need to obtain permission from the head of the family, even if they themselves are heads of household, and household decisions are often influenced by socio-cultural attitudes within the community. In view of the progressive implementations in the context of this research, the capability theory, social exclusion theory, and intersectionality theory all provide useful frameworks for understanding women's economic empowerment in Bangladesh. Indeed, the capability theory

suggests that women's empowerment should focus on expanding women's capabilities, or the ability to achieve certain things (Robeyns & Morten, 2023). Social exclusion theory suggests that women's empowerment should focus on reducing women's social exclusion, or their lack of social ties and connections (K. Duffy, 1995). Finally, intersectionality theory suggests that women's empowerment should focus on addressing the multiple forms of oppression that women face, such as poverty, gender discrimination, and caste discrimination (D. Atewologun, 2018).



© Gaboli Sweeper Colony, Dhaka, Bangladesh
(Author, October 2023)

METHODS

The framework for this research was provided by an analysis of the literature, which offers a wealth of information on the health problems of women and adolescents, as well as on general living conditions in the informal settlements of the city of Sylhet. However, data on women who have migrated to Sylhet are still very incomplete. Moreover, articles dealing with the influence of women's empowerment on poverty reduction in Bangladesh will serve as a solid basis for the development of the design hypothesis.

One of the main research methods involves on-site observations and data collection, carried out during a field visit to Sylhet and Dhaka in October 2023. Sylhet's existing environment will be documented through a series of videos, photos, sketches and interviews with local stakeholders and residents. Different ecosystems will be explored during the fieldwork, each with distinct conditions and consequences for residents' livelihoods.

Furthermore, the fieldwork provides on-site case studies analysis with the opportunity to meet Mahmuda Alam, who works with slum dwellers in Dhaka and Jhenaidah through the POCAA collective. By visiting two settlements

on the outskirts of Dhaka and talking to women community leaders and residents, it is possible to gain first-hand sources and a deeper understanding of research methods and design solutions for improving urban settlements. Additionally, the analysis of case studies of different but similar contexts where women's empowerment strategies have proven beneficial for poverty reduction will add a valuable layer of analysis to this research in order to understand design possibilities.

In addition, another research method is to analyze existing site patterns and features through mapping. Inspired by the work carried out by Jan Rothuizen in his book «Refugee Republic», the chosen site will be fully mapped, incorporating all the ideas and background data gathered on site and during online interviews with landowners, local residents, students and professors from Sylhet's Shahjalal University of Science and Technology.

© Women Community Leaders During Interview with the Author, Dhaka, Bangladesh (Author, October 2023)



RESEARCH

HOW DOES THE OTHER HALF (LIVES)*

*In reference to Balkrishna Doshi's research *How The Other Half Builds*, this section illustrates gender disparities in private and public spaces based on site survey.



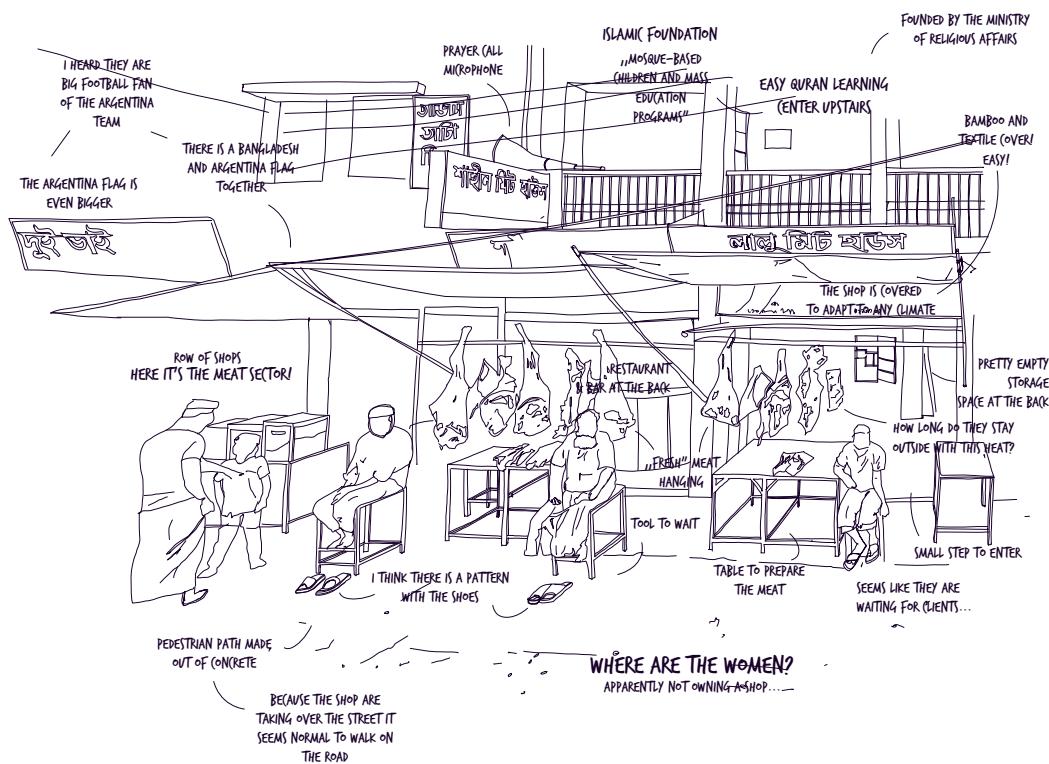
© Women preparing the firewood for cooking,
Tea Garden of Sylhet, Bangladesh
(Author, October 2023)

**LEARNING FROM THE SITE:
BOOK OF PATTERNS**

PRODUCTIVE SPACE FORMAL ECONOMY

The public space, especially areas dedicated to formal commerce like supermarkets and shops, seems to be dominated by men. In this drawing, we see this clearly. Men sit in chairs, positioned directly in front of their shops, acting as guardians of their property. It's rare to see a woman as a shop owner in this picture.

The drawing also reveals a common location for shops: the ground floor of buildings like houses or public facilities (here, a madrasa). These shops line the avenue, often spilling out onto the pedestrian walkway. This forces people to walk on the street to get around, highlighting the prioritization of shops over pedestrian comfort.

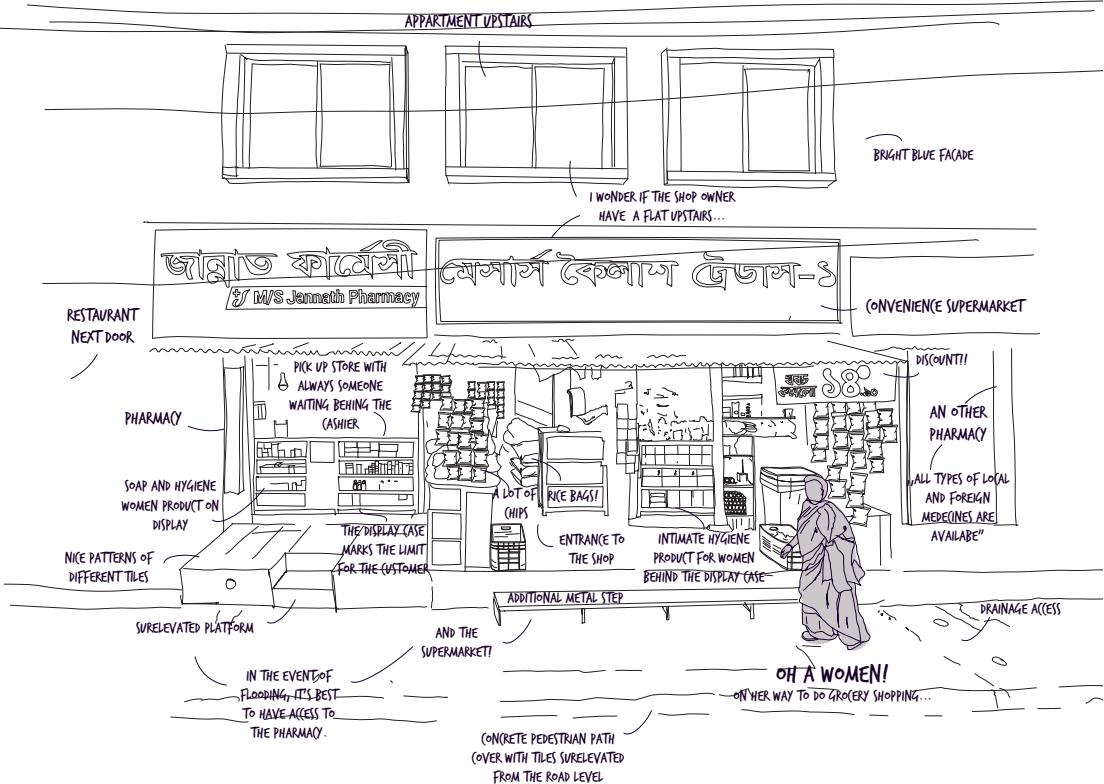


PRODUCTIVE SPACE **FORMAL ECONOMY**

This drawing showcases another example of the formal economy, with a supermarket and pharmacy. Interestingly, these essential stores seem to primarily target women and girls, based on the products displayed in their windows – skincare items and hygiene products.

Once again, we see the shops occupying the ground floor, with what appears to be residential space above them. The research doesn't clarify whether these dwellings belong to the shop owners or are rented out by the building's owner.

A notable feature is the step built in front of each shop. This serves a dual purpose: defining the boundary between the shop and the street, and providing additional display space. However, it's also worth noting that these steps could potentially double as a barrier against flooding.

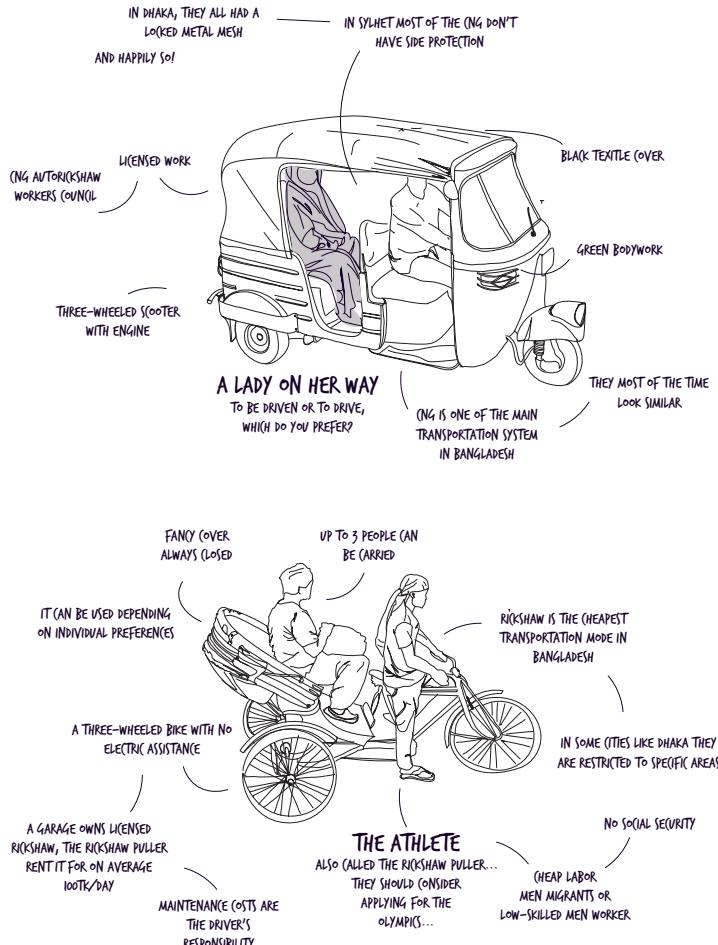


PRODUCTIVE SPACE **FORMAL ECONOMY**

Public transportation is another facet of Bangladesh's formal economy. CNGs (electric three-wheeled scooters) and rickshaws dominate the city's streets.

Here, a clear gender divide emerges. Women are rarely seen as drivers, typically occupying the passenger role. This reflects the broader societal structure where women often hold a more dependent position.

CNGs are owned and operated by a private company that leases vehicles to drivers. The city's transportation system oversees their operation. Rickshaws, on the other hand, are non-motorized tricycles owned by private individuals and rented out to pullers. Working conditions for rickshaw pullers are harsh, with minimal social security guarantees. They often face the burden of covering maintenance costs and represent a segment of cheap labor, typically filled by male migrants or low-skilled workers.

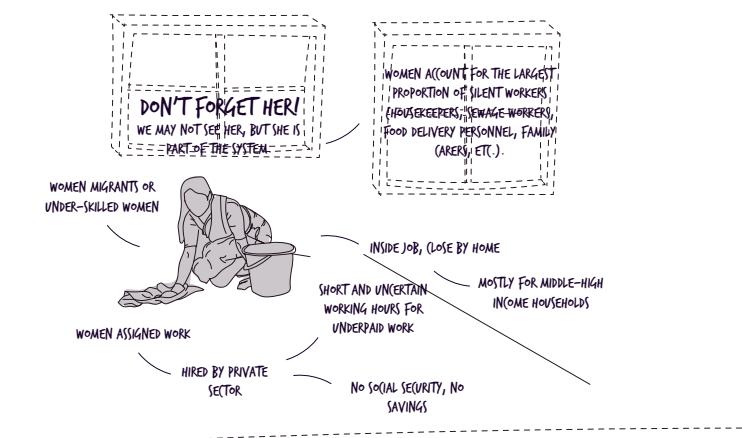
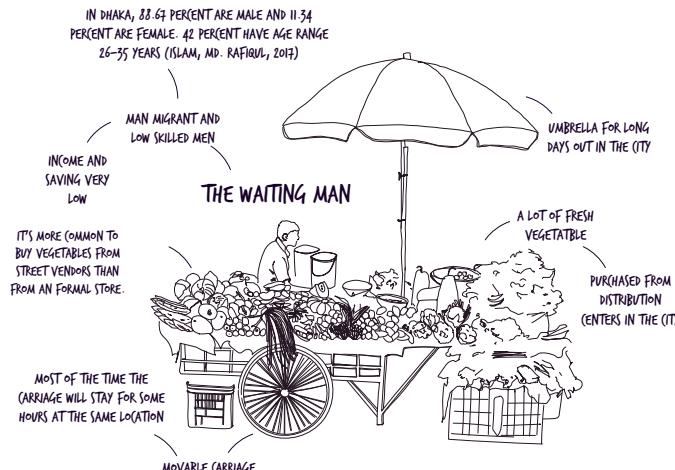


PRODUCTIVE SPACE

INFORMAL ECONOMY

The bustling streets conceal an entirely different market: the informal economy. Here, street vendors have become a familiar sight, offering fresh produce, particularly vegetables, at affordable prices. This system is a vital lifeline for many people, especially migrants, enabling them to earn a living and meet their basic needs.

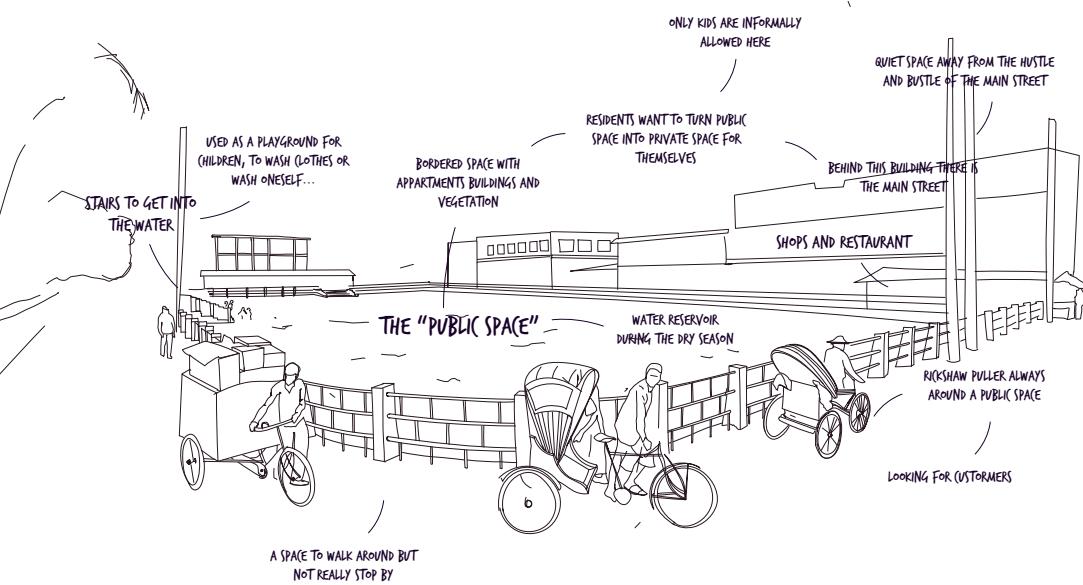
But the informal economy is not confined to the streets. Hidden jobs, often carried out by women, perform essential functions in homes and businesses. These housekeepers and carers provide essential services, but their work is often undervalued and carried out under uncertain conditions, with irregular and unpredictable working hours.



PUBLIC SPACE **THE POND**

In Bangladesh, ponds are a ubiquitous feature of the public landscape. They serve a multitude of purposes, acting as shared spaces for gathering, washing, and water storage. However, access to these ponds can be uneven. In some cases, residents surrounding the pond may limit its use, creating pockets of private space within the public domain and highlighting potential inequalities.

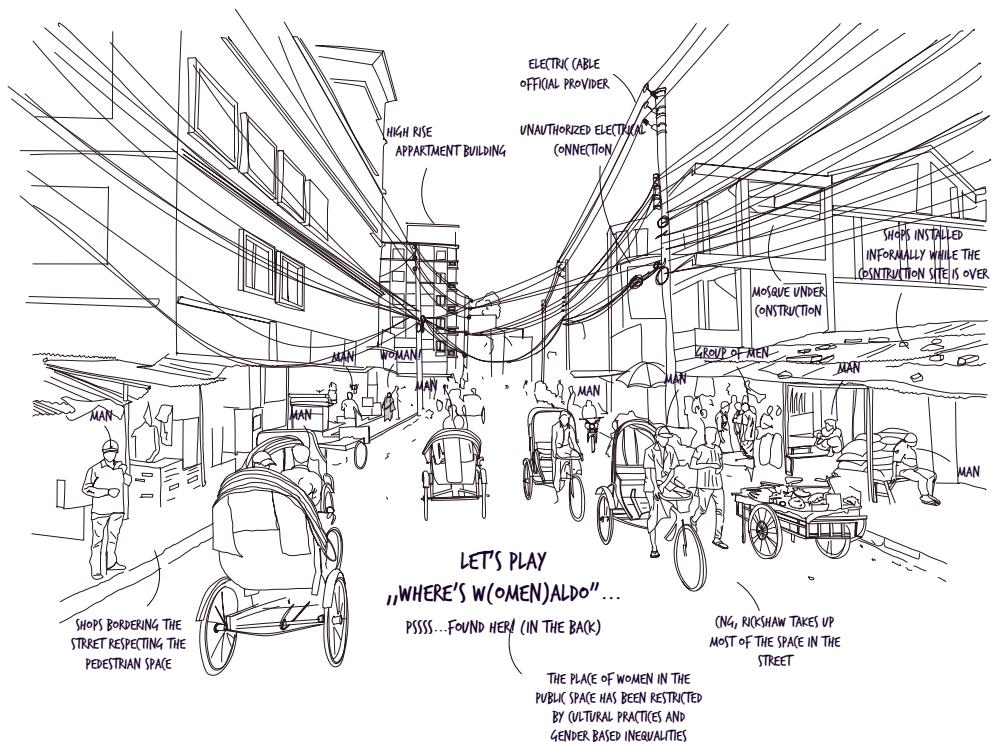
Despite this, the area around ponds often thrives with activity. Rickshaws line up waiting for passengers, while restaurants and tea shops provide places to socialize and unwind. The design itself often prioritizes accessibility, with stairs built to facilitate washing clothes and personal hygiene. However, the water quality in these ponds remains a concern.



PUBLIC SPACE **THE STREET**

In Bangladesh, as in many other countries, streets are an essential part of public space. Here, women tend to navigate the streets quickly and purposefully, spending as little time as possible. In contrast, men use the streets for social interaction, selling goods and informal gatherings.

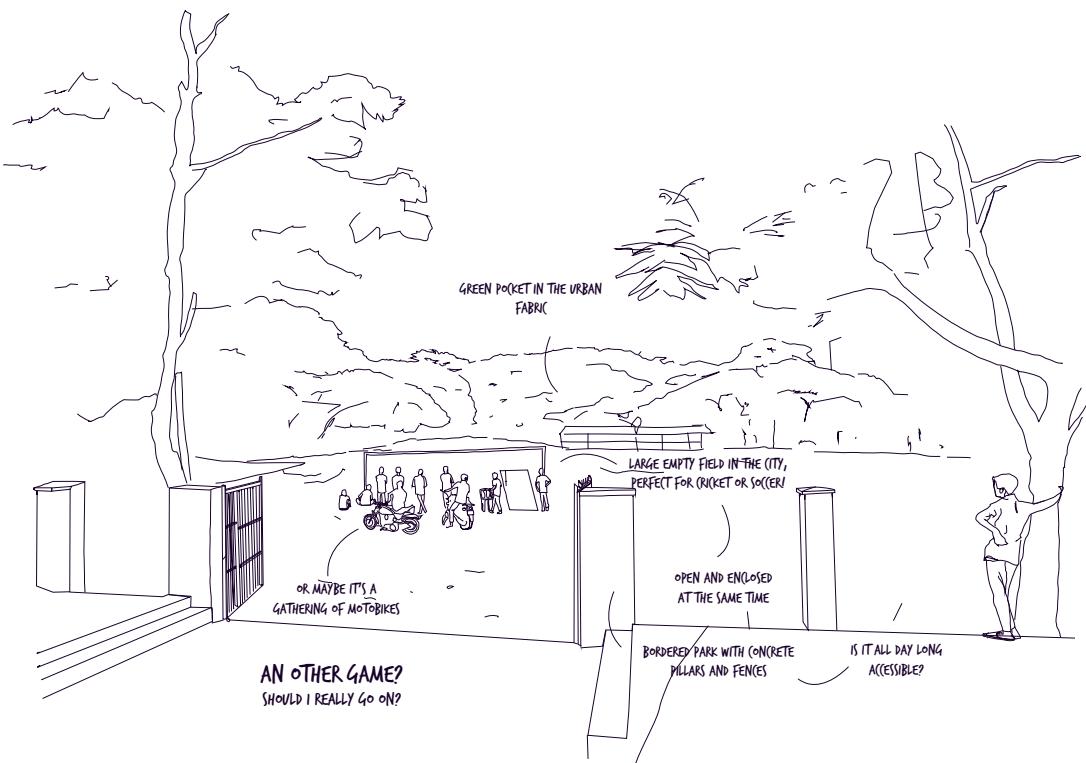
This distinction is reflected in the lively street scene illustrated in the drawing. Rickshaws, CNGs and street vendors occupy the space, guided by the surrounding buildings and the network of overhead cables. The absence of dedicated infrastructure, such as sidewalks, forces people to walk on the street itself, further emphasizing its multifunctionality.



PUBLIC SPACE **THE PARK**

In the cities of Bangladesh, open spaces are a rare sight. Where such spaces do exist, they are often linked to historical sites, providing a glimpse of the country's rich heritage. Open parks, in particular, are oases of freedom and recreation for the urban population. These parks are popular places where young couples can meet out of sight of their families, offering a sense of intimacy and freedom. In addition, these parks are multi-purpose spaces used for a variety of recreational activities, including sports.

However, a notable gender disparity emerges when it comes to sporting activities in these parks. Areas designated for sport are predominantly occupied by men, with women largely absent from these spaces. This imbalance underscores the societal norms and restrictions that limit women's participation in public sporting activities. While parks provide a sanctuary of freedom for many, unequal access highlights the ongoing challenges to achieving true inclusion in public spaces.



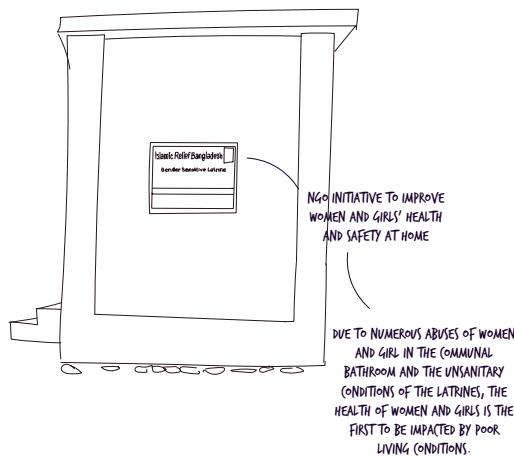
PRIVATE SPACE **THE COMMUN**

In contrast, private spaces in Bangladesh serve as significant areas of expression for women, allowing them greater freedom and ease of use. This dynamic reflects the cultural context of Bangladesh and the specific roles and positions women hold in society.

Within urban settlements, shared kitchens and bathrooms often become communal meeting points, particularly for women. These shared facilities foster a sense of community but also bring challenges related to privacy and the risk of abuse. In some settlements where NGOs have intervened, gender-sensitive latrines have been constructed to address these issues. These specially designed facilities provide a safer and more adequate living environment for vulnerable groups, highlighting the ongoing efforts to improve the quality of life and ensure the safety and dignity of women in urban areas.

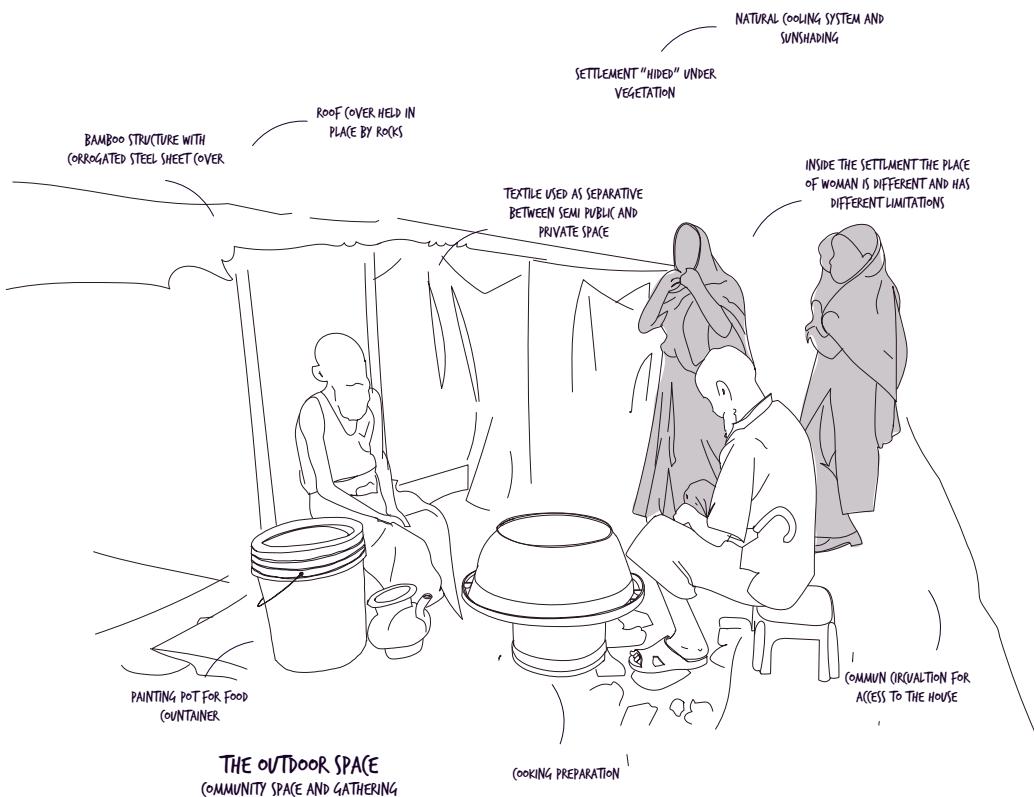


THE KITCHEN AND THE BATHROOM SHARED FACILITIES FOR EFFICIENT USE OF SPACE



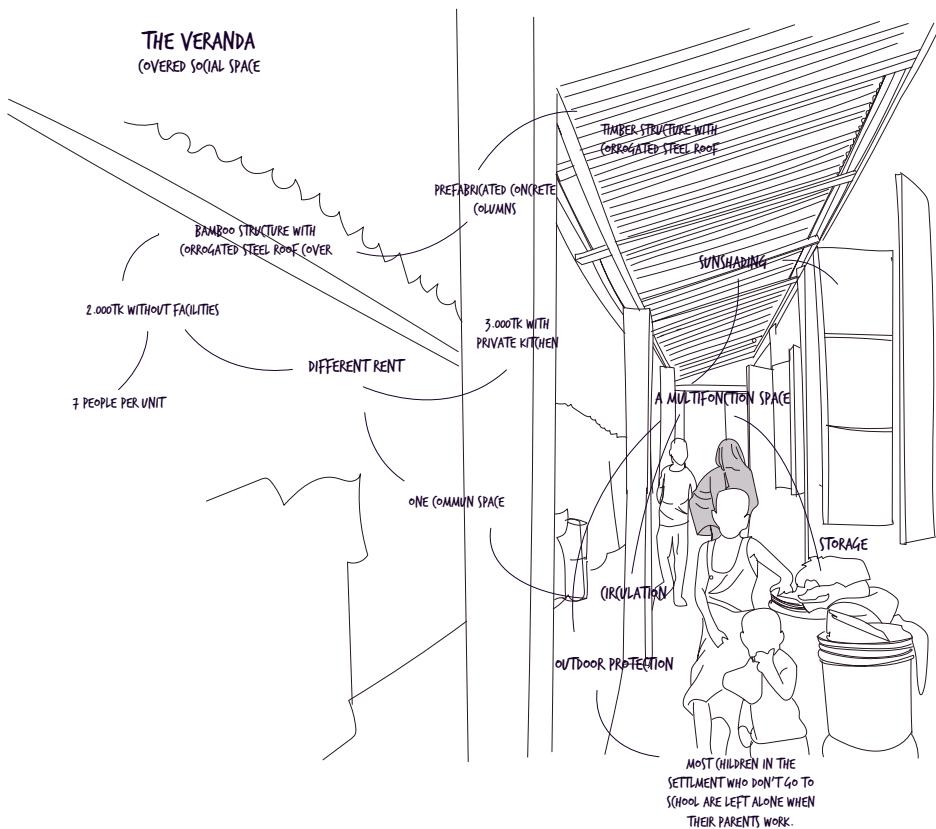
PRIVATE SPACE **THE COMMUN**

Continuing the theme of shared facilities, the open spaces within community areas are utilized as communal spaces by all residents. These areas serve as hubs for various daily activities such as cooking, washing clothes, and cleaning dishes. In these communal spaces, neighbors engage in these tasks in close proximity to one another, fostering a sense of community and interdependence. This close-knit environment underscores the collective nature of urban living in these settlements, where shared spaces and resources play a central role in daily life.



PRIVATE SPACE **THE COMMUN**

In the community, the veranda serves as a versatile, multifunctional space. It acts as a social hub where neighbors can gather and interact, and it extends the home's functional area for activities like cooking and storage. The covered space of the veranda adds an essential layer of privacy to the house, allowing women and children to feel safe and secure. Additionally, it provides climatic benefits by offering shaded protection from the sun and shelter from the rain. Moreover, the veranda can function as a communal passageway, facilitating access to and between different houses. This multifunctional role of the veranda highlights its importance in enhancing both the social and practical aspects of community living.



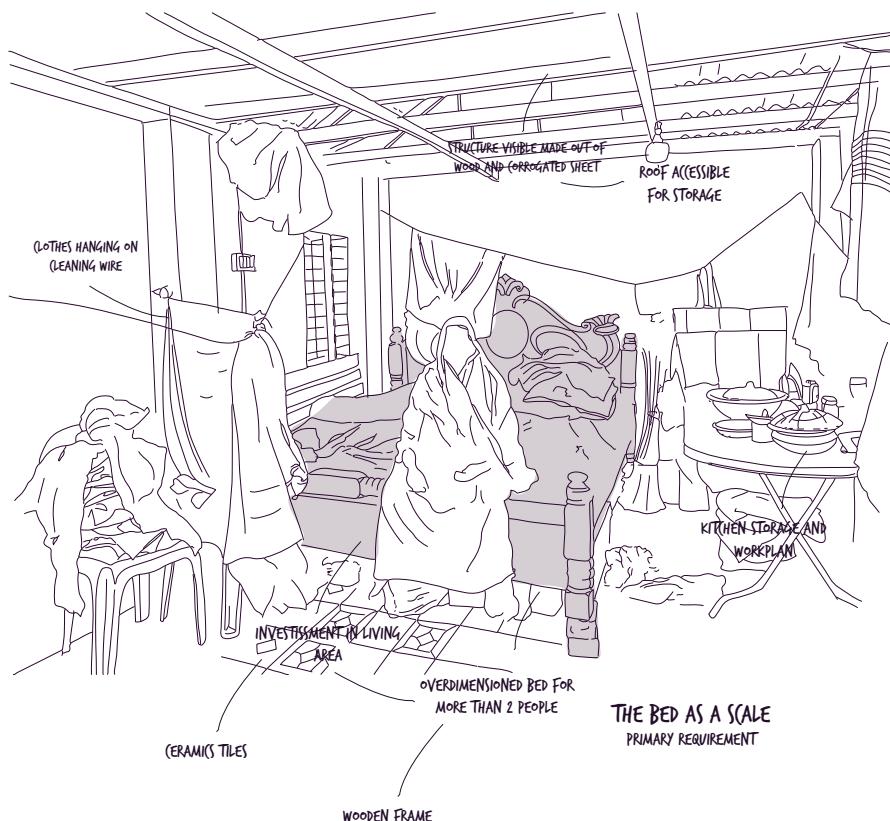
PRIVATE SPACE MINIMUM NEED

At home, the efficient use of space is achieved by utilizing vertical storage and expanding the living area upwards. However, this arrangement also underscores a significant issue: the lack of privacy within the dwelling unit. This is particularly problematic in a culture where separate spaces for men and women are essential. The inability to maintain distinct areas for different genders within the home highlights the challenges of balancing space efficiency with cultural and privacy needs.



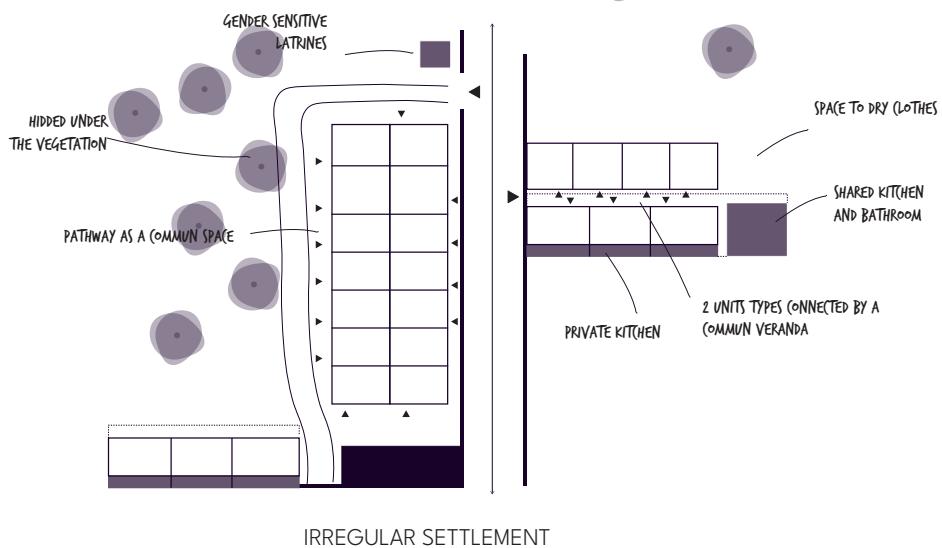
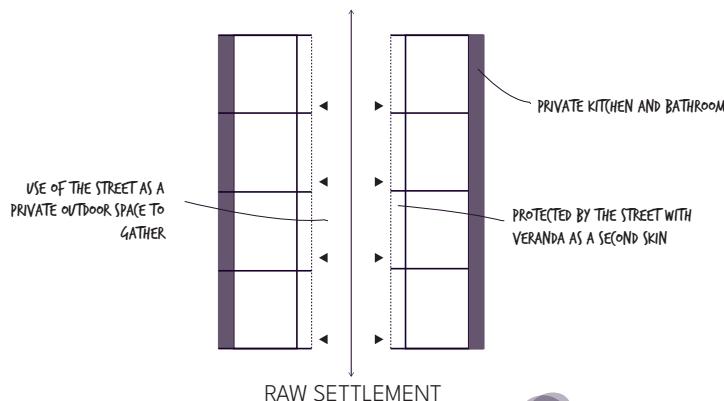
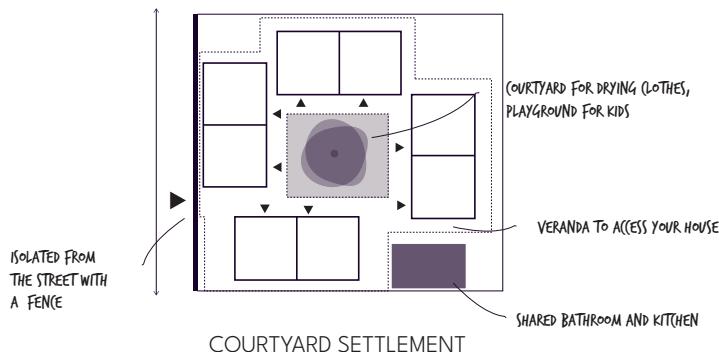
PRIVATE SPACE **BED AS A SCALE**

The bed is a central element in the room, serving multiple purposes beyond just sleeping. It can also function as a table and a chair, making it a versatile piece of furniture in a small space. The bed's presence sets the primary scale of the room, often dominating the available space. Additionally, the bed frame itself can represent a significant investment for the family, reflecting its importance not only as a piece of furniture but also as a valuable asset within the household.



SETTLEMENT ORGANIZATION**LAYERS OF PRIVACY**

Urban settlements exhibit various organizational layers that enhance security and community interaction. The courtyard, for example, serves as a secondary barrier from the public street, providing a communal area where neighbors can meet and where women and children can feel safe. In more rudimentary settlements, the veranda acts as a protective layer, extending the living space and creating a threshold between the home and the street. In irregular settlements, vegetation is often employed as a natural privacy element, enhancing the feeling of security by creating visual and physical barriers. These layers collectively contribute to a more secure and cohesive community environment.



**LEARNING FROM
CASE STUDIES**



LEARNING
FROM**TARA APARTMENTS, 1975-78**

Architect: Charles Correa

Location: New Delhi, India

Density: 375 hab.ha

Units: 160

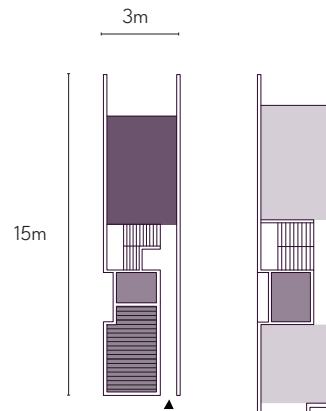


Fig. 1: Sanyam Bahga

The concept behind the Tara Apartments project, designed by Charles Correa, is based on a clever construction system that offers a variety of housing options. The system is based on interlocking duplex units, each measuring 3 meters by 15 meters. The layout of the stacked duplexes, with a strategic offset, allows the roof of the lower duplex to serve as a private terrace for the upper duplex, providing additional outdoor space for each unit. This layout promotes efficient use of space and optimization of available resources to adapt with the specific climate. In addition, the duplexes are carefully connected vertically by integrated pipes, ensuring the smooth distribution of essential services such as water and electricity throughout the complex. With this project, Charles Correa has designed a different system for interlocking the duplexes, offering a variety of typologies to meet the different needs of residents.

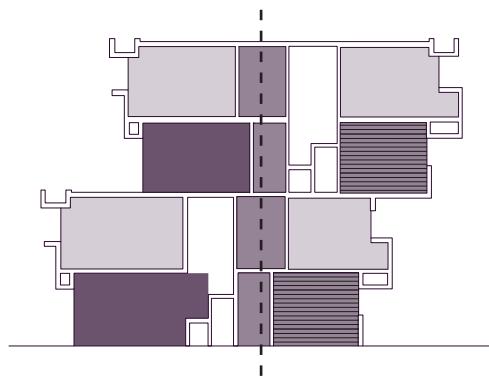
LINEAR STRUCTURES

- Living Room
- Kitchen
- Bathroom
- Bedroom

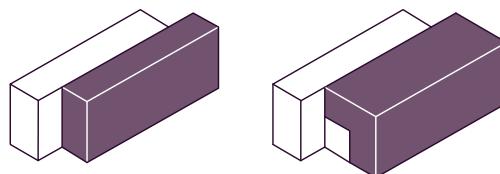


VERTICAL LINK

- Living Room
- Kitchen
- Bathroom
- Bedroom



VARIATION OF IMBRICATION



LEARNING
FROM**LIC COLONY OR JEEVAN BIMA NAGAR,
1969-72**

Architect: Charles Correa

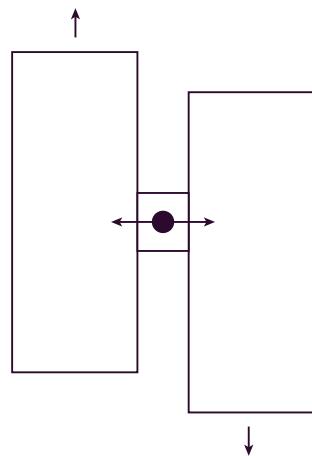
Location: New Delhi, India



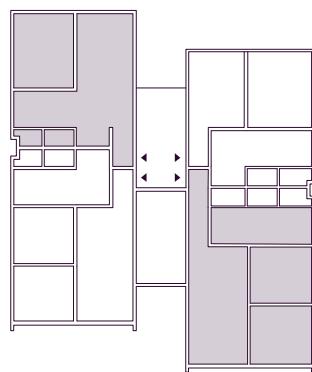
Fig. 1: Charles Correa Foundation

Designed to house employees of the Life Insurance Corporation (LIC), LIC Colony or Jeevan Bima Nagar aimed to accommodate a community where people from different social strata coexisted harmoniously. The design itself facilitated social interaction, with cascading terraces and open corridors forming natural communal spaces. The housing units, linked by common circulation spaces, accommodate 2 to 4 dwellings of different sizes. This open layout allows for abundant natural light and ventilation within the units. The abundance of greenery and outdoor space fostered a sense of unity among residents and provided a vital link with the surrounding nature, contrasting sharply with the dominant trend of high-density subdivisions prevalent at the time. Over time, some residents have closed off the terraces of their units, demonstrating the adaptability and versatility of the project to meet changing needs and preferences.

STAGGERED BLOCK, CENTRAL CIRCULATION



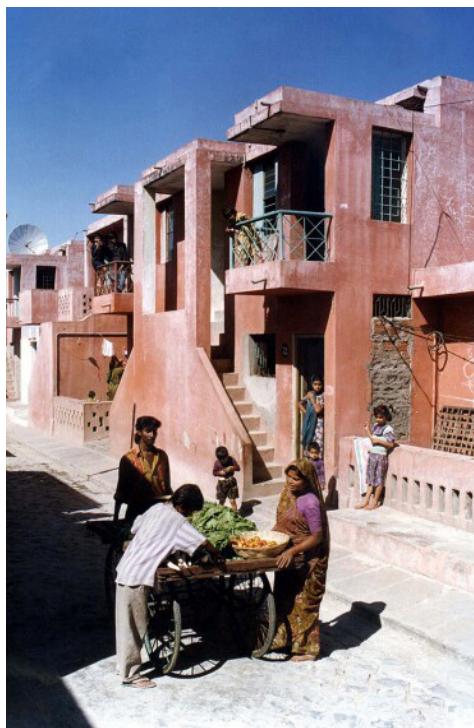
VARIETY OF UNIT TYPE



LEARNING
FROM**ARANYA LOW COST HOUSING, 1989**

Architect: Balkrishna Doshi

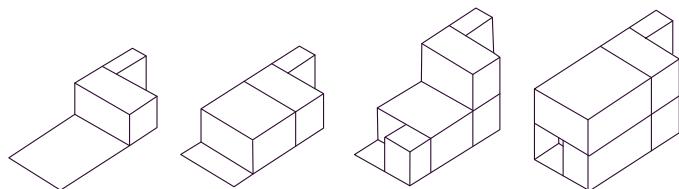
Location: Indore, India



In this study, the three principles that Balkrishna Doshi implemented in his housing project in Indore - progressive housing, mixed income and a well-considered hierarchy of spaces - are highlighted in relation to the development of the project. The project provides flexible structures that allow residents to expand their homes gradually as their needs evolve over time, promoting affordability and adaptability. Furthermore, Aranya fosters social diversity by accommodating residents from various income group within the same community, fostering social cohesion and inclusivity. This income mix not only enhances the social fabric of the neighborhood but also promotes economic resilience and stability.

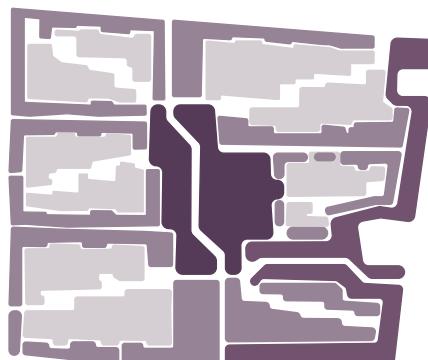
Moreover, the project incorporates a thoughtful hierarchy of spaces. From small public spaces to vibrant communal areas, creating a dynamic and harmonious living environment.

INCREMENTAL HOUSING



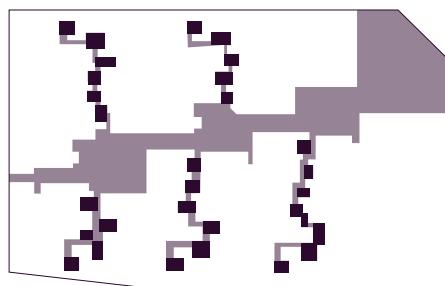
INCOME MIX

- Public Amenities
- High Income
- Middle Income
- Low Income



HIERARCHY OF SPACE

- Chowks
(small public space)
- Narrow Continuous Strip



LEARNING
FROM**BELAPUR HOUSING, 1983**

Architect: Charles Correa

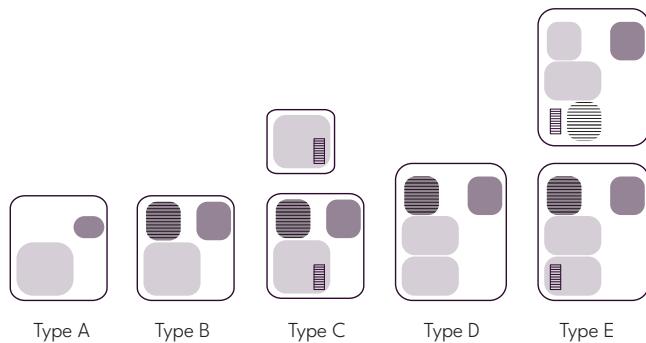
Location: Belapur, India



The project presents a pioneering approach to urban design, focusing on a variety of housing types and clustering arrangements. At the heart of the project is the courtyard module concept, where each housing unit is organized around a central 64 m² courtyard, fostering a sense of community and connectivity while offering residents private outdoor space. From the module courtyard to the shared community spaces within each cluster, residents experience a smooth transition between private and community spaces. Clustering not only encourages social interaction, but also enables flexible use of the space, addressing diverse needs and lifestyles. In addition, the project offers a diversity of housing typologies, providing a range of options to suit different family sizes and preferences, to create an inclusive and sustainable urban environment.

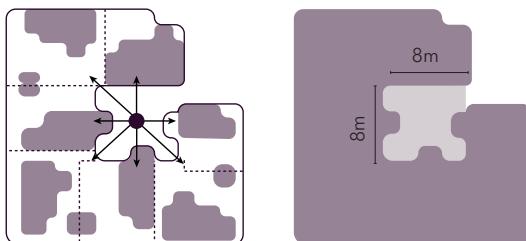
VARIETY OF HOUSE TYPE

- ≡ Terrace
- ≡ Kitchen
- Bathroom
- Room



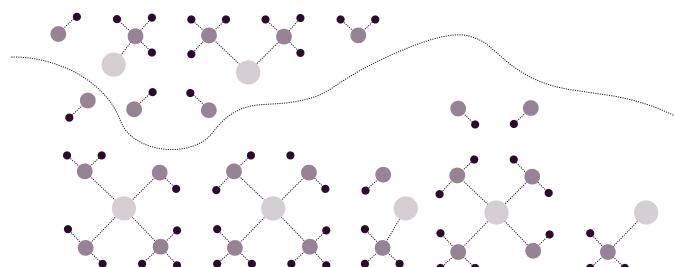
MODULE

- Units
- Courtyard



CLUSTERING

- Courtyard
- Community
- Cluster



LEARNING
FROM**DAR LAMANE HOUSING COMMUNITY,
1983**

Architects: Charai + Lazrak

Location: Casablanca, Morocco

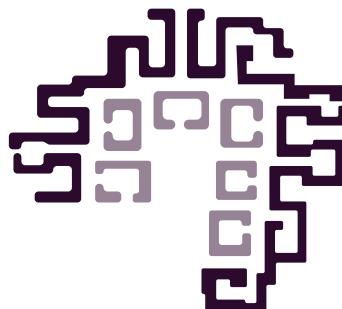


The scheme establishes a structured hierarchy of public spaces, anchored by a spacious central square adorned with amenities. Surrounding this square are six housing clusters known as Dars, while along the periphery of the site, housing is arranged in rows of attached apartment buildings. A central loop road, the sole vehicular route within the township, connects to dead-end streets. Encircling the site is a service road, providing access to private yards at the rear.

The project offers a diverse array of dwelling configurations within the Dars, including corner units, gateway dwellings, and various layouts per floor, resulting in a total of 90 distinct dwelling types to cater to residents' needs. Reflecting Moroccan way of life, these units typically feature 3 or 4 rooms, with kitchens positioned away from entrances and separate from guest areas.

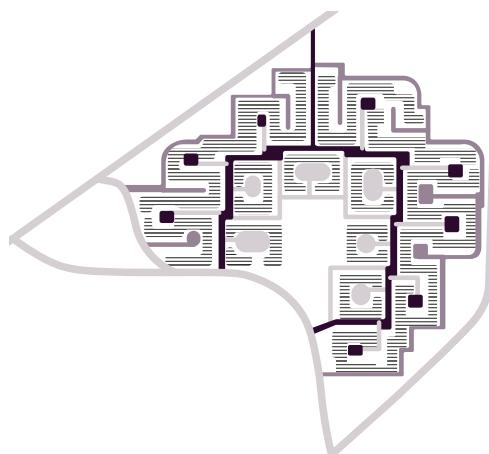
CLUSTERING

- Apartment Buildings
- Dars (traditional Moroccan, houses)



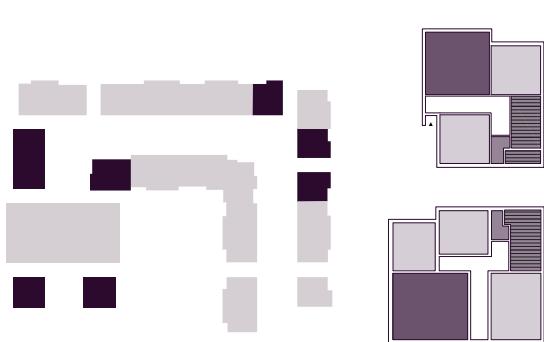
HIERARCHY OF SPACES

- Main Road
- Service Road
- Additional Road (overtime)



VARIATIONS OF DWELLING TYPE

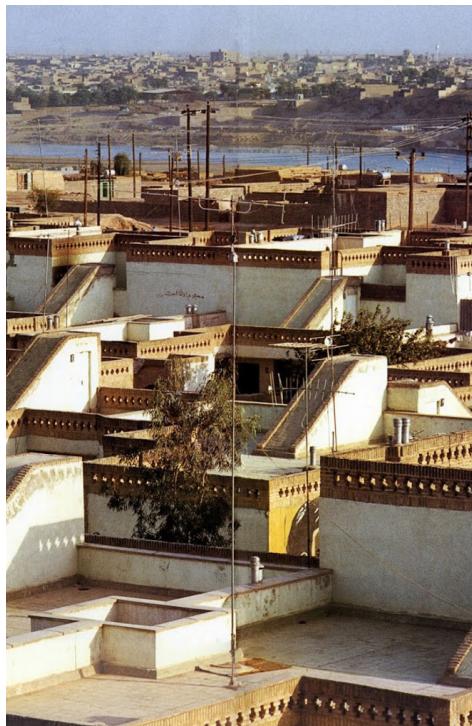
- Guest Space
- Kitchen
- Bathroom
- Bedroom



LEARNING
FROM**SHUSHTAR NEW TOWN, 1975-78**

Architects: Kamran Diba

Location: Shushtar, Iran

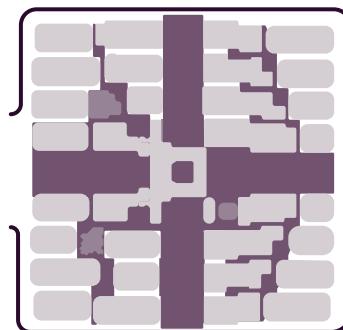


The project has been designed to function as a autonomous neighbourhood, with a pedestrian spine dividing it into four distinct urban clusters. To enhance neighborhood intimacy and engagement, motor vehicle traffic is restricted outside the residential zone, while a carefully planned hierarchy of streets and pedestrian walkways encourages residents to gravitate around the central social spine. Within this framework, three facilities are strategically positioned to punctuate the densely populated residential fabric.

The master plan incorporates a varied mix of typologies, from patio houses to apartment blocks, to meet a wide range of household needs. Whatever the type, all dwellings feature a courtyard that acts as a buffer between Biruni (social) and Andaruni (private) spaces, reflecting Iranian cultural norms while serving as a climatic response to the environment.

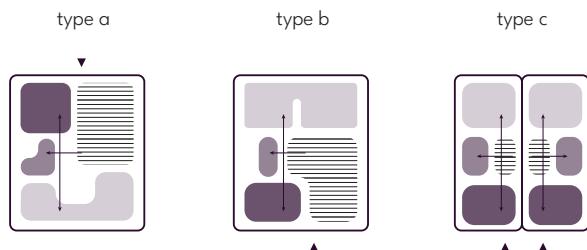
AUTONOMOUS NEIGHBOURHOOD

- Car Access
- Pedestrian Spine
- Amenities
- Housing Units



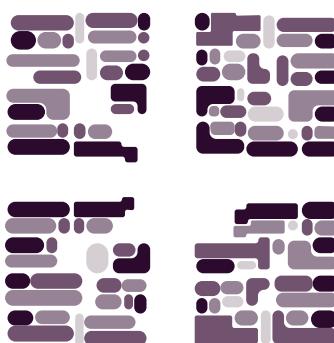
SOCIO-CULTURAL ADEQUACY

- Biruni
(social relation)
- Andaruni
(private area)
- Patio
- Bathroom - Kitchen



TYPOLOGY MIX

- Patio House (type a)
- Patio House (type b)
- Patio House (type c)
- Appartment Building



LEARNING
FROM**VILLA JAOU, 1953-1955**

Architect: Le Corbusier

Location: Neuilly-sur-Seine, France

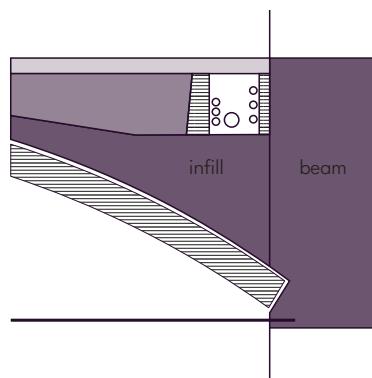


Villa Jaoul is a significant reference for its construction system and façade design. Using a brick vaulted system filled with concrete and reinforced by horizontal metal elements, the design effectively reduces reliance on concrete for floors. The possibility of replacing concrete with compressed earth adds a sustainable dimension to the construction method. In addition, the floor system is interrupted along its entire length to incorporate a staircase, conceived as an integral architectural element linking two levels.

In addition, the treatment of the façade, inspired by the forms of the vault, and the deliberate juxtaposition of various materials, contribute to the distinctive character of the project. Villa Jaoul is an example of the thoughtful integration of architectural elements, demonstrating how innovative construction techniques and design strategies can converge to create a harmonious and visually striking living environment.

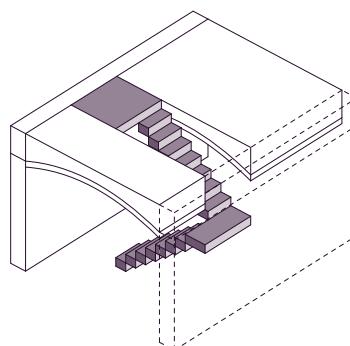
STRUCTURE

- Flooring
- Clinker Concrete
- Concrete
- Fired Brick
- Bracing



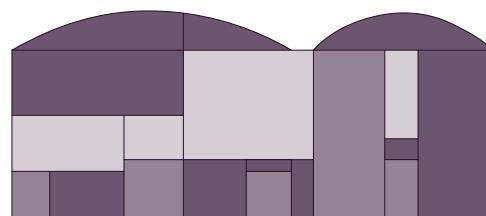
VERTICAL CIRCULATION

Floor-independent staircase
element



FACADE MATERIALITY

- Glass
- Frosted Glass
- Wood



LEARNING
FROM**VILLA SARABHAI, 1951-55**

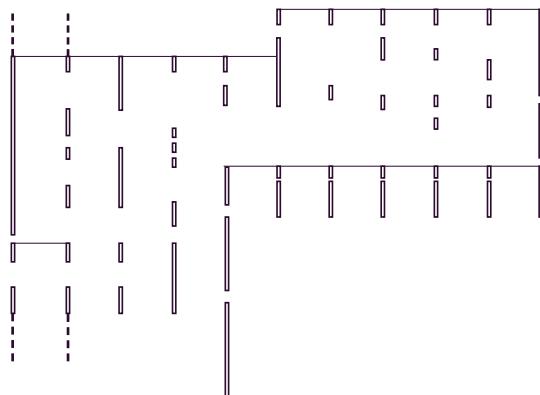
Architect: Le Corbusier

Location: Ahmedabad, India



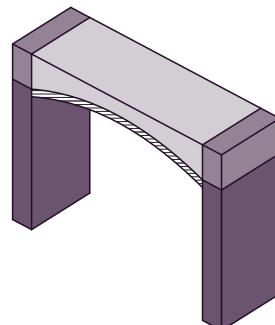
Villa Sarabhai shares some structural similarities with Villa Jaoul. Both rely on a load bearing brick walls, with a concrete beam acting as both a lintel for the brick walls and a floor joist. Additionally, the floor construction utilizes concrete-filled brick vaults. However, their facades diverge. Villa Jaoul displays its structure, creating a continuity with the indoor and outdoor space. In contrast, La Villa Sarabhai's final design conceals its structural elements behind a ring concrete beam facade.

LINEAR GRID

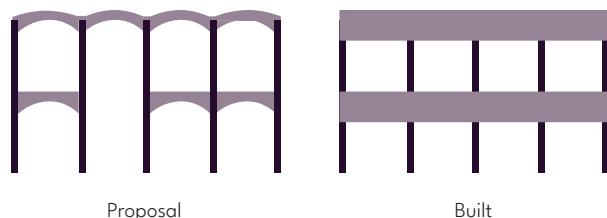


STRUCTURE - VAULT

- Flooring
- Concrete Beam
- Loadbearing Masonry Wall
- Brick Vault



FAÇADE VS STRUCTURE



LEARNING
FROM**BUILDING KNOWLEDGE, 2016**

Architect: Anupama Kundoo

Location: Venice Architecture Biennale

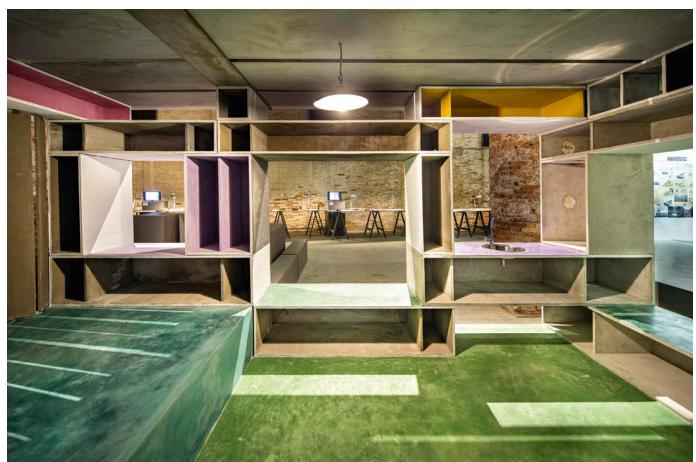


Anupama Kundoo, an Indian architect, unveiled a unique solution for affordable housing at the 2016 Venice Architecture Biennale. Her design uses prefabricated building blocks made of a special kind of concrete called ferrocement. These hollow blocks are stacked together to create houses quickly and with minimal environmental impact. They are also inexpensive to produce because they can be made by local workers without complicated equipment. The ferrocement is strong and lightweight due to a special mix that includes wire mesh and thin steel rods. Even windows, doors, and roofs can be made from this versatile material, reducing the need for additional parts. This innovative design offers a promising approach to providing affordable housing.

FERROCEMENT



FRAME WORK



LEARNING
FROM**KHUDI BARI, 2020-ongoing**

Architect: Marina Tabassum

Location: various location, Bangladesh



The analysis uses Khudi Bari's project as a reference for its low-tech system for assembling and disassembling elements. Its prefabricated steel joints offer flexibility, and can be used as a maintenance system for biobased materials requiring frequent replacement or processing. In addition, MTA's instruction manual provides a comprehensive guide to understanding the various design components and their assembly. This resource can serve as a communication tool, particularly useful for illiterate populations, and facilitate replication of the project. Drawing on innovative construction techniques and effective communication strategies, Khudi Bari illustrates a holistic approach to sustainable and inclusive design, ready to inspire similar initiatives worldwide.

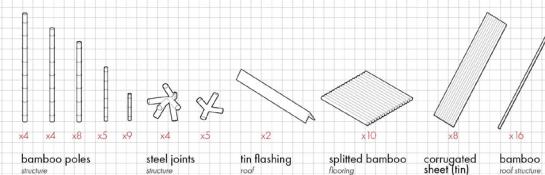
ASSEMBLE & DISASSEMBLE

Steel joint for easy disassembly and maintenance.

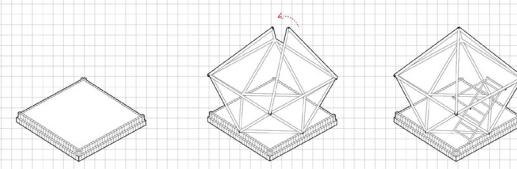


INSTRUCTION MANUAL

COMPONENTS.



ASSEMBLY.



① lay brick foundations

② assemble bamboo frame bottom to top, using steel joints

③ build bamboo ladder and bolt it to structure

④ insert bamboo flooring into structure

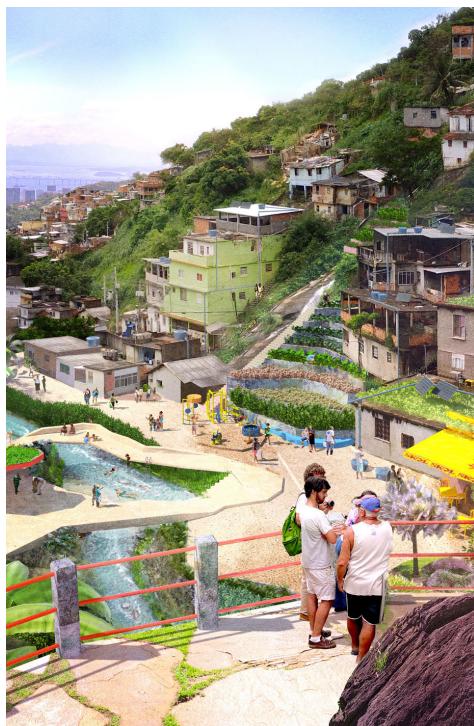
⑤ bolt bamboo roof purlins onto bamboo frame

⑥ apply tin sheet roofing onto roof purlins using bolts

LEARNING
FROM**AGUA CARIOLA, 2012-2017**

Architect: Ooze

Location: Rio de Janeiro, Brazil

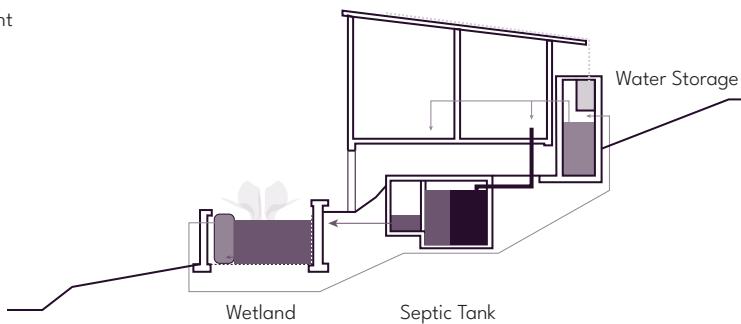


This project stands as a model for water management systems. Incorporating a constructed wetland prototype, it effectively treats raw sewage, preventing soil and water contamination by filtering sewage. The process begins by directing raw sewage to a septic tank for primary treatment, after which a portion is diverted to the constructed wetland for further filtration. The filtered water, along with rainwater, is then stored in an additional tank for reuse in non-potable applications such as watering plants and flushing toilets.

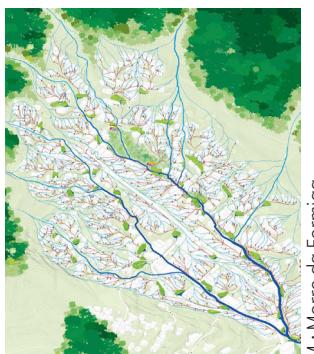
Ooze Architects have developed four adaptable solutions tailored to diverse locations, ranging from small-scale installations in schools to larger implementations like Rio das Pedras, collectively serving the sewage treatment needs of 90,000 residents.

SEWAGE FILTRATION THROUGH CONSTRUCTED WETLAND

- Raw Sewage
- Primary Treatment
- Filtered Water
- Rain Water



ADAPTABILITY OF THE PROTOTYPE



LEARNING
FROM**SMRITIVAN EARTHQUAKE MEMORIAL,
2023**

Architects: Vastushilpa Sangath

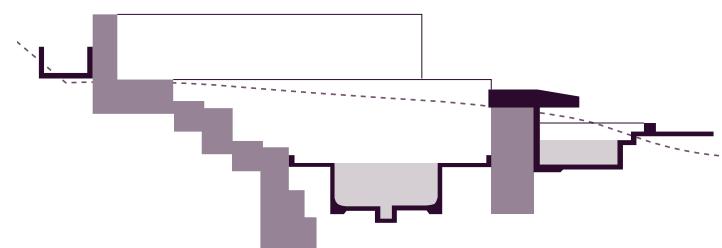
Location: Bhuj, India



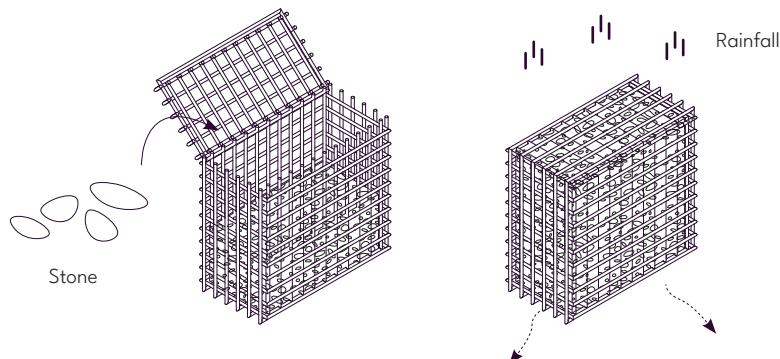
The Smritivan Earthquake Memorial incorporates soil regeneration through the installation of ponds designed for water storage and memorial space, built with gabion walls that facilitate water percolation. In addition, the design incorporates forest areas to enhance water absorption. The ponds feature stepped elements typical of Indian ponds with overflow devices, ensuring water balance during monsoon seasons or major rainfall events. This multi-dimensional approach to water management not only contributes to soil regeneration, but also strengthens the site's resilience to environmental fluctuations.

(RAIN)WATER STORAGE

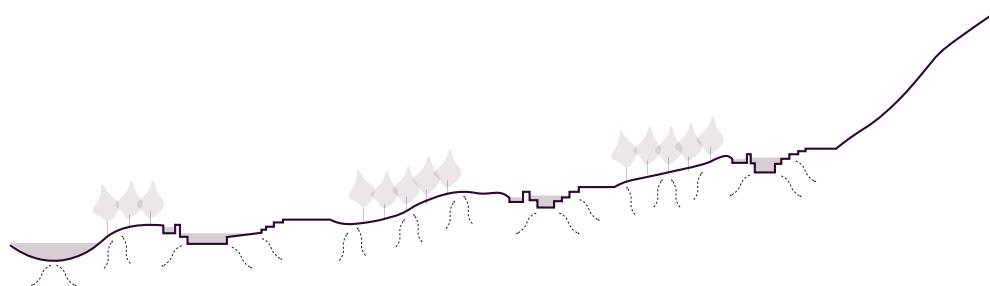
- Concrete
- Gabion Elements
- Rain Water Storage



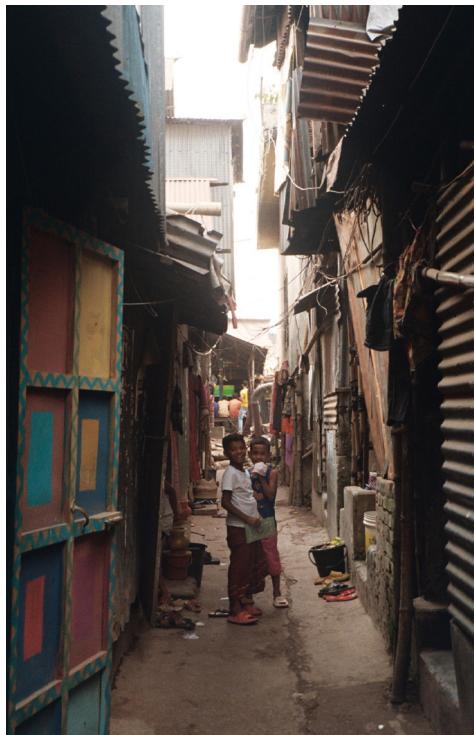
GABION WALL = POROSITY



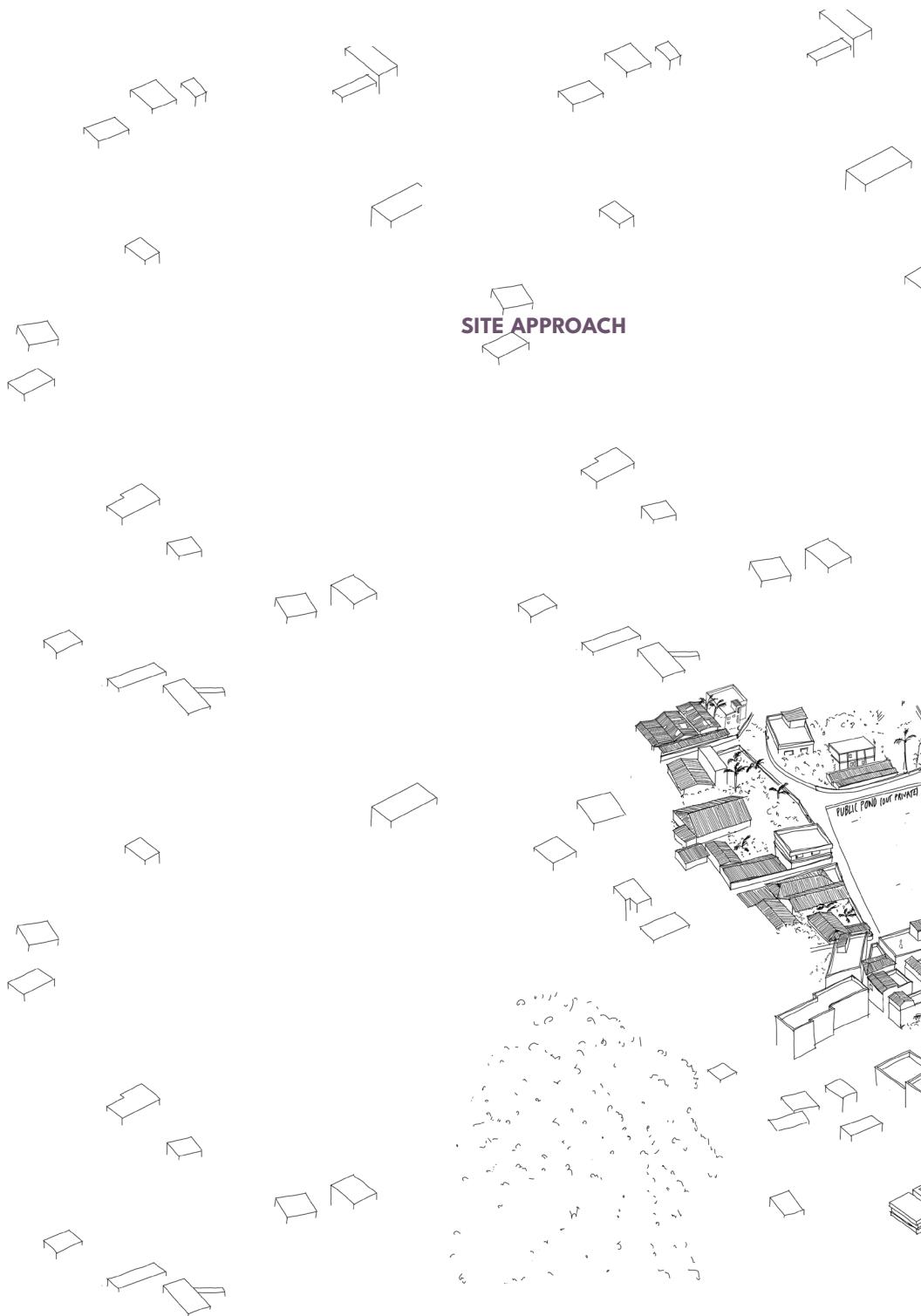
REGENERATION OF THE GROUND

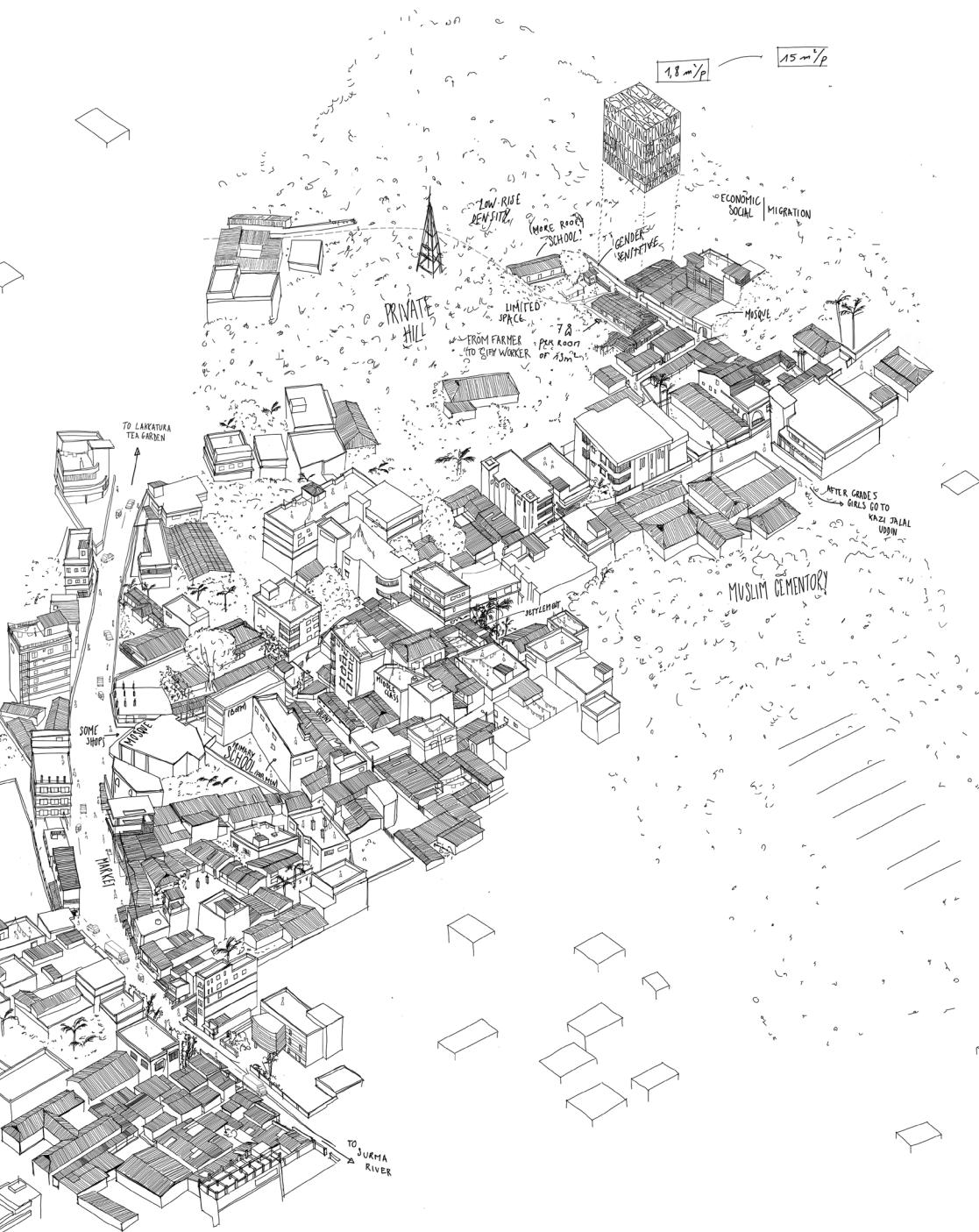


DESIGN APPROACH

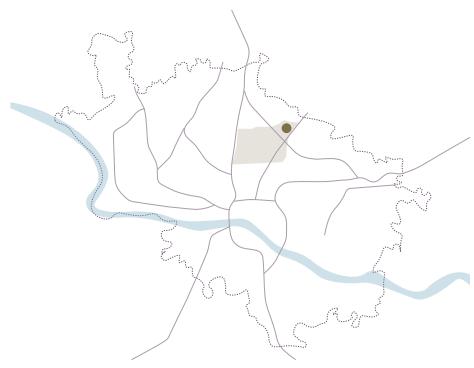


© Gaboli Settlement, Dhaka, Bangladesh
(Author, October 2023)

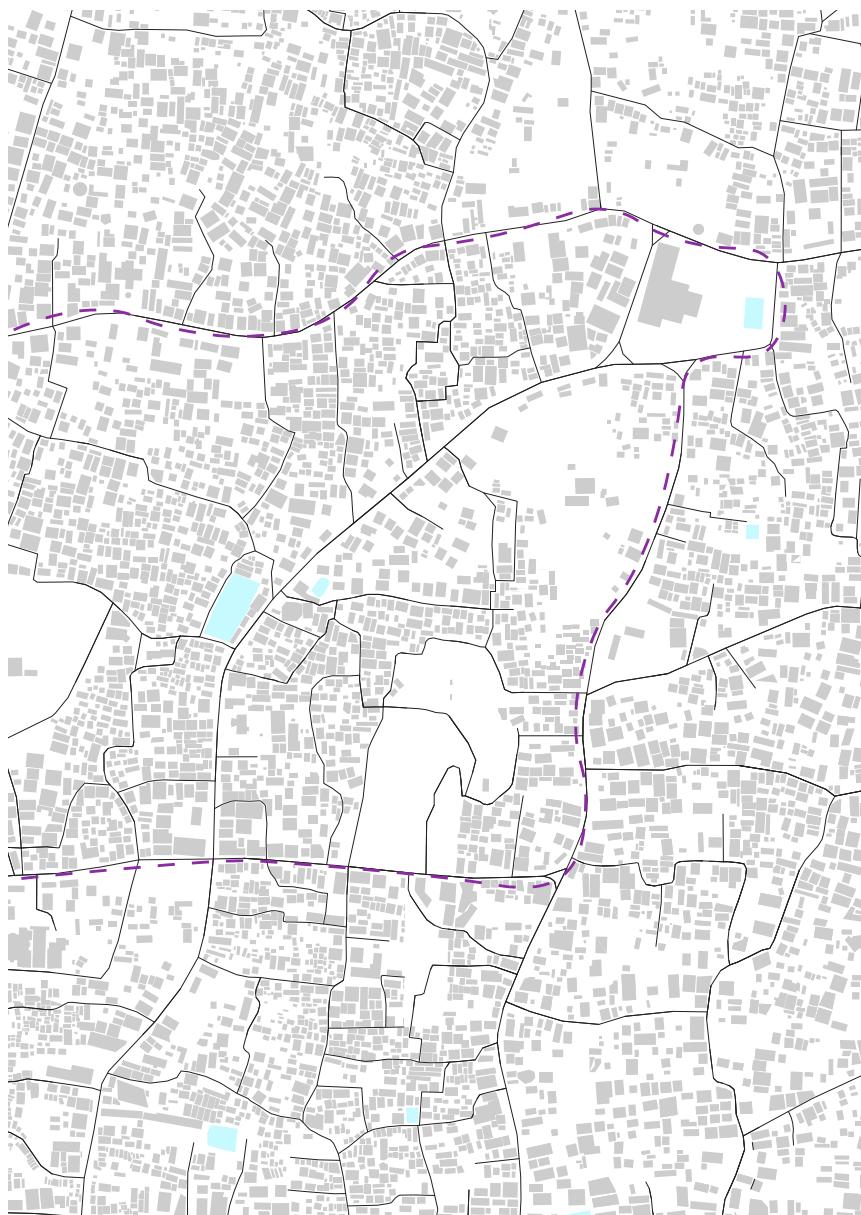
SITE APPROACH



SITE CHOICE WARD 17

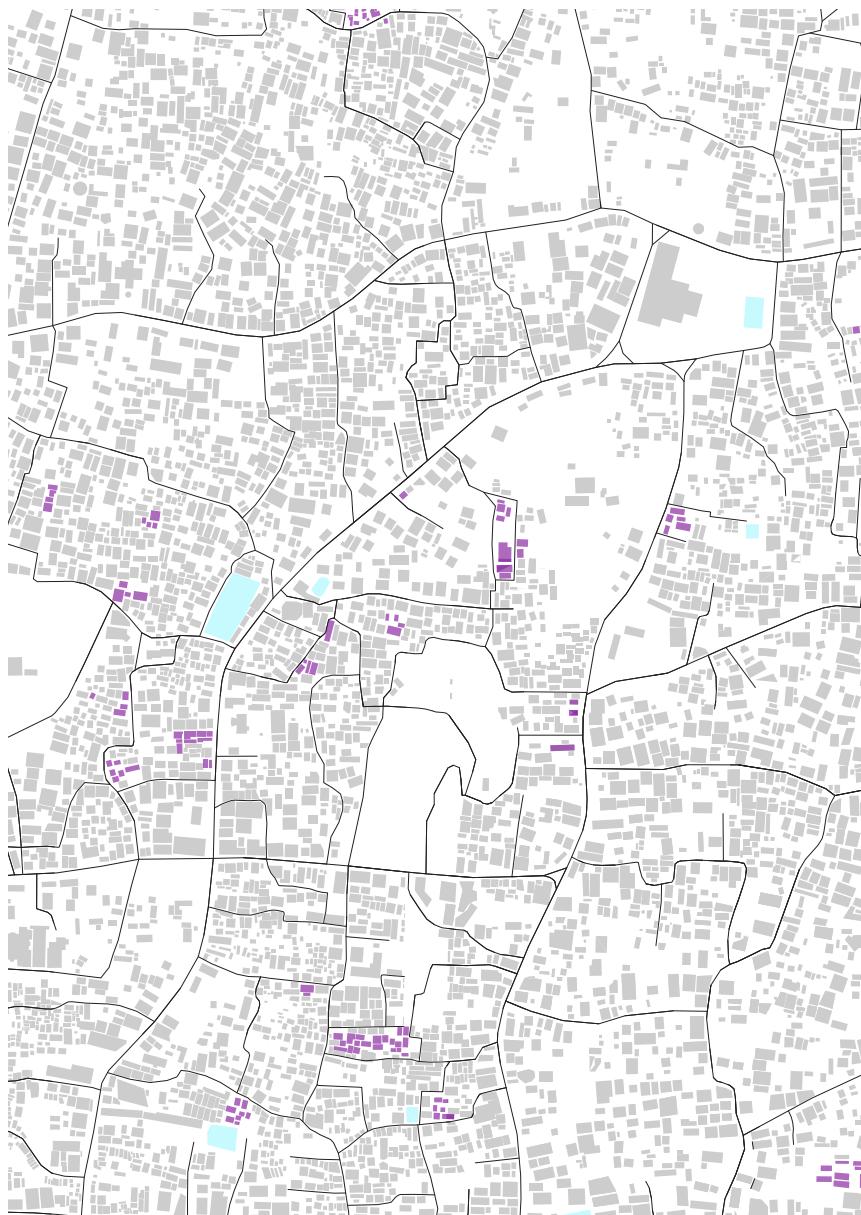


Sylhet City



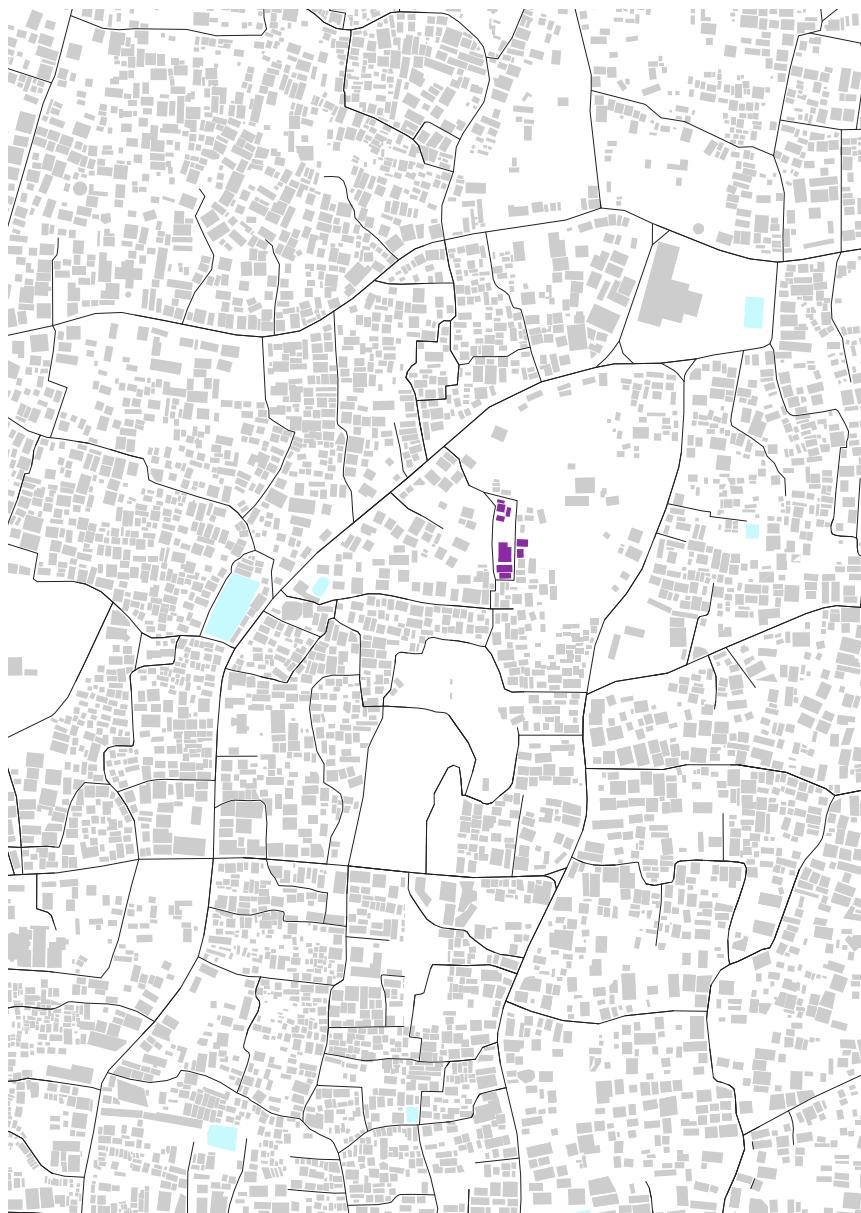
WARD 17 **AN ACUPUNCTURE OF SETTLEMENTS**

Around the globe, it's common to find settlements on the outskirts of cities or in areas that are not officially designated for building. However, in Sylhet, the pattern of settlement is distinct. Here, settlements, also called colony, typically occur on privately owned land, with the landowners benefiting from this arrangement. This unique pattern of settlement, often referred to as "acupuncture of settlement," is particularly evident in Ward 17, where numerous settlements have sprung up on private properties. Landowners in this area take advantage of their property rights to host these settlements, creating a financially beneficial situation for themselves. However, this results in inadequate and precarious living conditions for the residents, who are often migrants. This contrasts sharply with the more haphazard developments seen in other parts of the world.



SITE CHOICE **THE URBAN POOR COLONY**

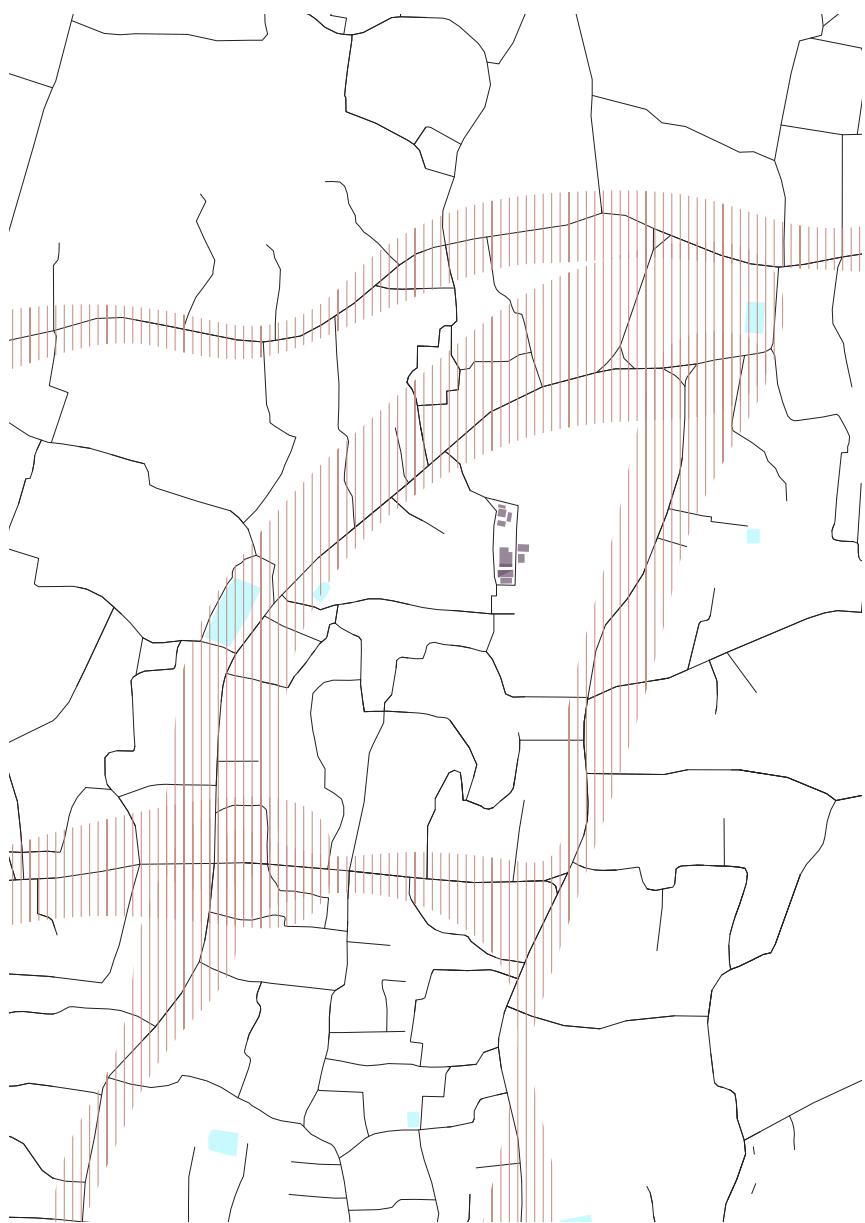
Situated apart from the bustling main commercial thoroughfares, the urban poor colony has been strategically selected due to its location, offering insights into the migration patterns prevalent in Bangladesh and the living conditions of its residents. This deliberate placement highlights the complexities of urban migration dynamics, where individuals and families seek refuge in marginalized areas due to economic constraints or social factors. By examining this colony, one can gain valuable insights into the challenges faced by urban migrants, including access to basic amenities, employment opportunities, and social services. This location serves as a microcosm reflecting broader socioeconomic trends and disparities within urban Bangladesh.



THE URBAN POOR COLONY

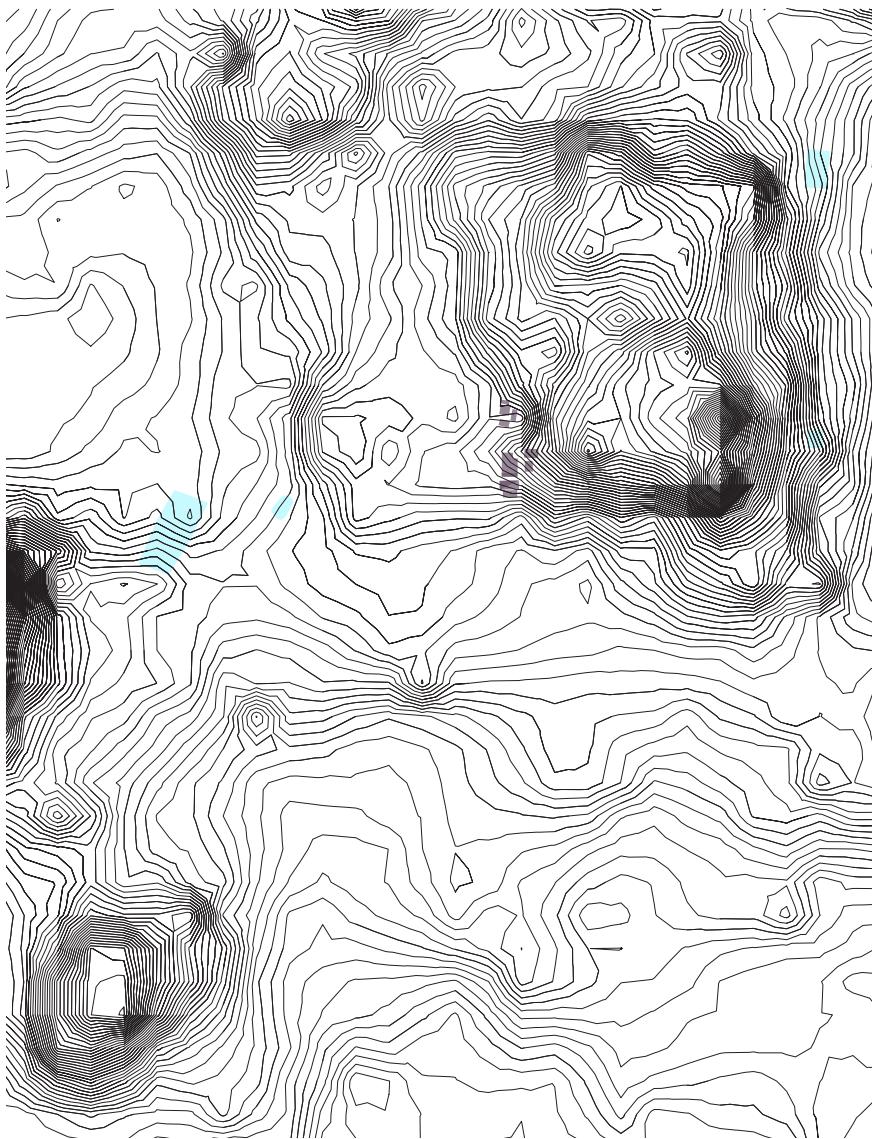
**A SITE AT THE HEART OF
THE DYNAMIC SYLHET**

Located within the urban fabric, the site benefits from convenient access to amenities along the main axis, including hospitals, schools, stores and supermarkets. Despite its proximity to busy commercial areas, the site itself offers a striking contrast: a quiet environment nestled in the heart of a bustling city.

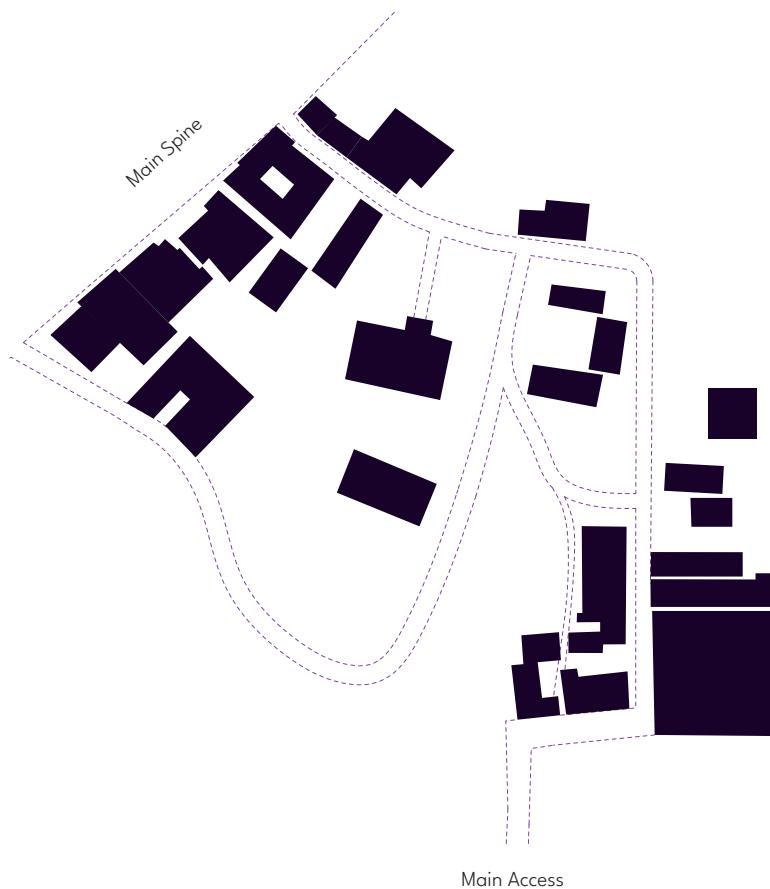


THE URBAN POOR COLONY **ON TOP**

The site is located on a verdant city hill, a rare spot nestled between two other important hills that serve as landmarks in the historic part of the city. This elevated position among the trees offers a sense of tranquility amidst the urban landscape. Interestingly, the hill has a dual function: it is used by the telephone company for its infrastructure and is also home to a Muslim cemetery, adding to the cultural and historical significance of the area.

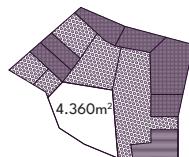


THE URBAN POOR COLONY **BUILDING MASS**

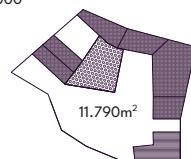


THE URBAN POOR COLONY **PLOT DIVISION & OWNERSHIP**

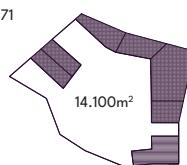
2008



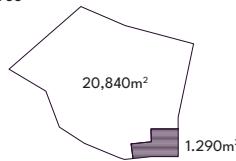
2000



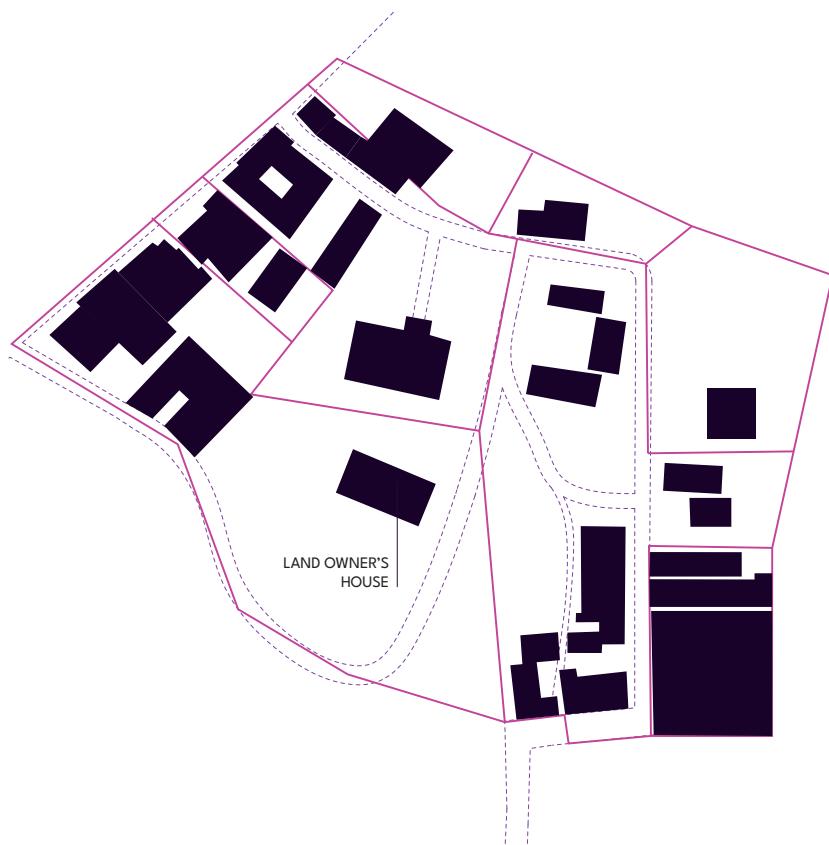
1971



1955



SUBDIVISION OF THE SITE AND SITE AREA
OCCUPIED BY THE LAND OWNER

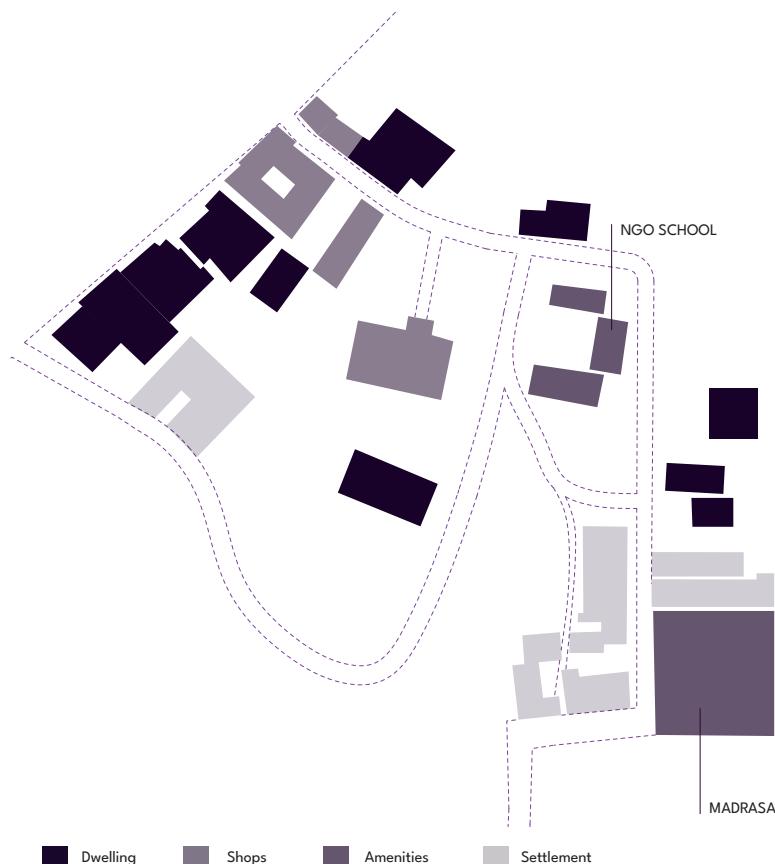


PLOT AREA: 22.129 SQM

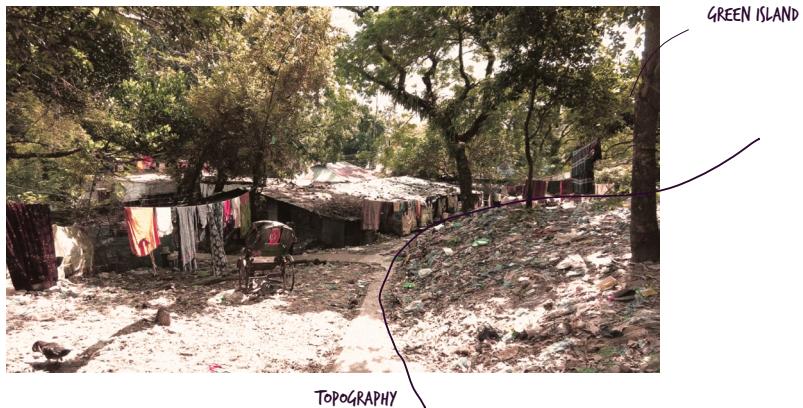
THE URBAN POOR COLONY

PLOT DIVISION & OWNERSHIP

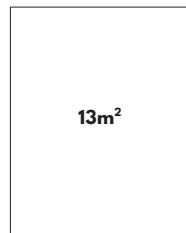
The site is privately owned by an individual who resides there and generates income by renting out parts of the property. One notable feature is the traditional Bengali baton house, reflecting the architectural heritage of Sylhet, which is used for tourism purposes. Additionally, shops constructed on the site are leased by a car repair company, further contributing to the owner's revenue streams. Another income-generating activity involves the construction of low-tech housing structures for urban migrants, who endure poor living conditions and pay rent. Approximately 600 residents, comprising 85 households averaging 7 individuals each, occupy this section. Adjacent plots are rented out for higher-income housing, accommodating 60 people. Furthermore, the site hosts amenities such as a Madrasa (Islamic school) and a school established by an NGO. However, rather than allocating space for education, the landowner utilizes these facilities as additional sources of income.



THE URBAN POOR COLONY **CURRENT LIVING SITUATION**



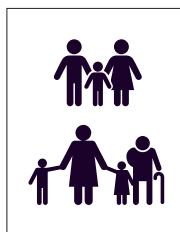
THE URBAN POOR COLONY **CURRENT LIVING SITUATION**



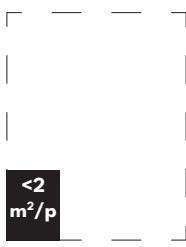
UNIT



OVERCROWDED



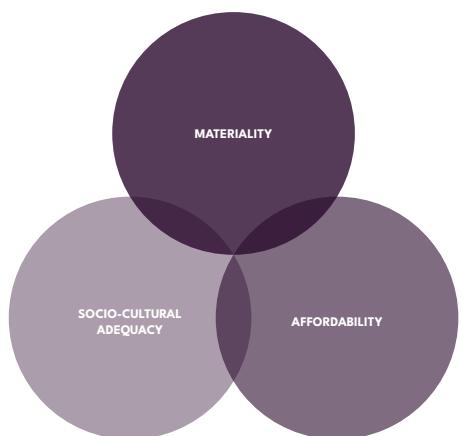
FAMILY STRUCTURE

INSUFFICIENT
LIVING AREA

DESIGN STRATEGY

FINDING THE BALANCE BETWEEN EFFICIENCY AND RESILIENCE

The design, guided by the followed specific design goals, seeks to challenge the prevailing norms of the social housing market in Bangladesh. It aims to disrupt the status quo in terms of development, construction, and affordability. By introducing innovative approaches to design and construction methods, the project endeavors to break away from conventional models and offer more sustainable, efficient, and cost-effective housing solutions. Additionally, by prioritizing affordability without compromising on quality and livability, the design aims to address the pressing need for accessible housing options for low and middle-income individuals and families in Bangladesh.





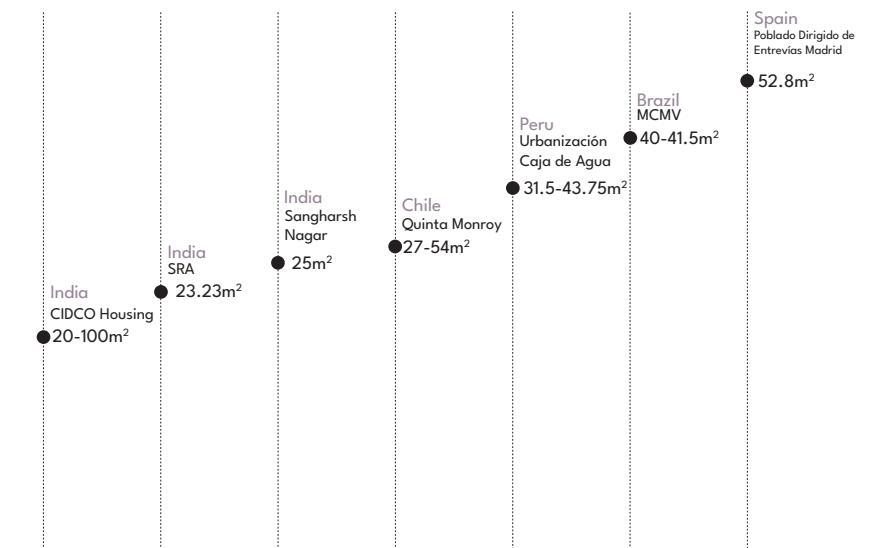
© Marion Achach, Dhaka, 2023

AFFORDABILITY

AFFORDABILITY

**GLOBAL PERSPECTIVES:
SLUM REHABILITATION PROGRAM
UNIT AVERAGE**

In order to determine the appropriate allocation of space in slum rehabilitation programs, a comprehensive analysis of projects worldwide was conducted. This analysis resulted in establishing an average unit space requirement of a minimum of 30m², equating to 9m² per person.

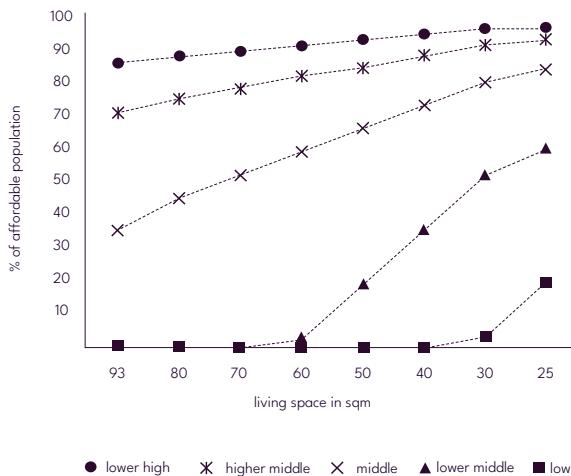


AFFORDABILITY

AFFORDABILITY & USE OF SPACE

To further define the design components, analyzing the affordability of living spaces per income group is crucial. This helps determine the space requirements per unit and the flexibility needed in the building system to accommodate a variety of unit sizes. Additionally, understanding how spaces are utilized is essential in shaping the building system and selecting appropriate materials. By adopting a modular system based on a 3m x 3m grid, the design ensures that various activities can occur without disrupting the inhabitants' use and appropriation of the space.

Study undertaken in Dhaka by Md Kamruzzaman and Nobuyuki Ogura as part of their research "Housing for the Middle Income Group in Dhaka, Bangladesh", May 2008

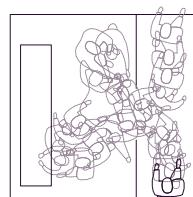


AFFORDABILITY

USE OF SPACE

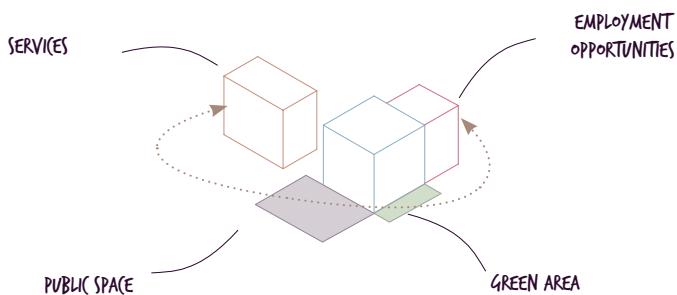
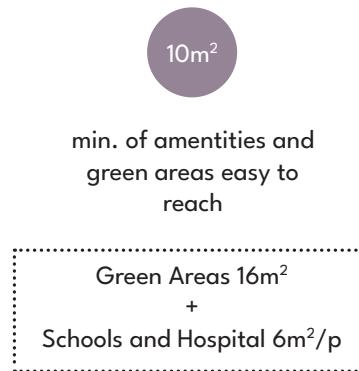


basic module



AFFORDABILITY**CHARLES CORREA'S THEORY :
BEYOND HOUSING**

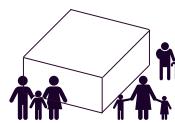
However, considering Charles Correa's theory that housing should extend beyond mere living quarters, encompassing at least 10m² of amenities and green spaces per person, readily accessible, this requirement expands to a total of 19m² per person. This comprehensive approach integrates services, employment opportunities, public spaces, green areas, and living spaces into the housing framework.



AFFORDABILITY **FROM THEORY TO REALITY**

Applying these theories to the site, housing units should ideally be designed with a minimum of 63m² for a single household. Alternatively, units of at least 31.5m² could accommodate nuclear families, with the possibility of combining units to create linked spaces for extended families, mirroring the existing arrangement within the settlement where households average seven people.

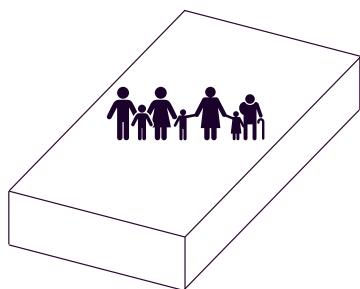
Furthermore, green areas and amenities should occupy a minimum of 70m² per person to ensure adequate access to recreational spaces and essential services.



13m²

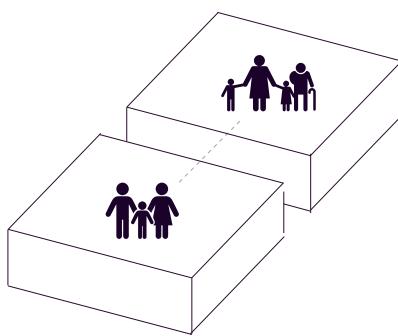


LIVING AREA (7 people)



1 unit of min. 63m²

or



2 units of min. 31,5m²

10 m² OF GREEN AREAS & AMENITIES/PERSON

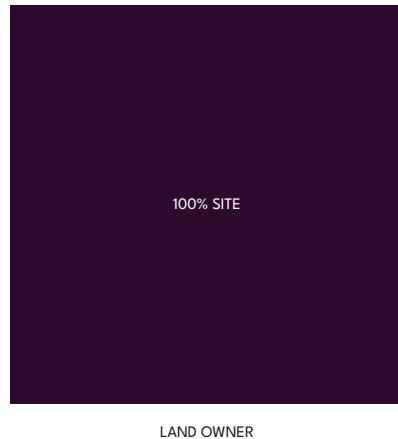
7people x 10m² = 70m²

+

MANAGERIAL STRATEGY

MANAGERIAL STRATEGY**HOW TO PROVIDE BETTER LIVING CONDITIONS WHILE BENEFICITING ALL STAKEHOLDERS IN THE PROJECT?**

In line with common housing market trends in Bangladesh, the current private landowner plans to sell 50% of their site to a real estate developer. The developer will undertake the development of a middle to high-income household housing program on the purchased land. The proceeds from this sale will then be reinvested into the development of an affordable housing program, catering to the needs of both current and future residents of the settlement. This strategic decision aims to improve living conditions for existing residents while accommodating the influx of new residents and maintaining affordability and benefits for all stakeholders.



LAND OWNER



affordable housing program

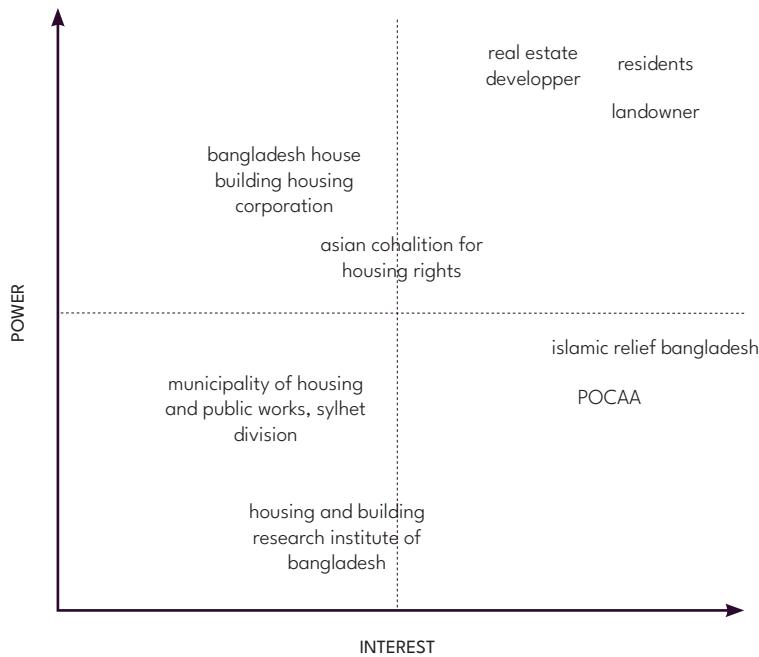


middle-high income housing program



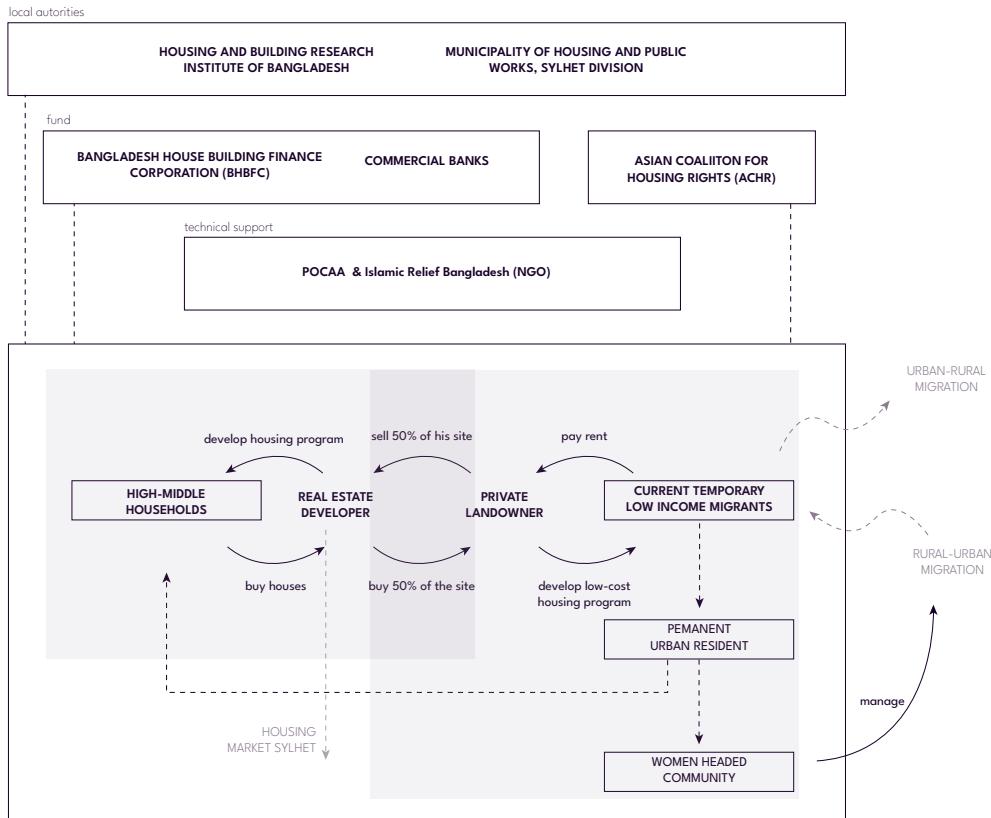
MANAGERIAL STRATEGY**STAKEHOLDERS ANALYSIS**

Each stakeholder holds varying interests and levels of influence in the project. These stakeholders encompass governmental bodies, Asian housing cooperatives, NGOs, developers, and residents.



MANAGERIAL STRATEGY**STAKEHOLDER ANALYSIS**

This network of stakeholders is committed to improving living conditions for current migrants and fostering community development through the establishment of upgraded housing units and a nurturing environment. This environment will offer economic opportunities, amenities, and support individual growth, enabling temporary urban migrants to transition to larger housing units and eventually become permanent urban residents. Women will lead this community, facilitating urban-rural migration for those who wish to return to their origins.



BUILDING TECHNOLOGY APPROACH

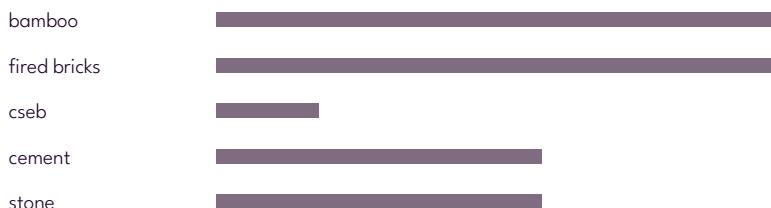
BUILDING TECHNOLOGY APPROACH

INTEGRATE SUSTAINABLE BUILDING MATERIALS

To challenge the social housing model, understanding the availability of building materials, skills, and labor at different scales is crucial. This knowledge allows for a more sustainable and resilient approach to affordable housing design by utilizing locally available resources and eco-friendly practices. By reducing reliance on imported materials and promoting indigenous industries, the project aims to create durable, cost-effective, and environmentally conscious housing solutions for communities in Bangladesh and worldwide.



BUILDING MATERIALS



SKILLS



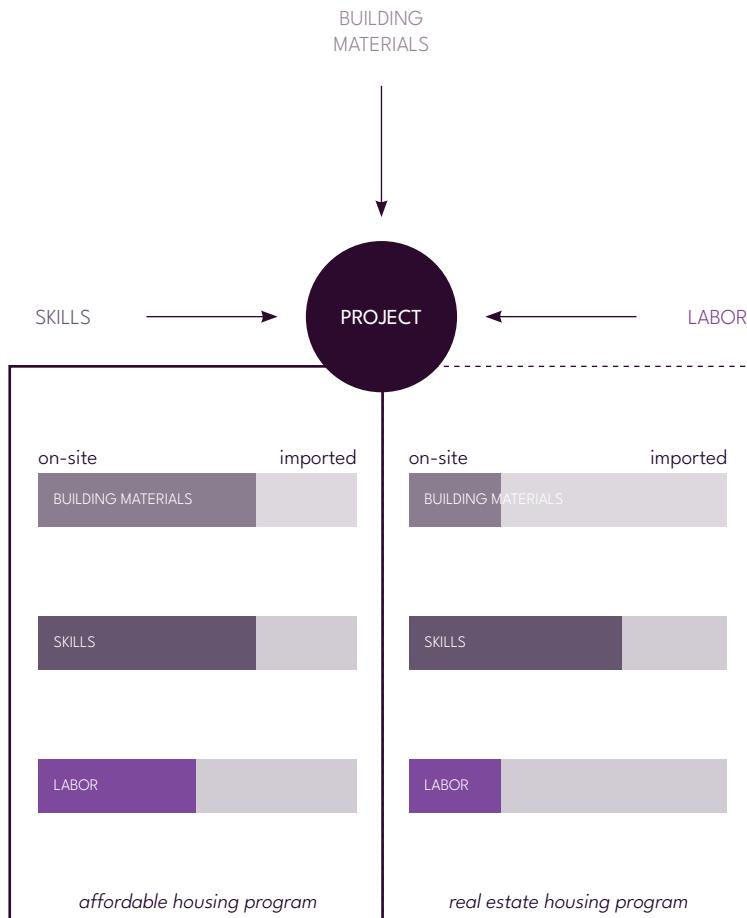
LABOR



BUILDING TECHNOLOGY APPROACH

A PROJECT WITH TWO NUANCES

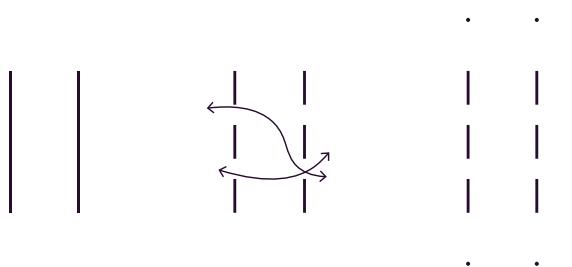
Therefore, the project adopts two distinct approaches for its two programs, seeking to strike a balance between efficiency and resilience. The affordable housing program prioritizes locally available materials and actively involves residents in the building process. Conversely, the real estate housing program, due to the need for taller buildings, incorporates more imported materials that necessitate specialized building skills.



BUILDING TECHNOLOGY APPROACH

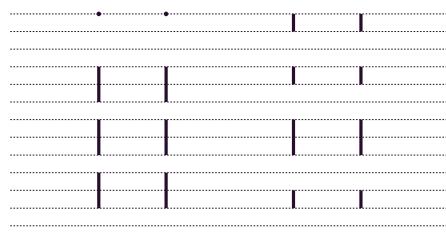
DEFINITION OF THE RHYTHM: APPLICATION

By using compressed earth blocks as load-bearing materials, the structural constraints help define the project's grid system. The design is based on a load-bearing linear structure, with wall openings not exceeding 33%. This system is complemented by a bamboo framework to facilitate incremental growth. The compressed earth block load-bearing system also informs the concrete system for the real estate development part of the project. By adopting a common structural system for both segments, the project aims to ensure that affordable housing offers the same quality of space as higher-income developments, demonstrating that affordability does not equate to lower quality.



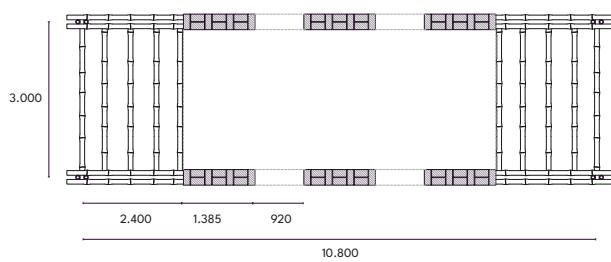
linear structure

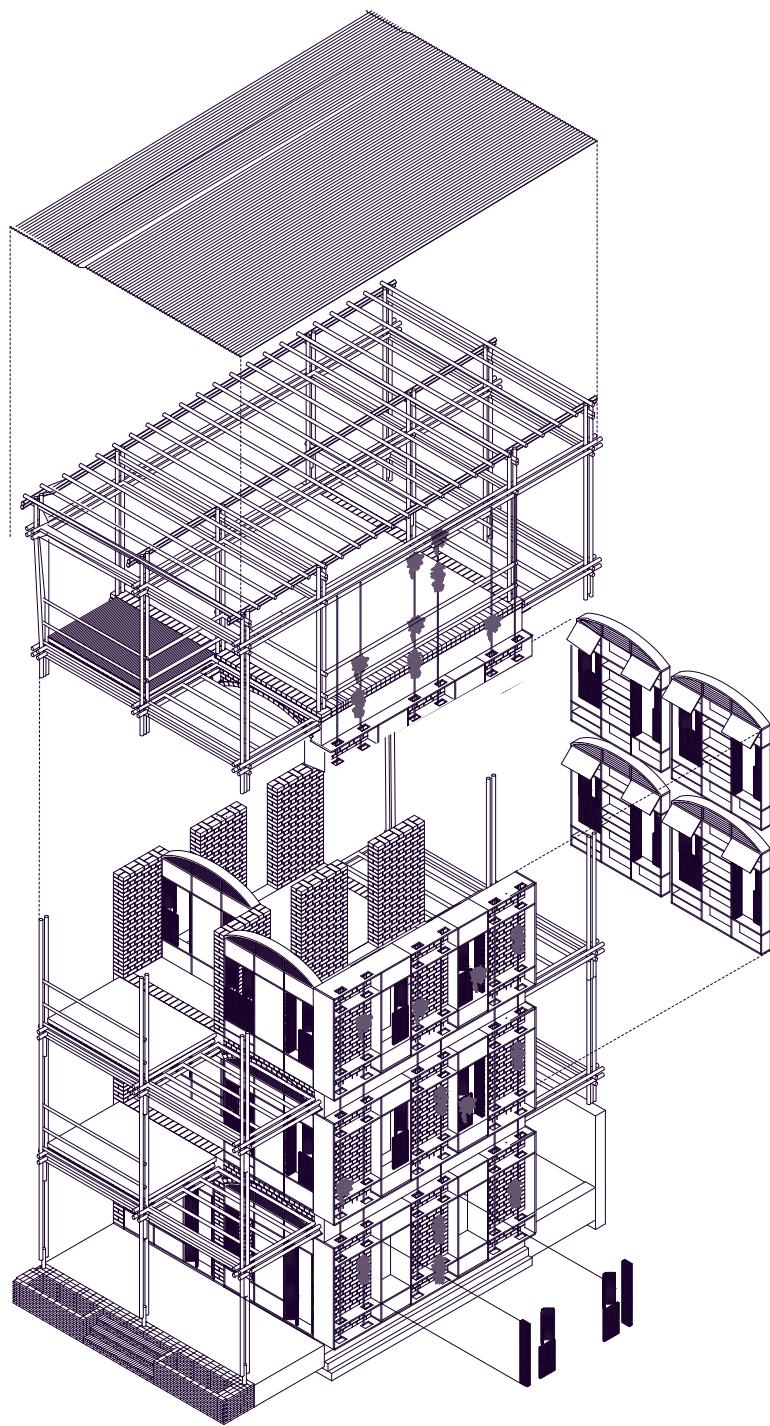
flexibility

framework for
incremental growthadapting the system to
concrete

BUILDING TECHNOLOGY
APPROACH

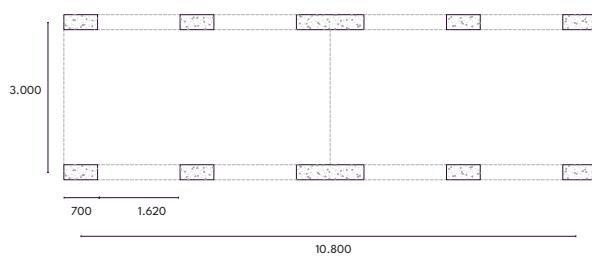
**TWO PURPOSES ONE SYSTEM:
AFFORDABLE HOUSING PROGRAM**

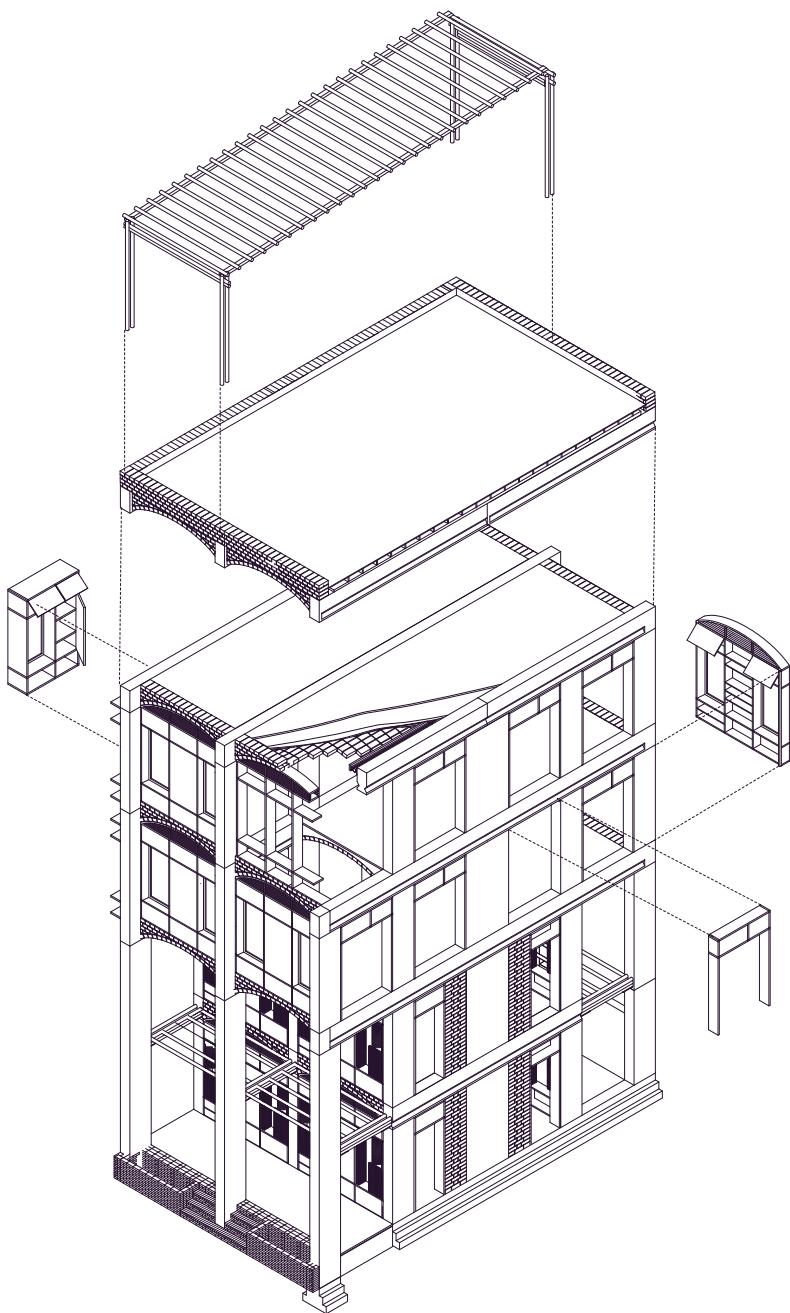




BUILDING TECHNOLOGY
APPROACH

**TWO PURPOSES ONE SYSTEM:
REAL ESTATE HOUSING PROGRAM**

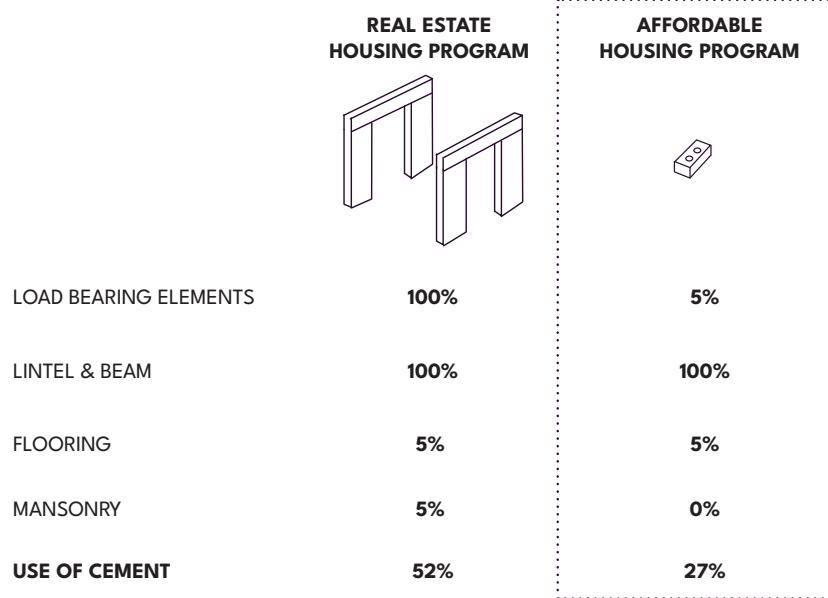




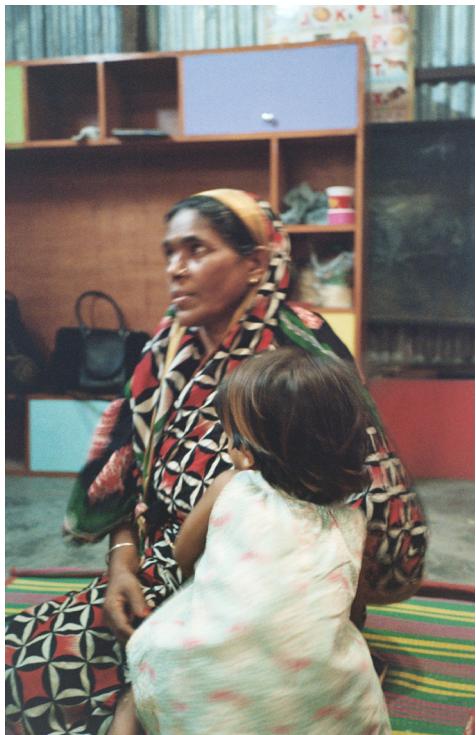
BUILDING TECHNOLOGY APPROACH

TESTING AND CHALLENGING

The combination of these two systems reduces the environmental impact of the project by incorporating more locally sourced and environmentally sensitive building materials. Implementing the compressed earth block system for the affordable housing segment significantly decreases the overall use of cement. This approach not only promotes sustainability but also aligns with local construction practices, enhancing the project's ecological footprint and cultural relevance.



DESIGN

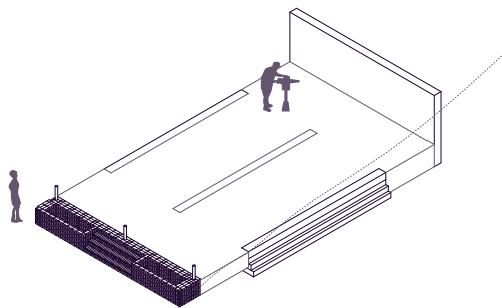
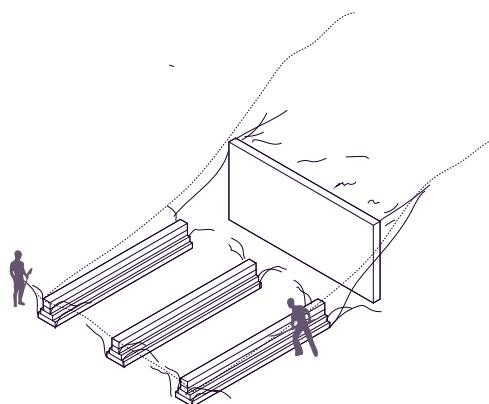
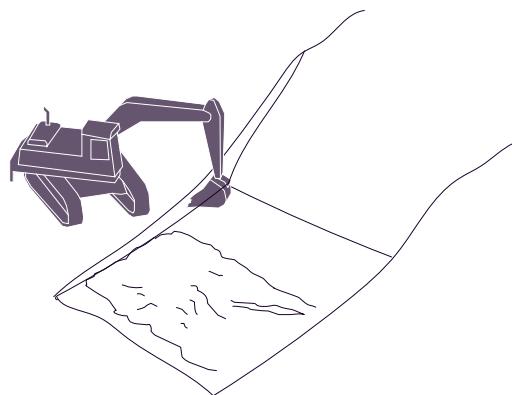


© Woman-head of the community of the
Gaboni Sweeper Colony, Dhaka, Bangladesh
(Author, October 2023)

CONSTRUCTION & DETAILS

CONSTRUCTION PHASING**EXCAVATION & FOUNDATION**

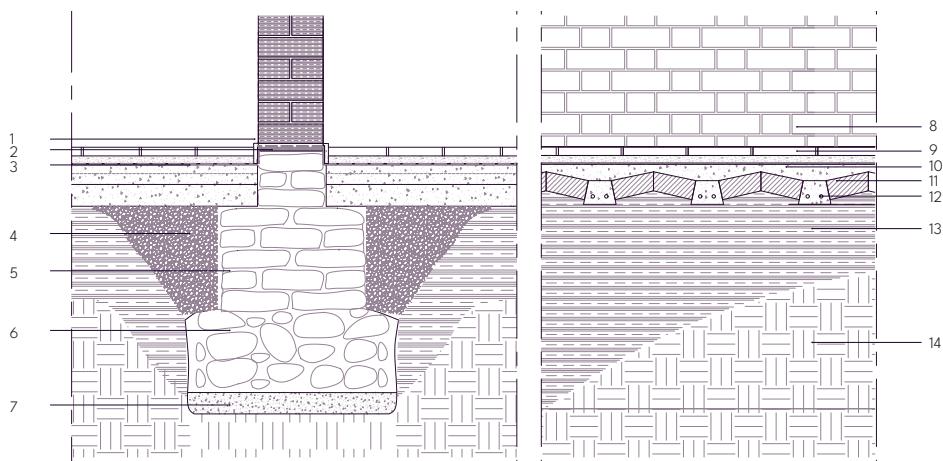
Due to the hilly location of the development, extensive excavation will be necessary, providing building materials for the project. The foundations, constructed from stone and fired brick excavation walls, will form the initial phase of the construction system. To embrace the topography and create a clear distinction between street level and building level, each building is elevated by 70 cm.



CONSTRUCTION PHASING

EXCAVATION & FOUNDATION

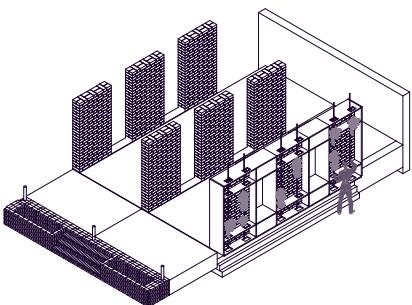
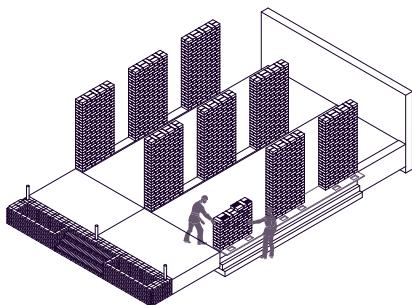
1	Plint
2	Carefully proportioned levelling mortar
3	Waterproofing
4	Gravel
5	Fine-cut Natural Stone
6	Stone Masonry
7	Cement Footing
8	Compressed Stabilized Earth Block 300x150x90mm bounded with the flemish bounding
9	Ceramics Tiles 300x300mm with 30mm adhesive
10	Layer of stabilized soil concrete
11	Fired Bricks with Chamfered ends
12	Reinforced Concrete Girder
13	Tamped Earth
14	Soil



CONSTRUCTION PHASING

LOAD BEARING WALLS & RAIN WATER PROTECTION

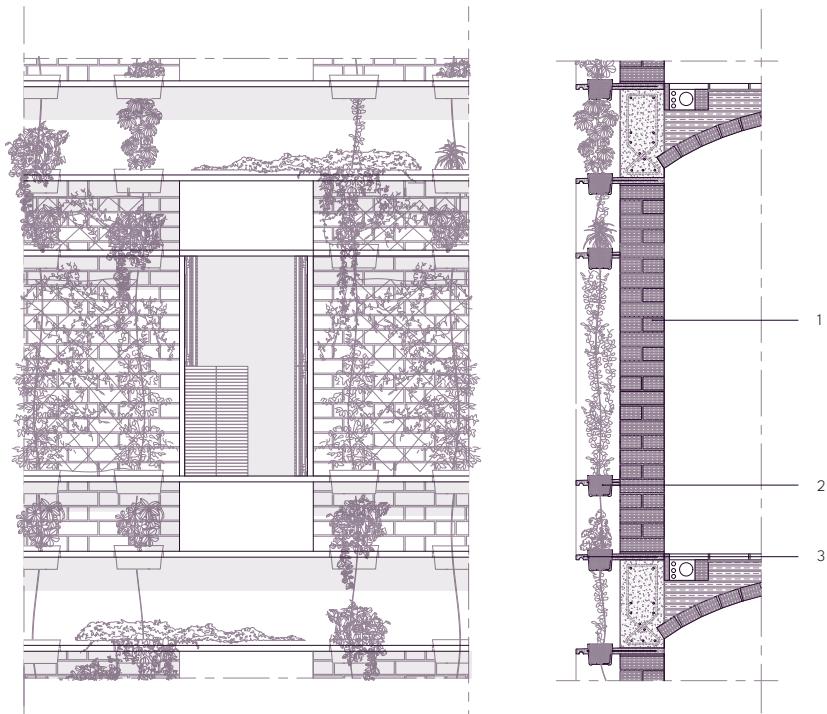
The compressed earth blocks are designed with dimensions and weight that make them easy to handle, allowing everyone to participate in the building process. To safeguard the load-bearing exterior walls from rainwater and climate effects, a ferrocement frame with vegetation will be added. This not only improves the walls' durability and resilience but also provides natural insulation and aesthetic appeal, promoting a more sustainable and community-inclusive construction approach.



CONSTRUCTION PHASING

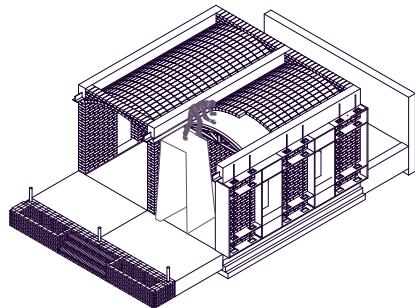
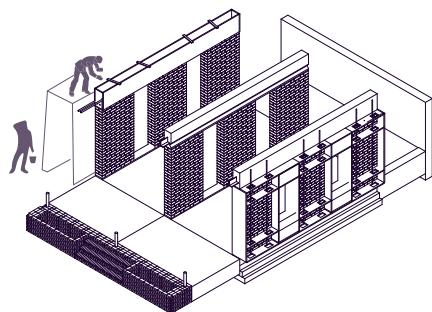
**LOAD BEARING WALLS
& RAIN WATER PROTECTION**

- 1 Compressed Stabilized Earth Block Bounded with the flemish bounding
- 2 Ceramic pots with plants inserted in prefabricated ferrocement frame for rainwater protection at CSEB. Ropes and jute mesh are attached to the system to ensure adequate protection and vegetation growth.
- 3 Hood Mould designed in the prefabricated ferrocement frame



CONSTRUCTION PHASING **VAULTING**

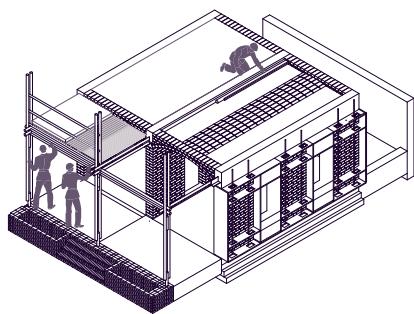
The slabs are designed using compressed earth block vaults filled with compressed earth, minimizing the use of concrete for flooring. These vaults rest on site-cast concrete beams that also serve as lintels for the load-bearing walls. During the casting of these beams, metal L profiles are incorporated to allow for the insertion of a bamboo frame for incremental growth.



CONSTRUCTION PHASING

FLOORING & BAMBOO STRUCTURE

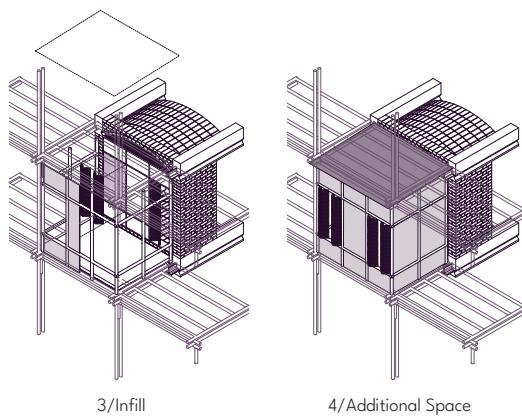
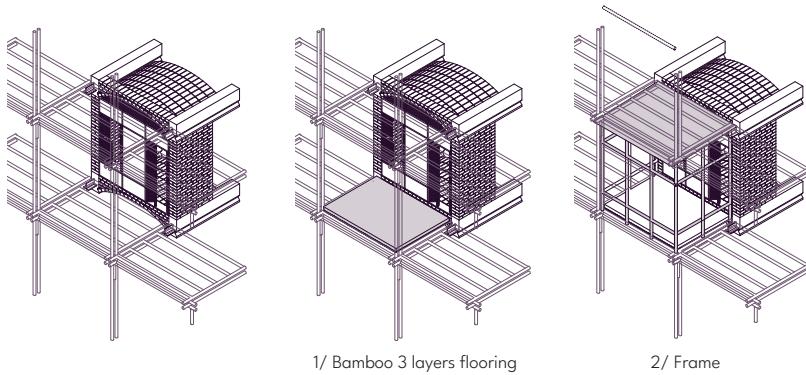
The bamboo frame for incremental growth is screwed onto the metal L profile and serves as scaffolding for the building's construction. This system, with bamboo disconnected from the core structure, allows for easy maintenance and prevents damage to the main structure.



CONSTRUCTION PHASING

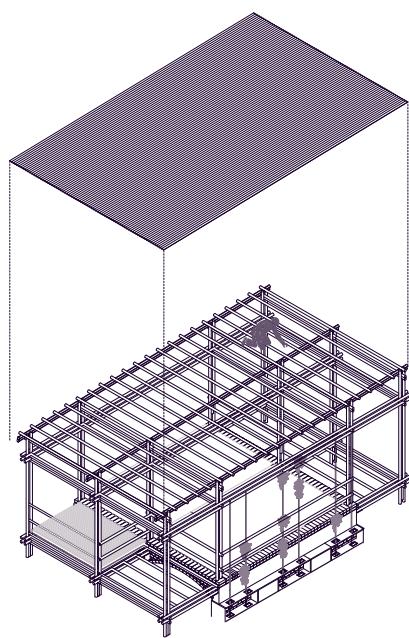
**BAMBOO EXTENSION:
INCREMENTAL GROWTH**

Here is an example of incremental growth with the construction of an external space. The provided facade can be easily detached to create shutter elements for the new facade. Each extension can be built independently from the adjacent grid, allowing residents to expand their spaces without depending on their neighbors. They can choose their own materials and designs for the extensions based on their available resources.



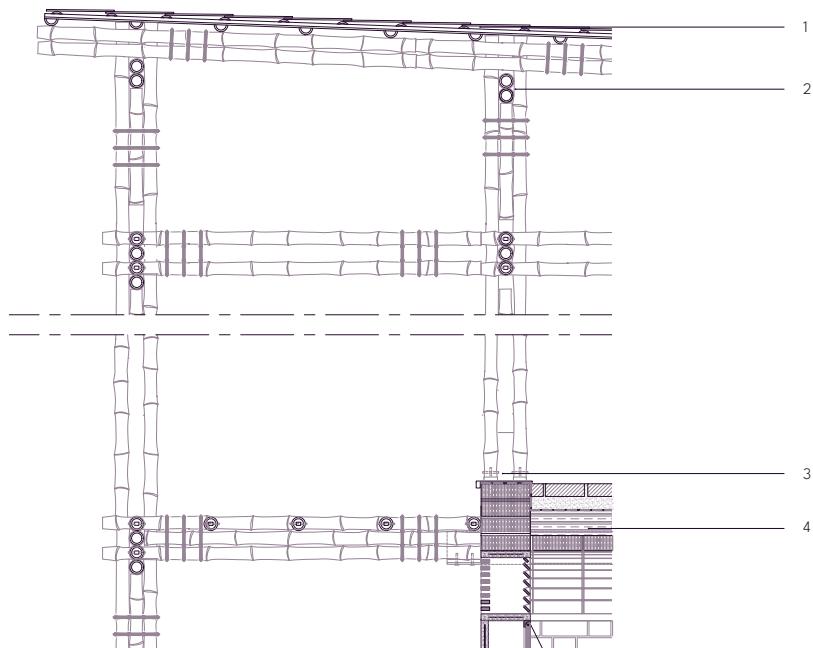
CONSTRUCTION PHASING ROOF

As the final step in the construction process, the roof is installed to cover the entire structure and is detached from the core to enable climate control. This inbetween space between the roof and the core can serve multiple purposes for the community, such as drying clothes or gathering space.



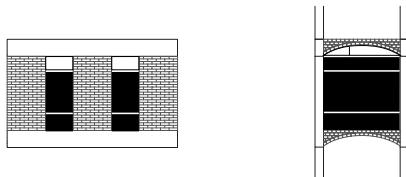
CONSTRUCTION PHASING**ROOF**

1	Split Bamboo shingles - Waterproofing Membrane - Split Bamboo Ceiling - Bamboo Rafters
2	Bamboo Roof Structure 2x Bamboo 800mm tied and nailed with jute ropes
3	Rubber bamboo connector screwed to metal plate for connecting additional bamboo columns to reinforce roof stability.
4	Vault filled with Compressed Earth - Waterproofing - Sand - Fired Bricks

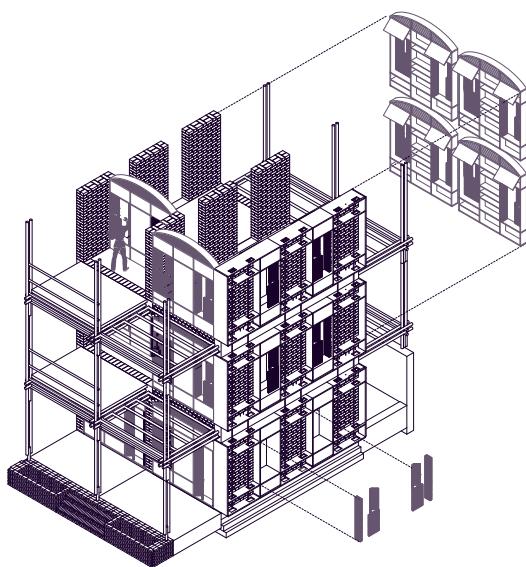


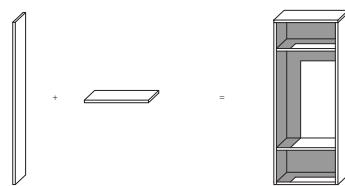
CONSTRUCTION PHASING INFILL

Inserted within the ferrocement frame, bamboo shutters (for the affordable housing program) or windows (for the real estate development) can be affixed. Each facade operates on a shared system based on a standard module of 92cm. The frontal facade conforms to the shape of the vault, incorporating permanent ventilation elements. Meanwhile, the side facade functions both as climate protection and storage space, utilizing the frame accordingly.

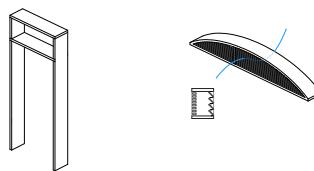


2 FACADES ELEMENTS BASED ON THE SAME MODULE

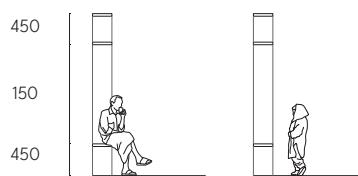


FACADE STUDY **MODULE & USES**

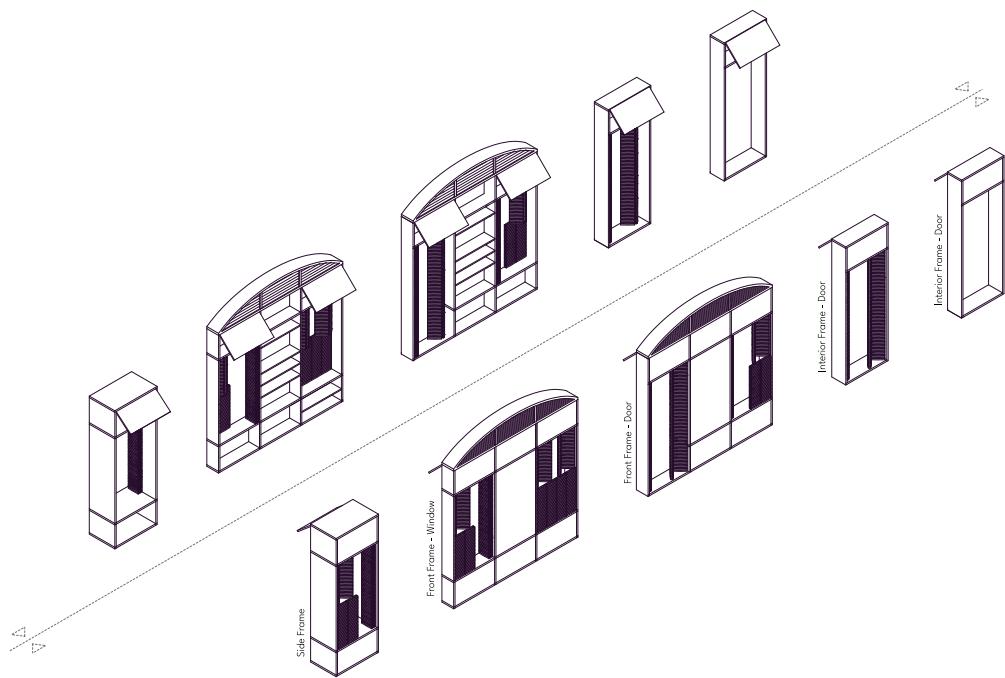
Sunshading Device



Storage & Permanent Ventilation

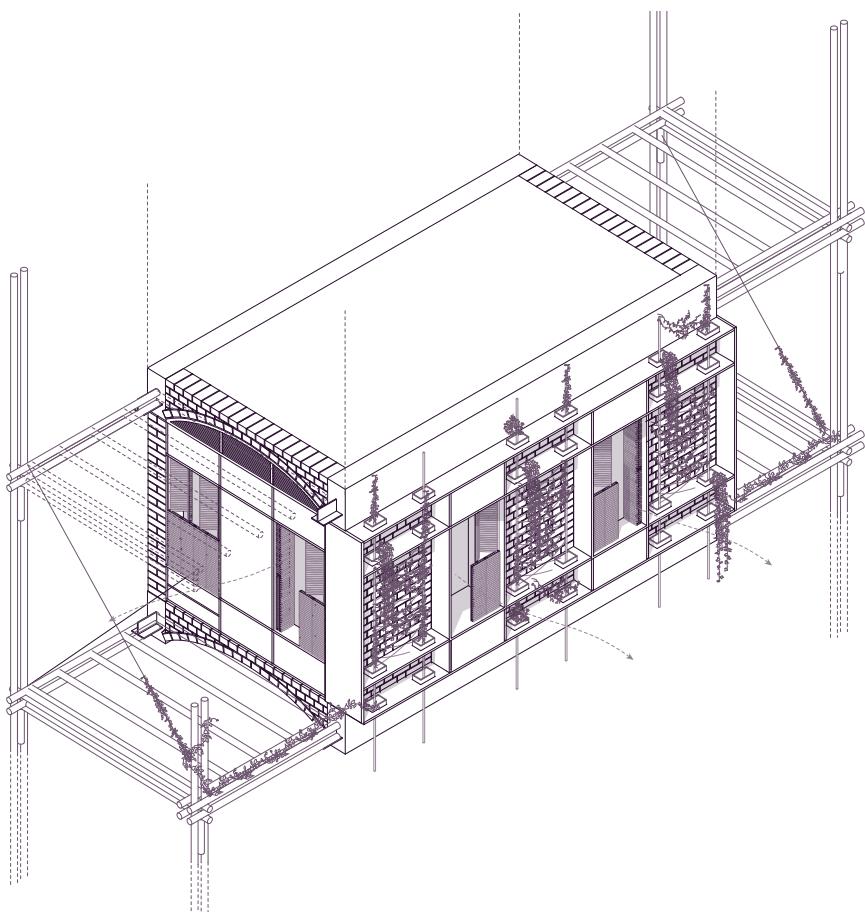


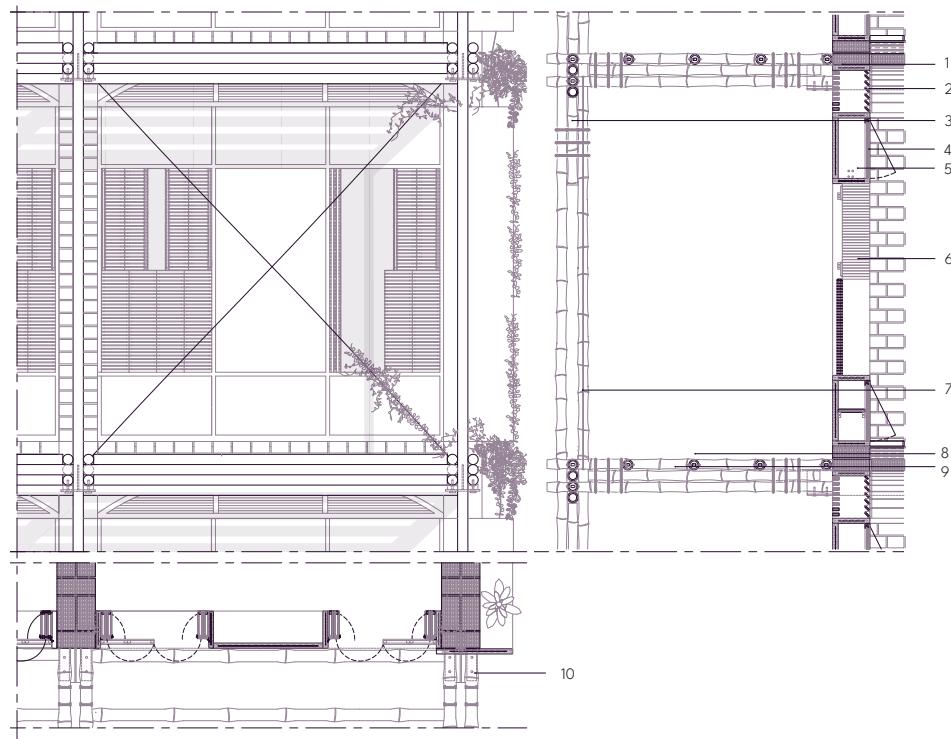
Dimensions



FACADE STUDY

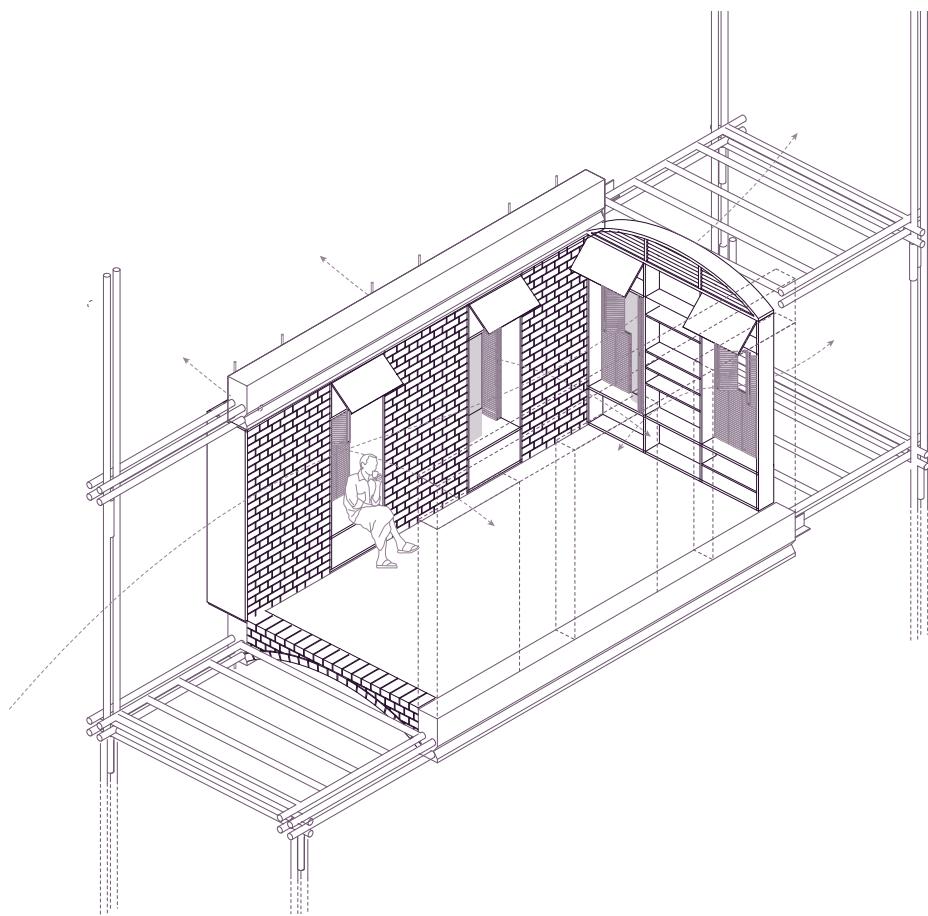
A FACADE AS A PROTECTION





Timber 20mm claustra screwed to the ferrocement frame	1
Adaptable ventilation dampers	2
Prefabricated Prefabricated ferrocement facade frame (920x2700), bolted to L steel profile (every 60cm) inserted into the CSEB joint	3
Timber Shelf 470mmx830mm	4
Bamboo Strip 20x200mm nailed to Timber Frame 20mm	5
screwed to hinge	
3x Bamboo 80mm tied and nailed with jute ropes	6
Jute rope attached to bamboo beams for bracing	7
Bamboo 80mm nested in Bamboo Beams	8
3 x 80 mm Bamboo tied with jute ropes and	9
screwed to the L-profile with a rubber connector	
Metal L profile inserted in the casted concrete beam	10

FAÇADE STUDY

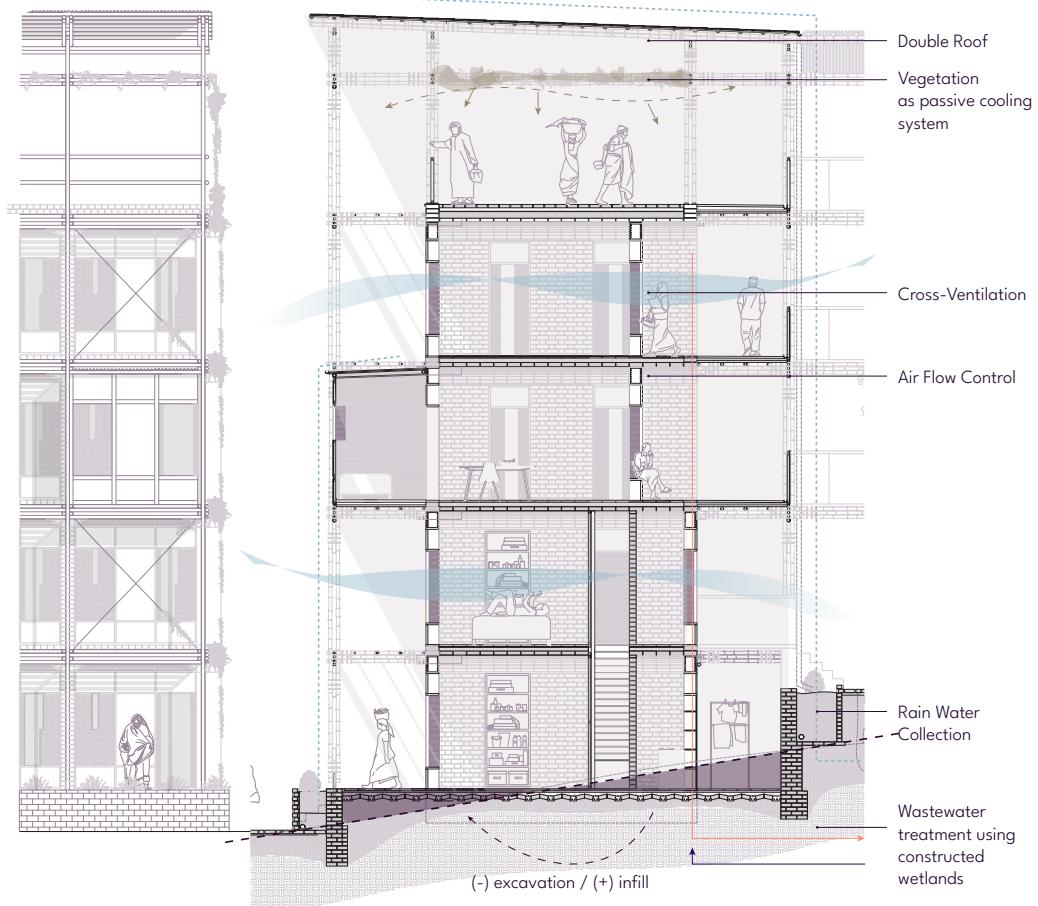
**A FAÇADE AS
A PROVIDED FURNITURE**



Ceramic Tiles 300x300x40mm with 20mm Adhesive 1
 Plint 150mm with technical pipes 2
 On site casted concrete beam 600mmx6000mm 3
 Vault filled with compressed earth 4
 Prefabricated ferrocement façade frame 5
 (920x2700), bolted to L steel profile (every 60cm)
 inserted into the CSEB joint
 Bamboo Strip 20x200mm nailed to Timber Frame 6
 20mm screwed to hinge
 Timber Shelft 470mmx830mm 7
 Metal L Profile inserted into CSEB Joint 8

CLIMATE VENTILATION & SUNSHADING

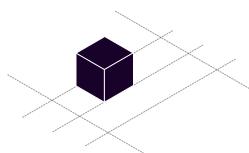
Overall, the building system enables various aspects of climate control, including cross-ventilation for airflow, passive cooling facilitated by vegetation, rainwater collection and storage, and sewage treatment.



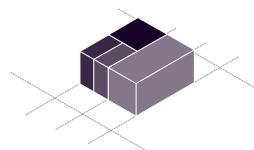
UNIT DESIGN

UNIT DESIGN UNIT SYSTEM

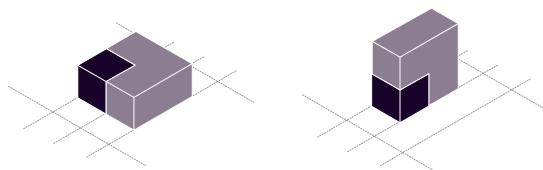
The structural system allows for a multitude of variations, fostering flexibility and incremental growth. For the affordable housing development, basic elements are provided, with open flexible space for one appropriation.



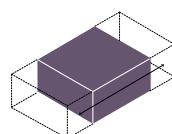
LINEAR STRUCTURE



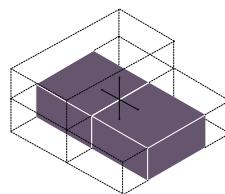
LAYER OF PRIVACY



VARIATIONS



INCREMENTAL
GROWTH



FLEXIBILITY

UNIT CSEB SYSTEM **FLAT**

18m² shop

access from
street



18m² studio

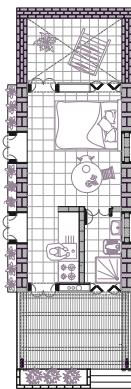
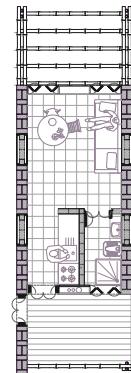
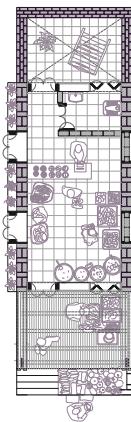
access from
gallery



18m² studio

access from
courtyard





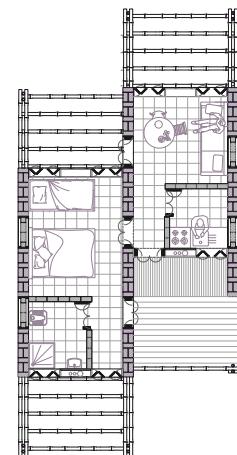
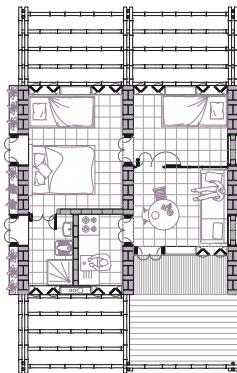
UNIT CSEB SYSTEM **FLAT**

36m²
access from
gallery



36m²
access from
gallery





36m²

access from
courtyard



UNIT CSEB SYSTEM DUPLEX

54m²

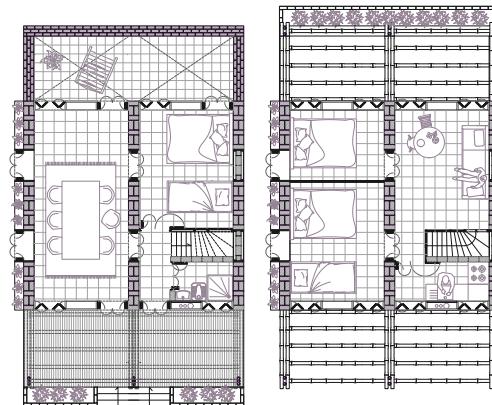
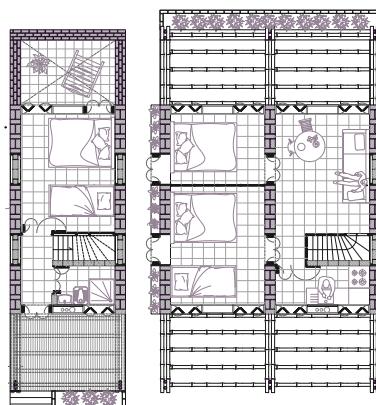
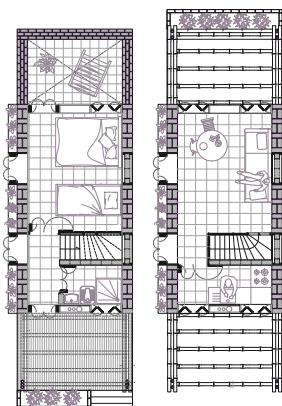
access from
courtyard



72m²

access from
courtyard





UNIT CONCRETE SYSTEM LOW INCOME UNITS

$36m^2$
access from
courtyard

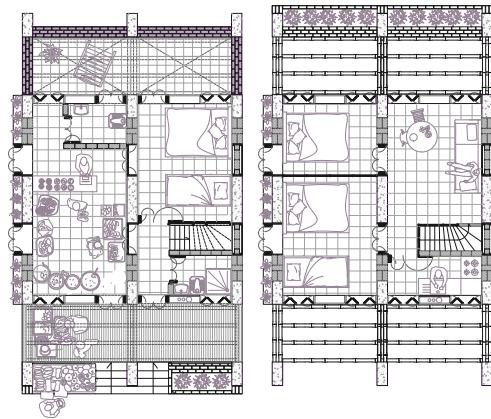
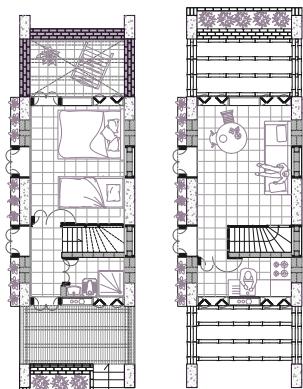
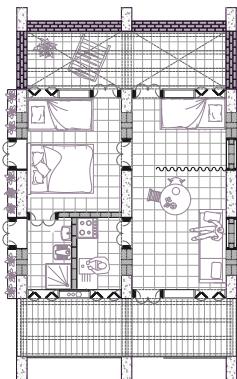


$36m^2$
access from
courtyard



$72m^2$
access from
courtyard





UNIT CONCRETE SYSTEM

MIDDLE-INCOME UNITS

32m²
low

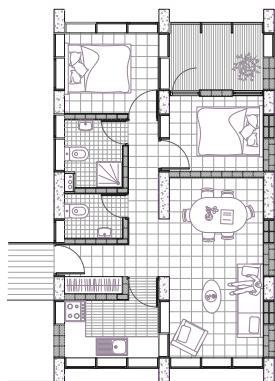
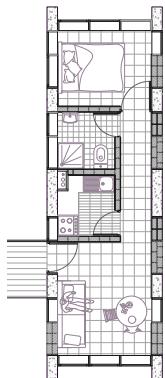


64m²
low-middle



64m²
middle





UNIT CONCRETE SYSTEM

MIDDLE-HIGH
INCOME UNITS

96m²
lower-high

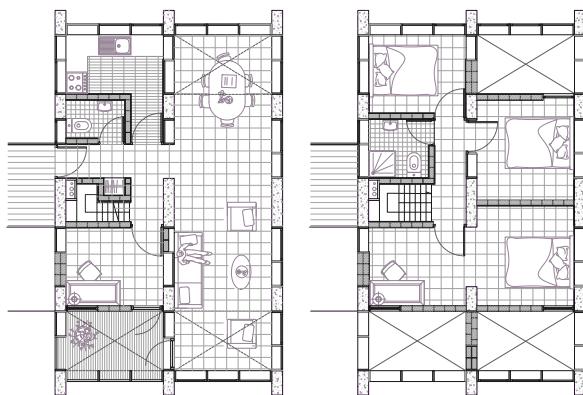
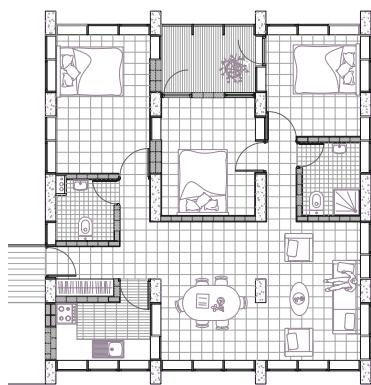
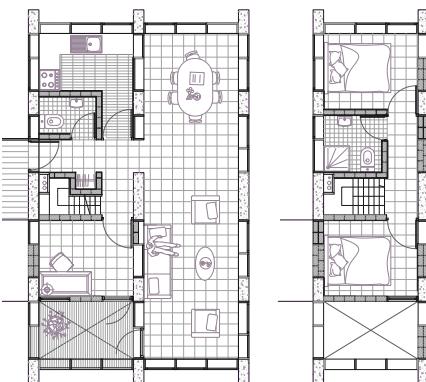


96m²
lower-high



128m²
high





UNIT CONCRETE SYSTEM

HIGH INCOME UNITS

128m²
high

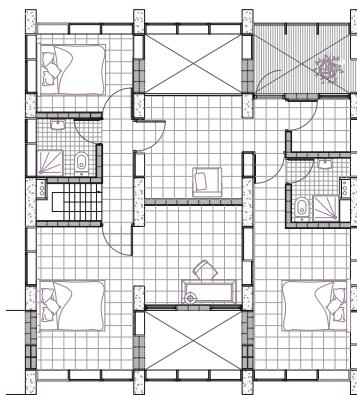
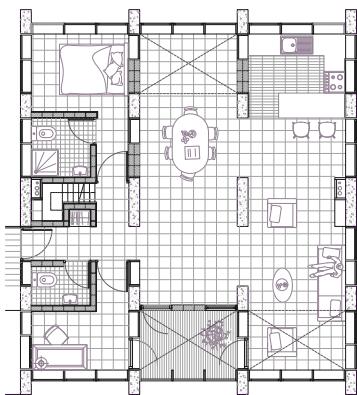
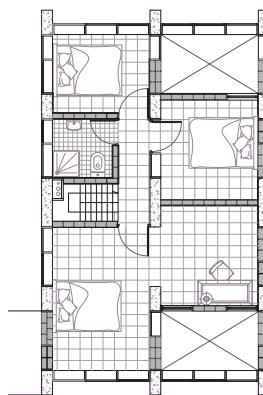
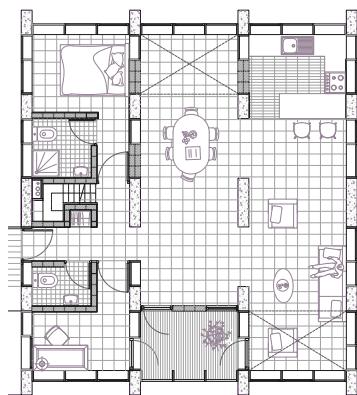
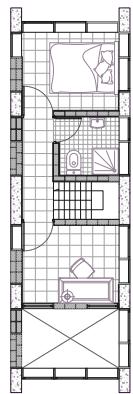
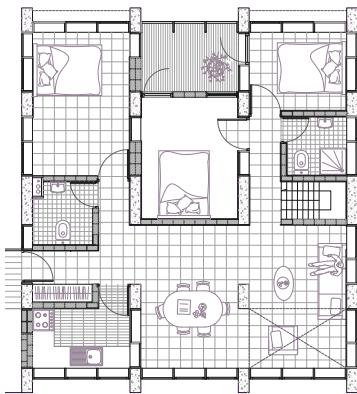


160m²
high



192m²
high



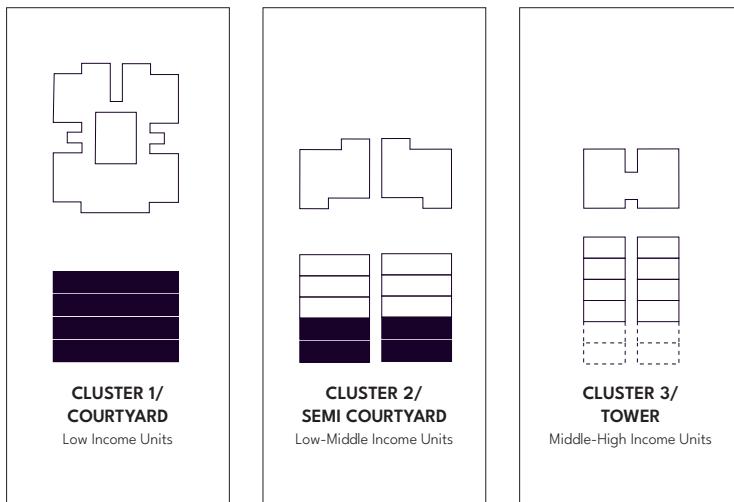


CLUSTER DESIGN

CLUSTER DESIGN

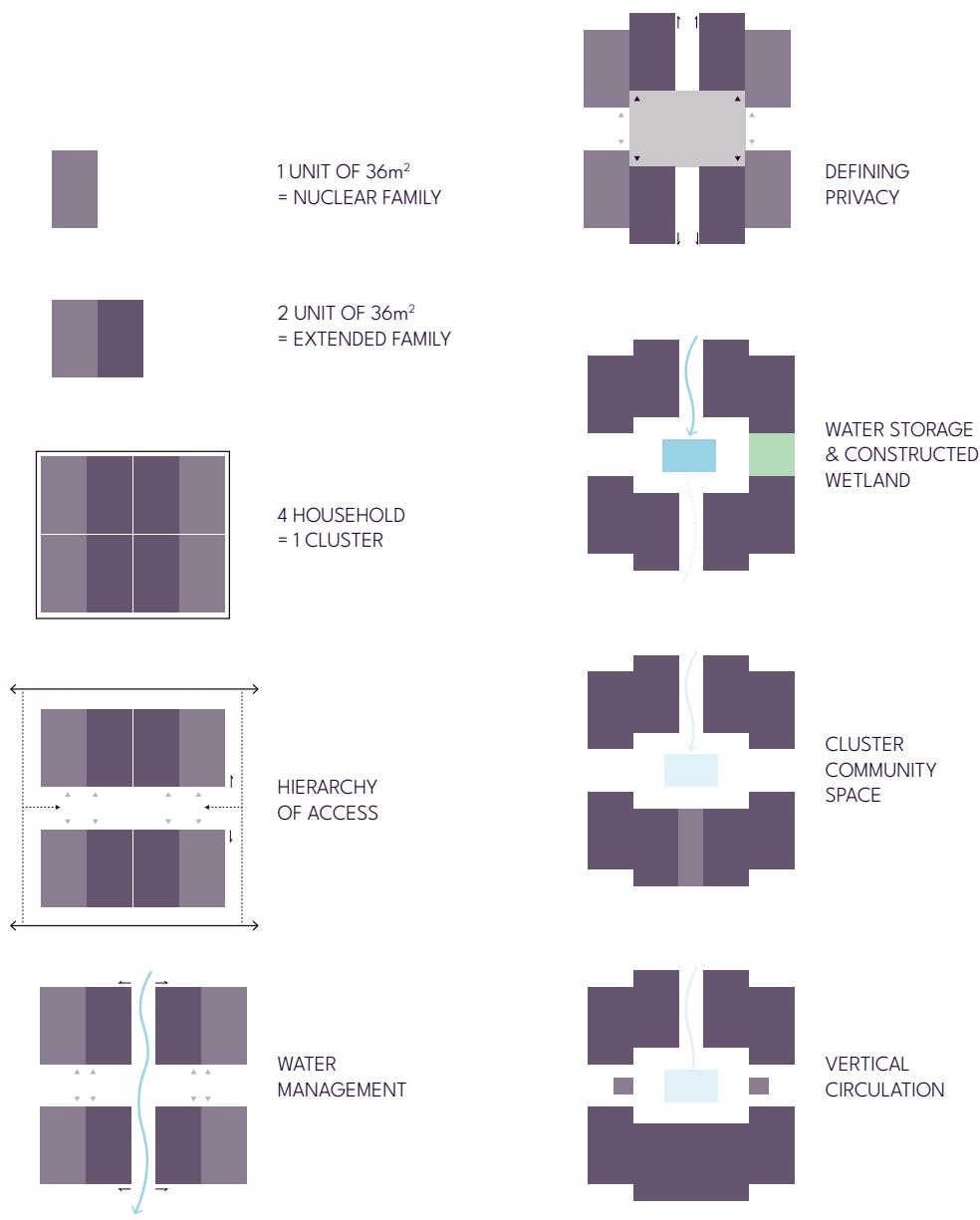
3 DIFFERENT CLUSTER TYPE BASED ON THE SYSTEM

Utilizing a straightforward structural rhythm and offering a range of unit types from maisonettes to flats and duplexes, the project is organized into three clusters. Cluster 1 constitutes the affordable housing development, featuring four-story buildings arranged around a central courtyard. Cluster 2 accommodates income diversity, with low-income units on the ground floor and separate access for higher-income units above. Cluster 3 is designated for shops and versatile open spaces on the ground floor, with higher-income units situated on the upper levels. The latter two clusters are constructed using concrete and form part of the real estate development system.



UNIT CSEB SYSTEM LOW INCOME CLUSTER

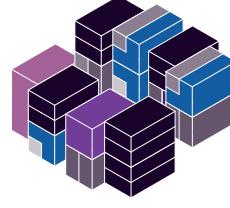
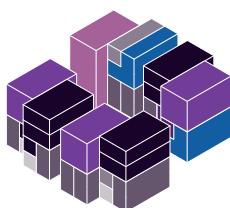
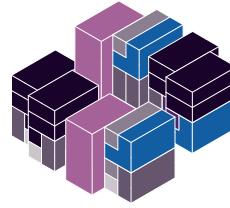
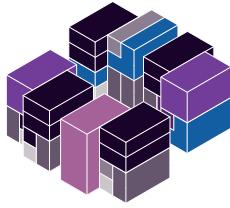
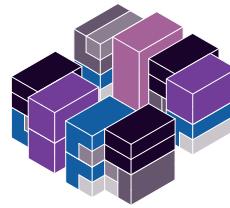
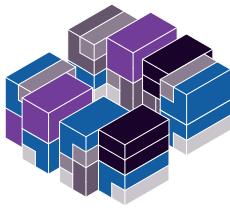
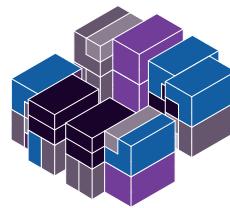
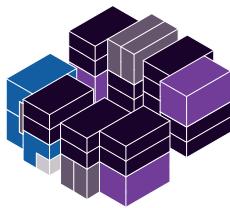
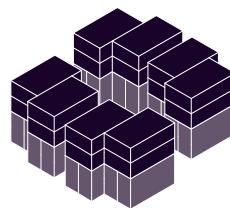
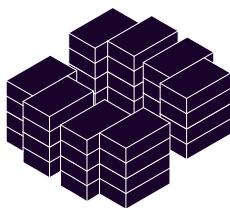
The design of the low-income cluster revolves around grouping four households on the ground floor around a courtyard, establishing a privacy layer. Within this courtyard, there's provision for water storage and a constructed wetland for sewage and rainwater treatment, along with additional water storage facilities. Residents can access their units directly from the courtyard, away from the pedestrian spine. Additionally, access to the upper level is provided from the courtyard, allowing for the distribution of four more household dwelling units. Each cluster also includes a communal space, such as a community kitchen, for income generation activities or meetings.

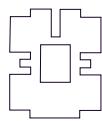


UNIT CSEB SYSTEM

A VARIETY OF COMBINAISON

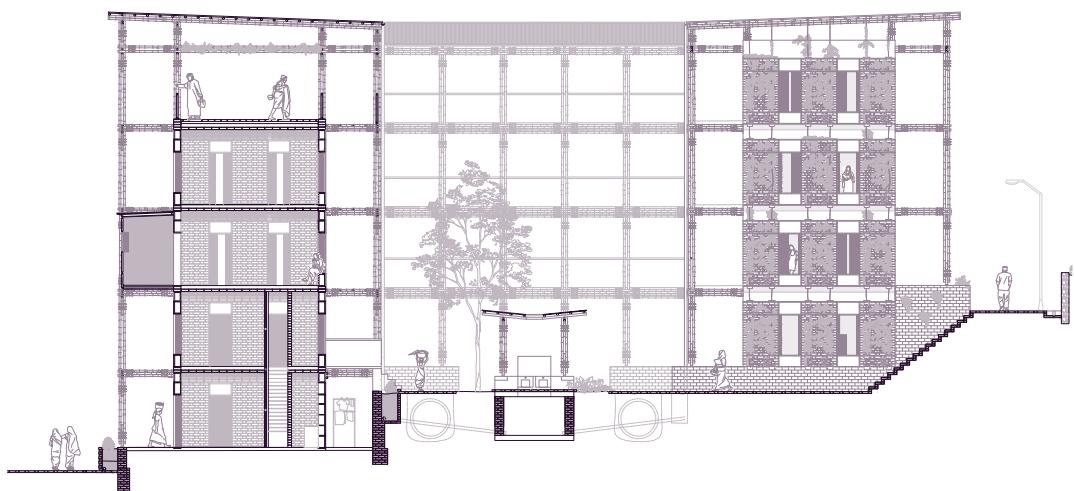
The system's flexibility enables a wide range of typologies to be observed within a cluster. This diversity is adapted to different needs and available resources. Each cluster can have unique characteristics, depending on specific requirements and available resources. This adaptability ensures that the system can be adapted to a wide range of configurations, optimizing functionality and efficiency according to the particular requirements of each situation. As a result, the system is highly versatile, capable of supporting different typologies that align with individual needs and resource constraints, ultimately enhancing its overall efficiency and applicability in a variety of contexts.

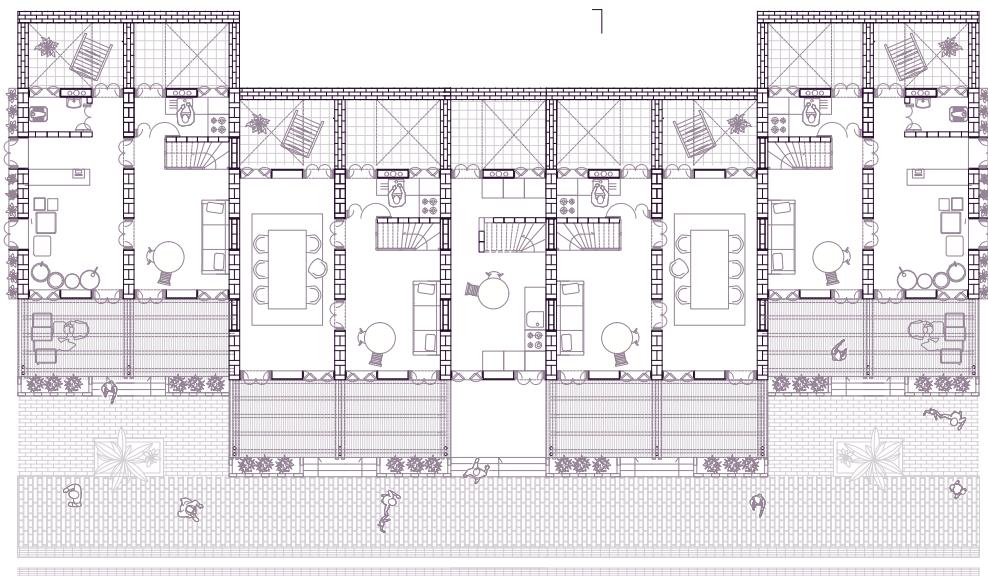


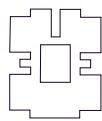


CLUSTER DESIGN

COURTYARD CLUSTER

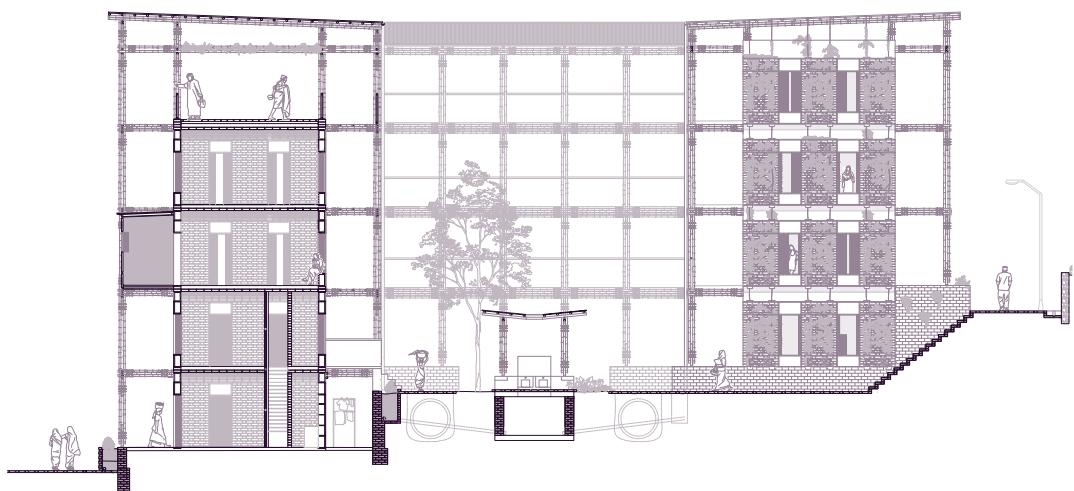


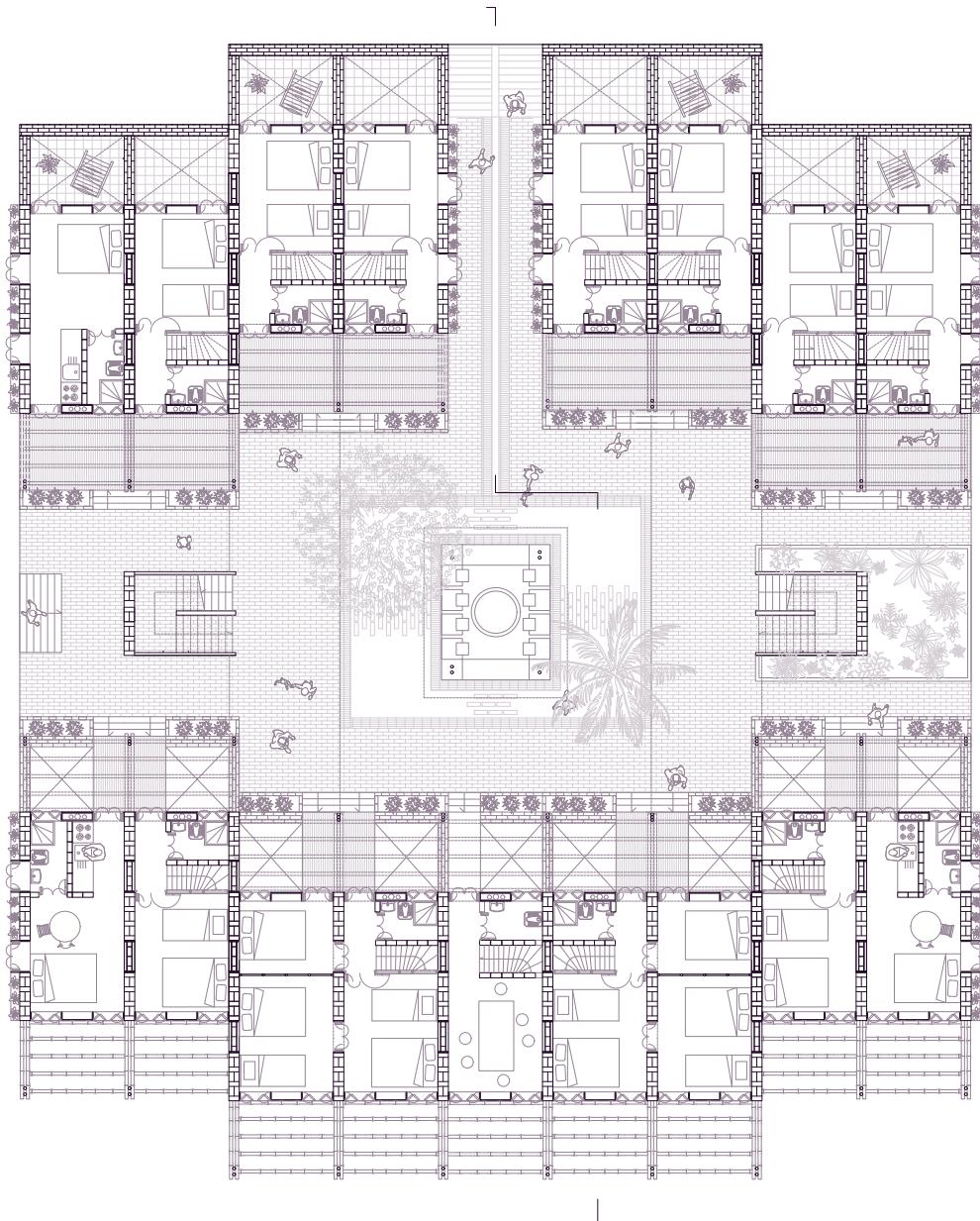


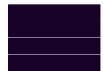
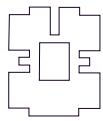


CLUSTER DESIGN

COURTYARD CLUSTER

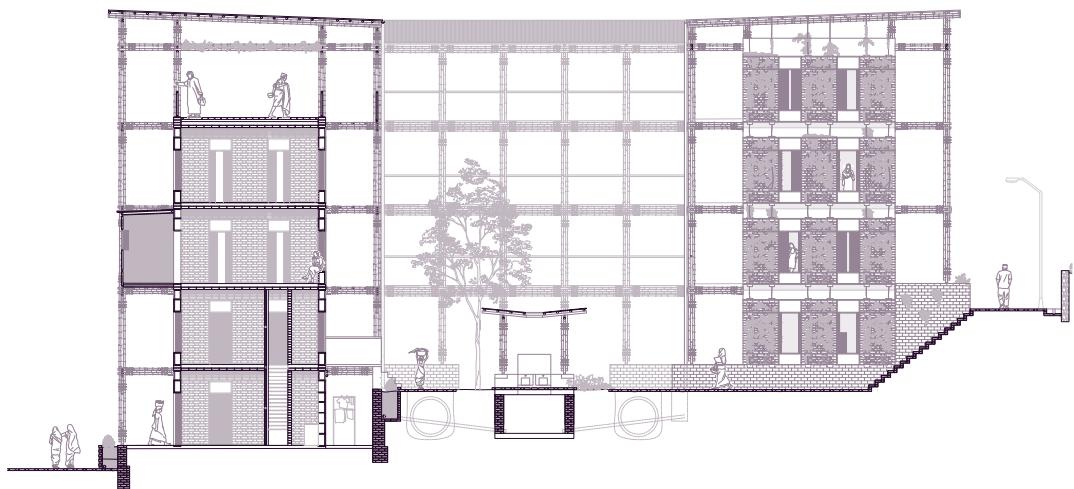


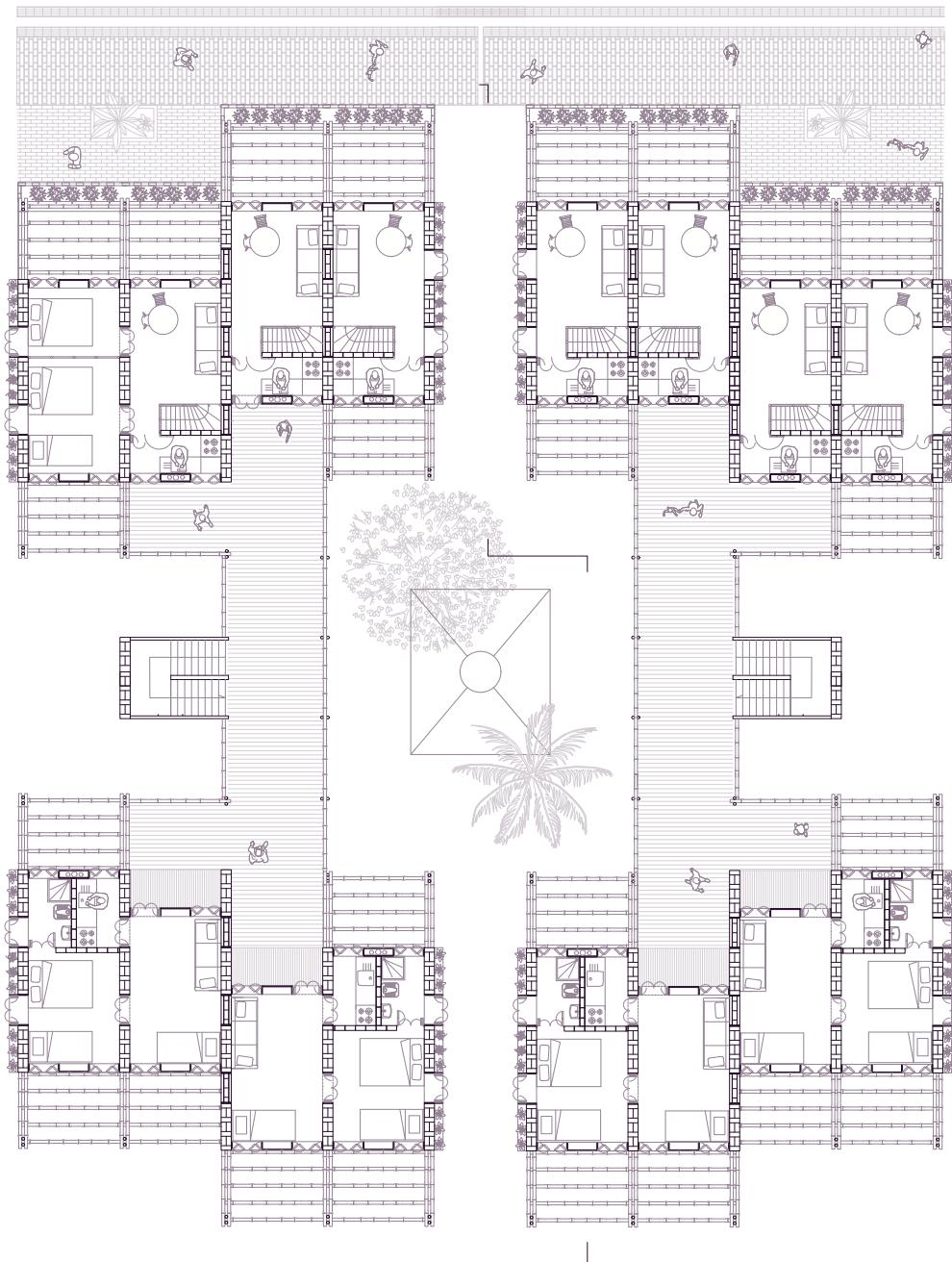


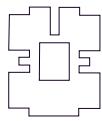


CLUSTER DESIGN

COURTYARD CLUSTER

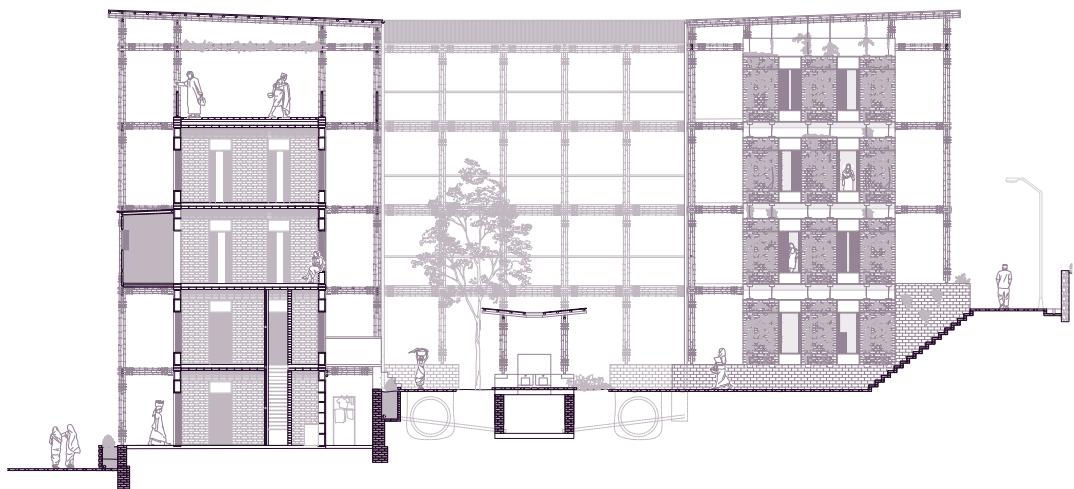


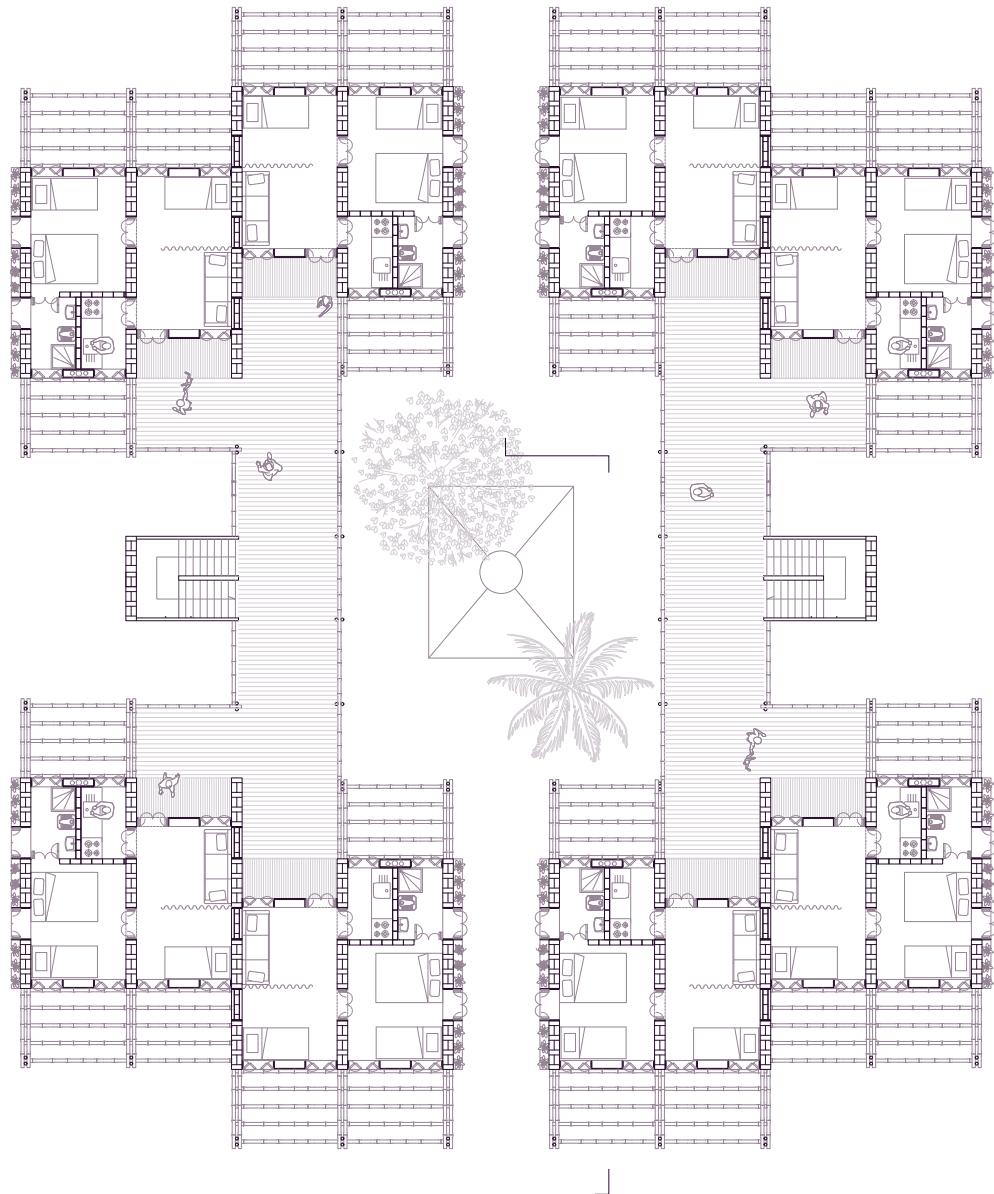


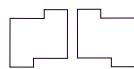


CLUSTER DESIGN

COURTYARD CLUSTER



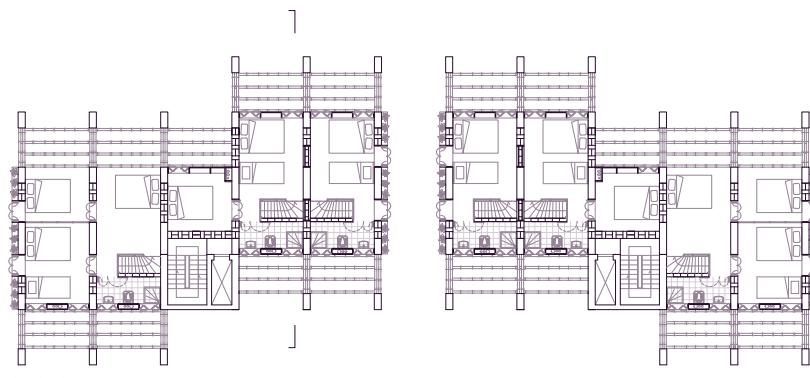




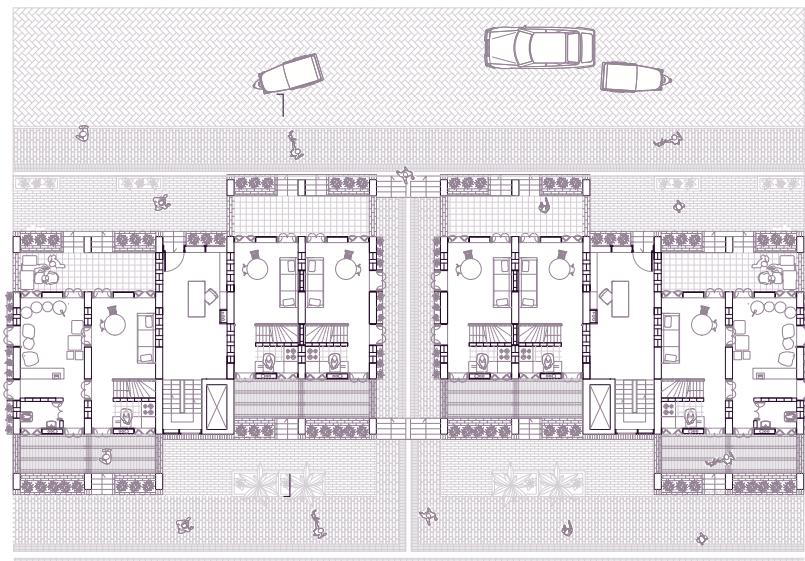
CLUSTER DESIGN

SEMI-COURTYARD CLUSTER

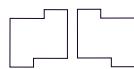




level 1- low income units
(maisonnette)

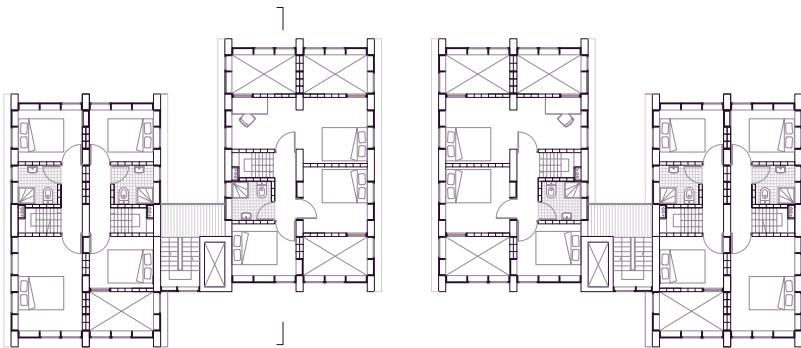


ground floor- low income units
(maisonnette)

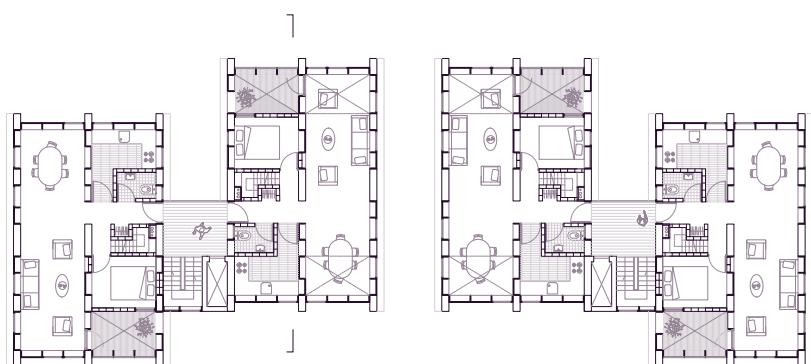


CLUSTER DESIGN

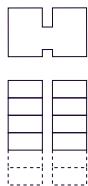
SEMI-COURTYARD CLUSTER



level 3- higher income units

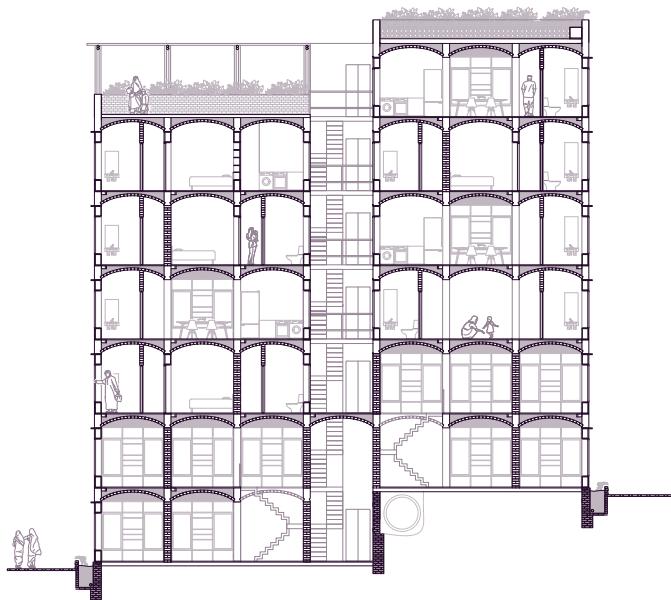


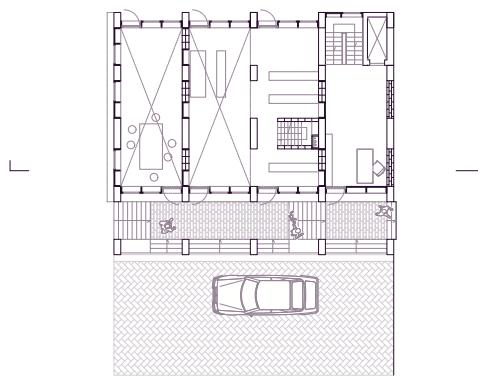
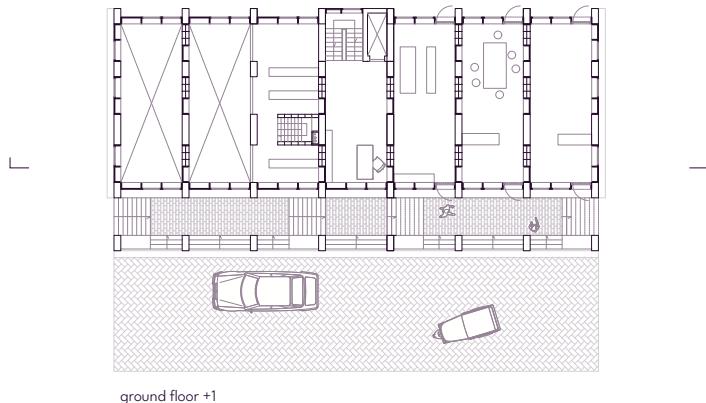
level 2- higher income units

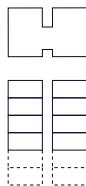


CLUSTER DESIGN

LOW RISE CLUSTER

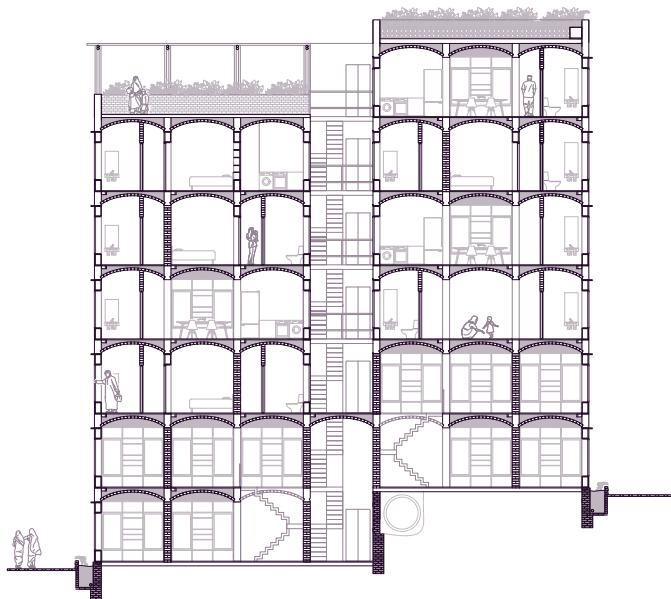


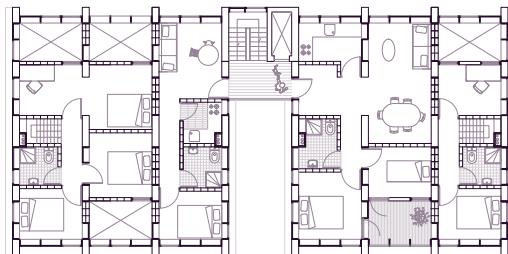




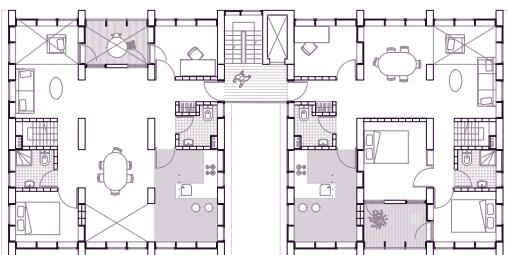
CLUSTER DESIGN

LOW RISE CLUSTER





level 2



level 1

URBAN STRATEGY

URBAN STRATEGY EXISTING

The three cluster types presented above are then implemented on site, taking into account the specific requirements of the context. By adapting each cluster type to the unique characteristics of the site, ensuring that the design aligns with contextual needs and environmental factors.



URBAN STRATEGY**LEVERING THE TOPOGRAPHY,
WATER MANAGEMENT & URBAN MIX**

The urban plan is based on a strategy aimed at redefining access to the site, linking it to the main spine and thus integrating it with the rest of the city. Following the redefinition of access, the polarity and hierarchy of spaces are defined with a main spine linking the main avenue to the other public space: the madrasa. From this main axis, two more private pedestrian routes provide a more private distribution of access. Both paths lead to a more communal area with a community space and a park.



CURRENT ACCESS



REDEFINED ACCESS



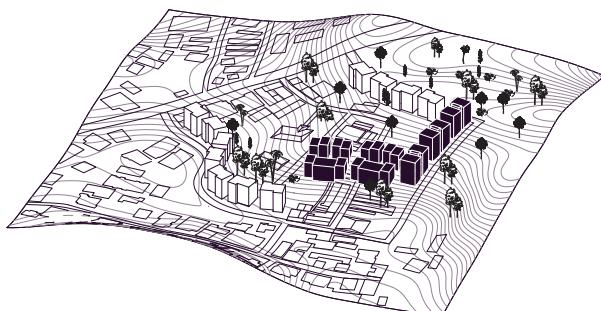
HIERARCHY OF SPACE

URBAN STRATEGY **PHASING**

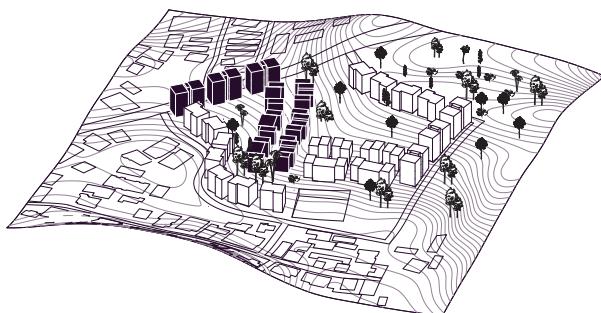
Additionally, the urban plan has been designed to avoid displacing current residents by utilizing the empty part of the site. The project begins with constructing Cluster 2 on the site's edge and vacant area. Since Cluster 2 includes low-income units on its ground floor, current residents can relocate there, enabling the redevelopment of their existing dwellings. Meanwhile, Cluster 3 will be built to accommodate higher-income groups and shops on its ground floor. This allows existing shops to temporarily move to this new location, facilitating the development of the avenue side of the site and completing the overall plan.



PHASE 1: BUILDING THE EDGES &
ACCOMODATION FOR THE CURRENT RESIDENT

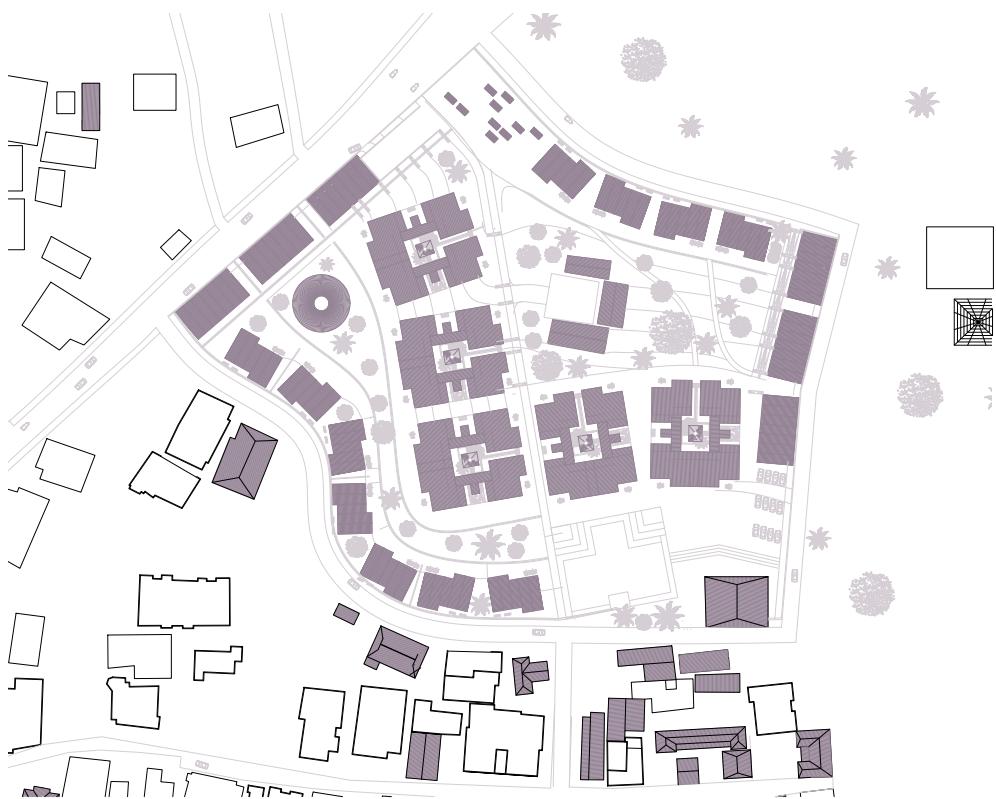


PHASE 2: HIGHER & LOWER INCOME
CLUSTER WITH AMENITIES



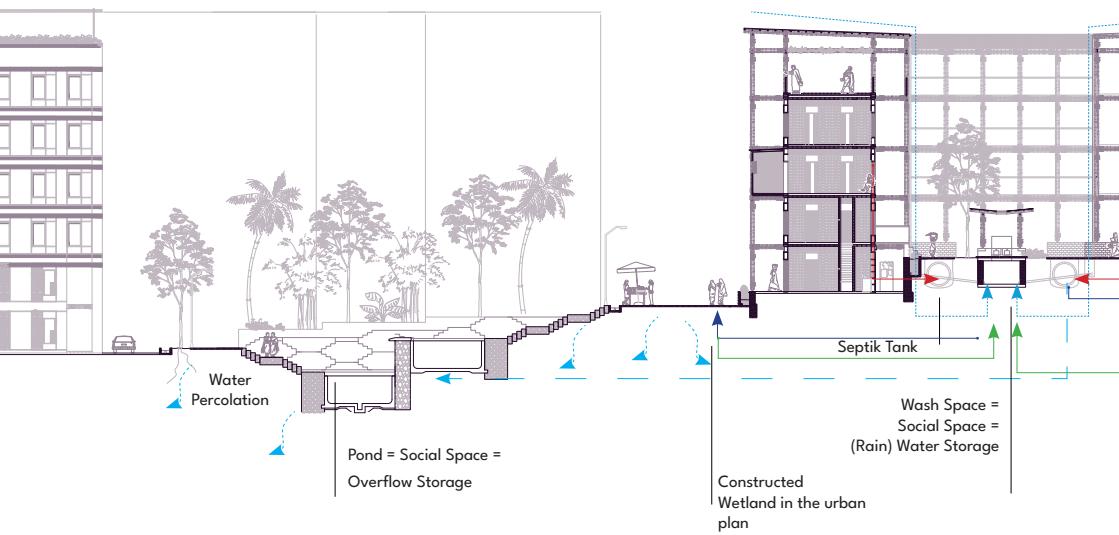
PHASE 3: CLOSING THE LOOP

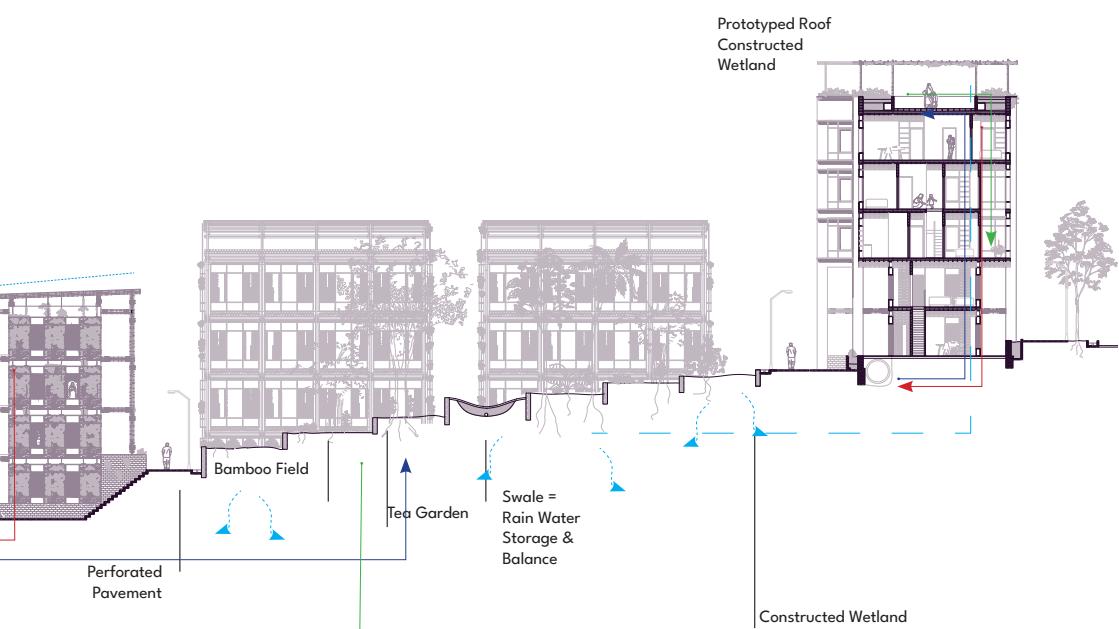
URBAN STRATEGY **PROPOSAL**



URBAN STRATEGY WATER MANAGEMENT

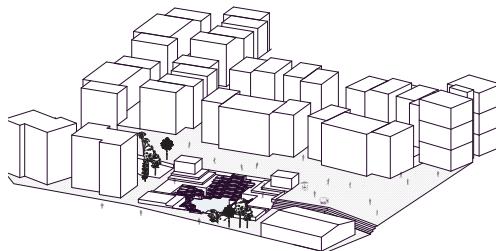
The urban plan has also been designed to integrate a complete water management system, both at cluster and urban plan level.



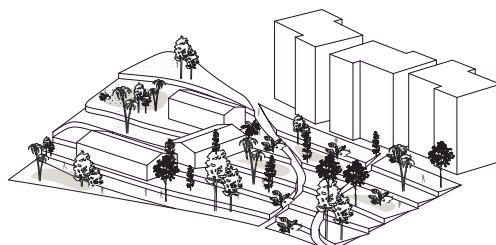


URBAN STRATEGY WATER MANAGEMENT

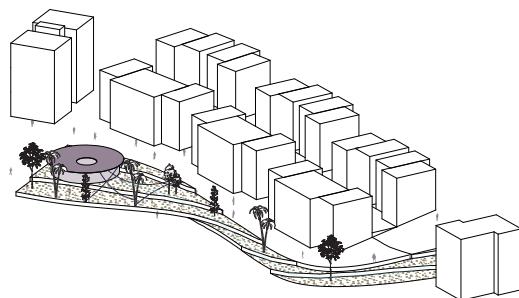
At the urban plan level, a pond has been strategically placed at the site's lowest point to function as both a water storage and overflow balance device. This pond also serves as a social and public space around the madrasa, facilitating community activities. Embracing the site's topography and existing school, a public garden has been designed, incorporating swales for water management, a tea garden for income generation, and a bamboo field to supply materials for incremental growth. Additionally, on the south-west side, a more private pedestrian green spine guides rainwater to the pond and houses a community women-led center.



THE POND
A SOCIAL AND WATER OVERFLOW SYSTEM



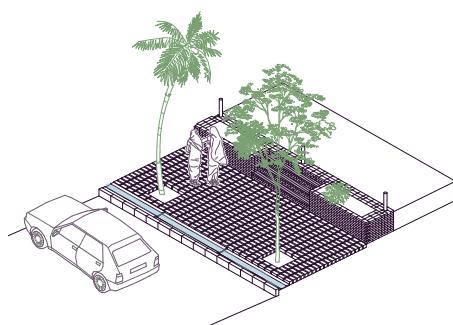
THE STEPPED GARDEN
INTERGRATING THE TOPOGRAPHY IN THE SYSTEM



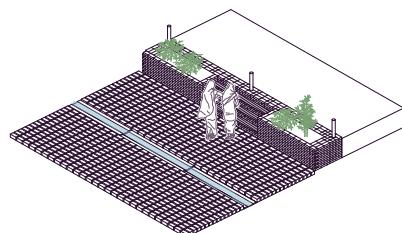
THE GREEN SPINE
GIDING THROUGH

URBAN STRATEGY WATER MANAGEMENT

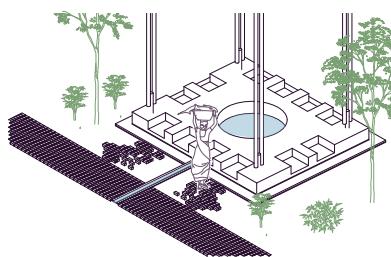
At the street scale, open drainages have been designed to keep water visible in public spaces while also delineating the boundary between the site and its surroundings. The water management design extends to the cluster scale, where wash spaces in the courtyards of low-income clusters serve as rainwater storage areas and community spaces.



THE CAR STREET
SITE LIMIT



THE PEDESTRIAN PATH
LEAVES WATER VISIBLE



THE COURTYARD
COMMUNITY SPACE

URBAN STRATEGY SEWAGE TREATMENT

Finally, the project's water management strategy includes treating raw water through constructed wetlands at both the urban and cluster scales. Each cluster is designed to incorporate its own constructed wetland. To ensure the efficiency and effectiveness of this treatment, each cluster can also be connected to the constructed wetlands in the urban plan, which are located around the stepped garden and along the green spine.

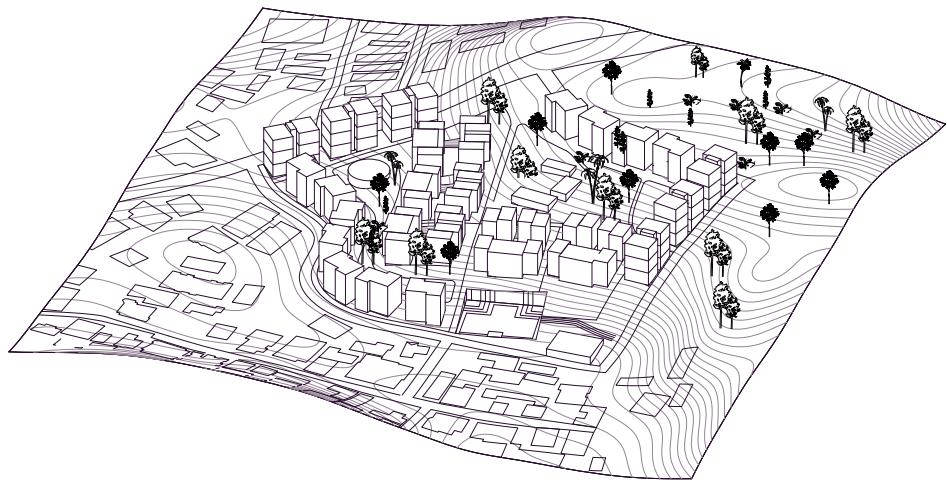


**THE CONSTRUCTED WETLAND
AS PART OF THE URBAN LANDSCAPE**

GENDER-BASED APPROACH

**GENDER-BASED
APPROACH****CURRENT VS PROPOSAL**

The project's versatility, efficiency, and replicability allow for the densification of the site while providing better living conditions in the urban fabric for various income groups through a gender-based approach to ubran housing design.



	M ² /PERSON	INCOME MIX	RESIDENTIAL DENSITY	POPULATION DENSITY	FSI	GSI
EXISTING	2	0%	133 units/ha	298 hab/ha	0,36	0,26
PROPOSAL	15	50%	181 units/ha	672 hab/ha	1,72	0,38

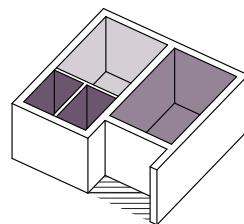




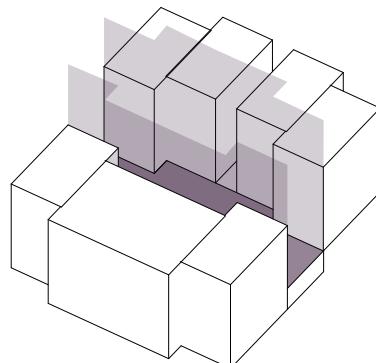
GENDER-BASED APPROACH

LAYERS OF PRIVACY

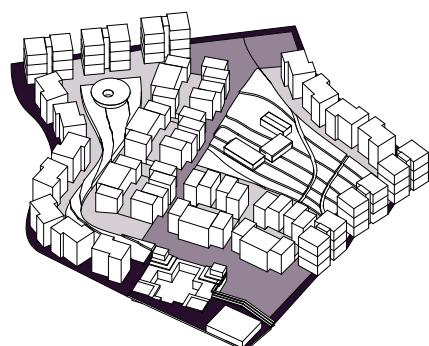
From the unit to the neighborhood scale, different layers of privacy have been implemented. At the unit scale, the hierarchy of rooms aims to address socio-cultural adequacy while avoiding the segregation of space for women. At the cluster scale, the courtyard defines a threshold between public and private space, providing women and girls, who spend most of their time at home, with a safer and better environment. At the neighborhood scale, the hierarchy of streets and the delineation of public and private areas have a significant impact on the security and sense of safety for vulnerable groups.



UNIT
hierarchy of room



CLUSTER
courtyard

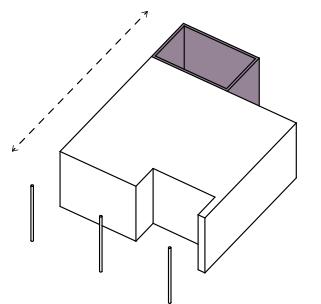


NEIGHBORHOOD
hierarchy of spaces

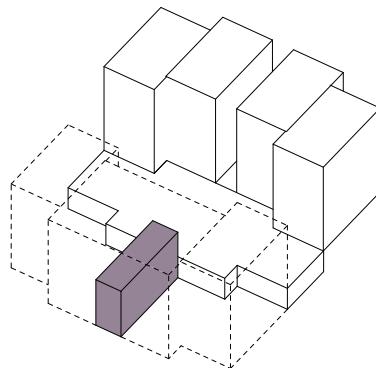
GENDER-BASED APPROACH

ECONOMIC OPPORTUNITIES

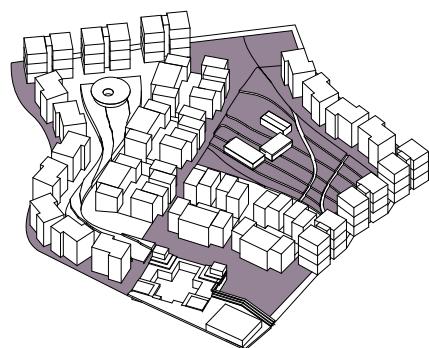
By providing opportunities for extension, the project creates space for income generation among residents. They can choose to expand their homes for larger living areas or to add extra spaces that could function as shops if connected to the street, or workshop space enabling income generation. At the cluster scale, communal spaces are always included to allow the community to generate income, such as through a community kitchen or by hosting meetings and events. The money generated can be used to maintain communal facilities like wash areas and bamboo galleries.



UNIT
extension



CLUSTER
communal space

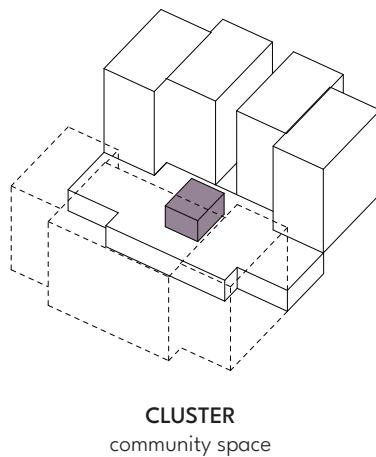
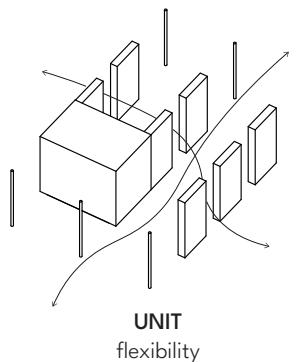


NEIGHBORHOOD
connection to public space
+ tea garden

GENDER-BASED APPROACH

EMPOWERMENT

By allowing flexibility at the unit scale and fostering community engagement through the implementation of a community space at the cluster scale, the design aims to empower the community and create a more inclusive and safer living environment at every scale. At the unit scale, flexibility enables residents to adapt their living spaces according to their needs, promoting autonomy and appropriation. Meanwhile, the community space at the cluster scale serves as a focal point for social interaction, activities, and collective initiatives, strengthening social ties and promoting a sense of ownership.







A SYNTHESIS OF A JOURNEY





REFLECTION



© Gaboni Sweeper Colony, Dhaka, Bangladesh
(Author, October 2023)

Beyond Academia: Architecture's Role in Addressing Urbanization and Migration Challenges

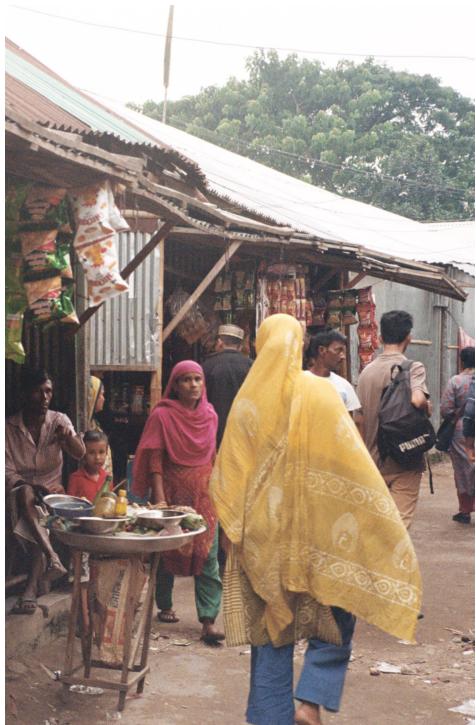
In an increasingly urbanized world, the global challenge is to ensure that cities provide safe and healthy living environments, thriving economies and social benefits for diverse groups for generations to come. Today, more than half the world's population lives in urban areas, with almost 90% concentrated in Asia and Africa. The trend towards urbanization is set to continue, with city dwellers expected to account for 68% of the world's population by 2050. When examining the drivers of urban growth, one of the main factors to consider is urban migration.

Today, in Bangladesh as in global migration trends, economic factors such as employment opportunities and social considerations such as marriage and education are the main drivers of migration. However, the influence of climate change and the resulting alterations will amplify the emergence of an ongoing trend, characterized by environmental migration. Meanwhile Bangladesh is already highly vulnerable to climate change, with 171 devastating natural disasters between 1970 and 2005 (WEDO, 2008), the consequences of climate change are unprecedented and will have socio-economic repercussions such as loss of livelihoods, effect on food security, damage to human settlements and infrastructure, access to job opportunities, education, resources as well as access to adequate and affordable housing. As a result, these impacts underline the urgent

need to address the consequences of natural and man-made disasters on human settlements and access to housing.

Because everyone is different in terms of knowledge, skills, power relations, gender roles, health, wealth, race/ethnicity, age, physical abilities and disabilities, migration and its impacts have disproportionate consequences (GSC, 2008). Thus, the ability to anticipate, cope with, resist and recover from the impact of a natural hazard or an economic-induced migration depends on one's vulnerability. As such, women and girls are disproportionately affected by urbanization challenges due to their economic, social, and health vulnerabilities. Urbanization has exacerbated gender disparities in urban contexts, limiting women's and girls' access to resources, education, employment, and services. In Bangladesh, gender disparities and related problems persist in various aspects of life, from education and healthcare to violence against women and early marriage. These problems are deeply rooted in cultural practices and societal norms. Men have a stranglehold on land ownership, decision-making roles, production, leadership and trade, while women face constraints linked to restrictions on their mobility known as Purdah, cultural norms, legal constraints and the dominant influence of the Islamic faith.

As such, the graduation project tackles the pressing challenge of the strain on affordable housing in densely populated cities caused by rural-to-urban migration. It delves deeper, examining how these migrations often transport existing gender inequalities, which are then exacerbated by inadequate living conditions and access to resources, education, services and employment opportunities in these new environments. By exploring the positive effects of a gender-based approach to urban housing design on social integration, economic growth, and sustainability for all, the graduation project aligns with the thematic focus of the Global



© Living Conditions of the Urban Poor, Dhaka, Bangladesh (Author, October 2023)

Housing Studio as well as with the Architecture master track of the MSc Architecture, Architecture, Urbanism and Building Sciences. Moreover, the project could contribute to the collective knowledge base on affordable housing design in mid-sized cities such as Sylhet in Bangladesh, in an attempt to enhance the regional redistribution of urban strategies towards mid-sized cities with high attractiveness potential in response to the ongoing urban growth.

Design through Research

The research involved various methods, including literature review, fieldwork, case study analysis, and feasibility studies, each

significantly influencing design decisions. During the site visit in October 2023, surveys and discussions with residents allowed to identified problems and needs faced by the residents. When moving to the the city in search of better living conditions, migrants often find homes in substandard rental housing built by private owners using low-tech methods. This results in urban pockets of overcrowded settlements called 'colony' where residents face inadequate, unhygienic, unsafe living conditions, with little access to resources and services and difficulties in adaption. In addition, the site analysis provided a better understanding of cultural practices. In a country where religion plays a major role in lifestyle and daily practices, the impact of cultural analysis was necessary to address the socio-cultural appropriateness of the project. The research highlighted the cultural restrictions faced by women and girls. With this in mind, the design was developed to accommodate existing societal practices rather than attempting to change them, aiming to provide a more effective solution within the current context.

Additionally, the framework of this research was provided by an analysis of the literature, which offers a wealth of information on the health problems of women and adolescents, as well as on general living conditions in the informal settlements of the city of Sylhet. However, data on women who have migrated to Sylhet are still very incomplete. Moreover, articles dealing with the influence of women's empowerment on poverty reduction in Bangladesh and worldwide gave solid guidelines for the development of the design and the understanding of how housing development project can go beyond housing simply considering the living space, by considering the living environment as a whole to create opportunities for economic and social development for all. The housing units become then more than a living space and are linked to income-generating spaces, access to local

amenities, shared spaces and green areas.

The analysis of case studies and affordable housing programs in Bangladesh and around the world provided valuable insights into the project's feasibility, in terms of space requirements, building cost and managerial strategy. Additionally, climate and water management systems as well as structural opportunities, with more sustainable building materials, like compressed stabilized earth block were analyzed to provide an adequate and effective design.

The graduation year has been a long journey leading to the final design, involving numerous design decisions to address the project's challenges in a balanced way, ensuring both efficiency and resilience. Initially and naively, the simplest goal was to provide better living conditions for residents. However, as the design progressed, it became clear that feasibility required considering certain realities. The challenge then was to strike the right balance, ensuring that the spaces retained their quality while being affordable enough to make the project viable and buildable.

Methodology, Replicability and Global Challenges

Access to housing is a primary concern that architect, urbanist and policy makers are continually confronting with, but with almost half the world's population expected to be living in informal settlements by 2050, the demand for affordable housing is far from being met. Accordingly, great importance was attached during the design process to the replicability of the design in other locations without compromising the design's quality. The analysis of case study addressing similar challenges was an important methodological approach in the design process. The case studies all highlighted the importance of spatial hierarchy, from cluster spaces to community areas, and the differentiation between public and private access, car streets, and pedestrian pathways. They also underscored the need for socio-cultural adequacy and flexibility in dwelling units resulting in a wider range of typology. Thus, the transferability and feasibility of the graduation project rely on establishing a replicable system that encompasses three building types, facilitating a mix of typologies and incremental growth adaptable to varying

© Rickshaw Drivers, Dhaka, Bangladesh
(Author, October 2023)



needs and resources.

Each building type is designed to allow for flexibility through its load bearing structure and give the possibility of extension for incremental growth for low-income units. Each low-income units are provided with core housing elements such as bathrooms, kitchens, and flexible spaces that can be adapted as living areas, bedrooms, or income-generating spaces based on residents' needs. The project's flexibility aims to challenge current models of affordable housing development that use a concrete load-bearing structural grid, an open floor plan with interior masonry. As part of the project, two systems have been developed: one system implements the use of compressed stabilized earth blocks as a load-bearing element, which is a cheaper and more sustainable building material for low-rise affordable housing development. The implementation could be done in situ and involve the local population in the construction process. On the other hand, the second system relies on the use of linear grid of concrete columns for medium and high-rise buildings requiring imported materials, technological structure and specialized skills, but it is also the system most widely used to build higher buildings in

Bangladesh. Thus, the combination of the two building systems enables a more feasible yet innovative approach to affordable housing design that could easily be transferred to other projects in Bangladesh and around the world. The use of more environmentally-friendly building materials, such as compressed stabilized earth blocks, offers opportunities to reduce the cost of building materials, making housing development more affordable and sustainable. This earth construction technique has already been implemented in Africa, Asia and Latin America.

Moreover, like many informal settlements in Asia, Latin America, and Africa, these areas are often illegally developed on hilly parts of cities because such lands are considered non-buildable by the government. Consequently, affordable housing solutions for these informal settlements must consider topography as a key criterion in the design development. The graduation project aims use the hilly location of the project to its advantages, emphasizing the design potential of working with the topography to create better living conditions and incorporate a water management system that benefits the entire community.

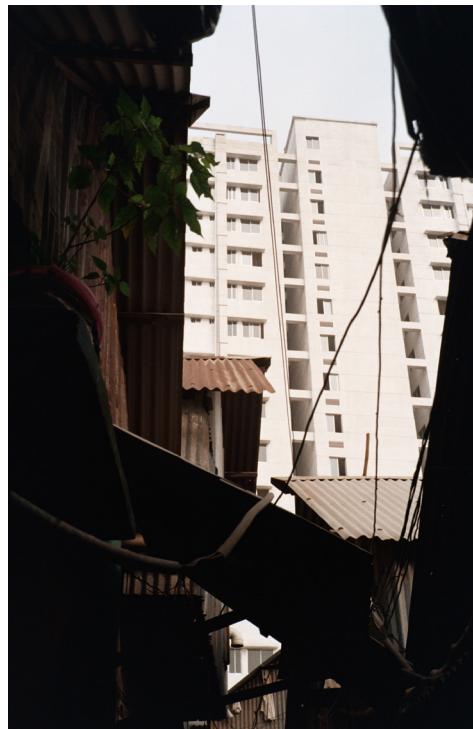
© Sweepers Colony, Dhaka, Bangladesh
(Author, October 2023)



Finally, to make the project feasible in view of the reality of the housing market in Bangladesh, the project relies on a management strategy based on cross-substitution with the implementation of various stakeholders. Like the majority of the land market in Bangladesh, the project site is privately owned. The landowner has provided the urban migrants with low-tech housing structures from which to generate income. To ensure the landowner has a financial incentive to improve housing conditions for tenants, half of the site will be sold to a private real estate developer who will create a development for low, middle, and high-income individuals, while the other half will be developed to provide affordable housing for current residents and incoming migrants. This approach makes the project viable, and easily replicable, benefiting all parties involved.

The role of the Architect

This topic holds significant relevance in today's context, given the escalating crises, ranging from economic and climatic to political and social. Although strategically positioned within a specific context, the work adopts a global perspective, aspiring to understand the vulnerabilities and capacities of individuals to cope with migration and adapt to new environments. While focusing on the development of housing for the urban poor, I seek to examine the role of the architect in such contexts. From its mediator side to its engineer skills, the architect is closely involved in bringing together diverse components to provide and ensure the most sustainable living environment possible, without discrimination. Going beyond the conventional boundaries of housing design, this graduation project seeks to interrogate gender related issues and aims to integrate economic, social and environmental opportunities. The aim is to empower local communities in a holistic way, promoting benefits that extend beyond the immediate project and positively impact the community. In addition,



© Government-Provided Housing building in contrast with the settlement, Dhaka, Bangladesh (Author, October 2023)

the project opens the discourse on the question of the positionality particularly as regards a European student designing a project in a foreign context with limited time and experience on site. This aspect invites a critical examination of the cultural, social and ethical considerations inherent in the design process, exploring the implications and responsibilities associated with designing in a cultural context distinct from one's own.

REFERENCES



© Pond in the center of the urban fabric,
Dhaka, Bangladesh (Author, October 2023)

Ahmad, N. (2012) 'Gender and Climate Change in Bangladesh, The Role of Institutions in Reducing Gender Gaps in Adaptation Program', Social Development Working Papers 126.

Alam, K. and Md. H. Rahman (2014) 'Women in natural disasters: A case study from southern coastal region of Bangladesh', International Journal of Disaster Risk Reduction 8: 68–82.

Alston, M. (2013) 'Women and adaptation', WIREs Clim Change 4: 351-358, doi: 10.1002/wcc.232

Alston, M. (2015) Women and Climate Change in Bangladesh, New York: Routledge.

Amirapu A. and M. Niaz Asadullah and Zaki Wahhaj (2022) 'Social barriers to female migration: Theory and evidence from Bangladesh', Journal of Development Economics 158

Andrew, M., Dhushyanth, R., Nistha, S. (2007) 'Gender Equality, Poverty and Economic Growth,' Policy Research Working Paper, no. 4349. World Bank, Washington, DC, <http://hdl.handle.net/10986/7321>

Angeles, G., Lance, P., Barden-O'Fallon, J. et al., (2009), 'The 2005 census and mapping of slums in Bangladesh: design, select results and application,' International Journal Health Geogr 8, 32 <https://doi.org/10.1186/1476-072X-8-32>

Asadullah M N. and Wahhaj Z. (2016) "Missing from the Market: Purdah Norm and Women's Paid Work Participation in Bangladesh," IZA Discussion Paper Series, no. 10463, pp. 3-7.

Atewologun, D., (2018), 'Intersectionality Theory and Practice' Oxford Research Encyclopedia of Business and Management, accessed 13 Nov. 2023 from <https://oxfordre.com/business/view/10.1093/acrefore/9780190224851.001.0001/acrefore-9780190224851-e-48>.

Azim, S. (2001) Naripokkho's Pilot Study on Violence against Women in Bangladesh, Dhaka, Naripokkho.

Begum, A. (2017) 'Review of migration and resettlement in Bangladesh: effects of climate change and its impact on gender roles,' DECCMA Working Paper, Deltas, Vulnerability and Climate Change: Migration and Adaptation, IDRC Project Number 107642. Available from: www.deccma.com.

Bhattacharjee, P. (2016) 'Microcredit among Slum Women in Sylhet: A Qualitative Analysis', International Journal of Social Work and Human Services Practice 4, no.2, 42-49.

Bennett, J. (2009) 'A gender analysis of national poverty reduction strategies', Agenda 81, 48-63

Black R., W. Neil Adger, Nigel W. Arnell, S. Dercon and A. Geddes D. S.G. Thomas (2011) 'The effect of environmental change on human migration', Global Environmental Change 21S.

Cannon, T. (2002) 'Gender and climate hazards in Bangladesh', Gender and Development 10, no. 2.

Centre For Global Change (CCC) (2009) Climate Change, Gender and Vulnerable Groups in Bangladesh. Climate Change Cell, DoE, MoEF; Component 4b, CDMP, MoFDM. Dhaka.

Chowdhury, F. (2009) 'Theorising patriarchy: The Bangladesh context', Asia Journal of Social Science, 37: 599-622.

Connell, R.W (2011) Confronting Equality: Gender, knowledge and global change, Sydney: Allen & Unwin.

Cornwall, A., (2016) Women's empowerment: What works. J. International Development 28, 342–359.

Dankelman, I. (2010) 'Introduction: Exploring gender, environment and climate change', Gender and Climate Change: An Introduction, Irene Dankelman (ed.), London: Earthscan, pp. 1-20.

Denton, F. (2002) 'Climate change vulnerability, impacts, and adaptation: why does gender matter?', *Gender and Development* 10, no. 2.

Deshwara, M. "Duck farming now a saviour for many haor women," *The Daily Star*. Mar. 9, 2018, <https://www.thedailystar.net/country/duck-farming-now-saviour-many-haor-women-1545478>. (accessed Sep. 23, 2023).

Dhar, S. (2023) 'Economic Globalisation and Women's Economic Empowerment in Bangladesh: An Econometric Approach', *Journal of Economic Theory and Practice* 1-29, Department of Economics, University of Calcutta.

Doepke, M., Tertilt M. (2014), 'Does Female Empowerment Promote Economic Development?' Nber Working Paper Series 19888, National Bureau Of Economic Research, Cambridge, Massachusetts, USA.

Duffy, K. (1995), Social exclusion and human dignity in Europe. Strasbourg: Council of Europe.

Enarson, E. (2000) Gender and Natural Disasters, Recovery and Reconstruction Department, Geneva.

Enarson, E. (2002) 'Building disaster resilient communities: learning from community women,' Statement for the UN Commission for the Status of Women 46th session, panel discussion on Environmental Management and Mitigation of Natural Disasters: a Gender Perspective, available from: <http://www.un.org/womenwatch/daw/csw/csw46/panel-Enarson.pdf>

Enarson, E. (2009) Women, Gender and Disaster, Thousand Oaks, CA: Sage Publications.

Enarson, E. (2012) Women Confronting Natural Disaster : From vulnerability to resilience, Boulder, CO: Lynne Reinner Publishers.

Food and Agriculture Organization (FAO) (2007b) Women, Agriculture and Food Security, Rome, FAO.

Ghafur, S. (2002) 'Gender implications of space use in home-based work: Evidences from slums in Bangladesh', *Habitat International* 26: 33-50 DOI: 10.1016/S0197-3975(01)00032-7

Hadi, A. (2001) 'International Migration and the Change of Women's Position among Left Behind in Rural Bangladesh', *International Journal of Population Geography* 7(1):53 - 61, DOI:10.1002/ijpg.211.

Hans, A. and Rao, N. and Prakash A. and Patel A. (2021) Engendering Climate Change, Learning from South Asia, Oxon : Routledge

Hussain, M. M., & Wakkas, M. A. (2019). 'Health care practices of slum dweller adolescent girls in Bangladesh: The case of Sylhet city'. *Advances in Social Sciences Research Journal*, 6(12) 43-54.

Halima Begum, M. (2015), 'The Causes, Consequences and Remedies of Feminization of Poverty: A Perception Study in Sylhet City'. *Bangladesh Research Publications Journal* 11(2), 112-118, retrieve from <http://www.bdresearchpublications.com/admin/journal/upload/1410069/1410069.pdf>

Hiramoni F. A., (2023) "Quality of life among women living in Haor Basin in Bangladesh and its socio-economic predictors," *International Journal of Public Health Science (IJPHS)* 12, no. 3, pp. 973-980.

International Labor Organization (ILO) (n.d.) Climate Change and Human Mobility in Bangladesh.

International Women's Democracy Center (2008) Fact Sheet, Women's Political Participation, available from: www.iwdc.org/resources/fact_sheet.htm

Inter-Parliamentary Union, UN Women (2019) "Women in Politics:2019", Maps.

Islam, M. and Sultana, N. (2019) 'Risk factors

for pregnancy related complications among urban slum and non-slum women in Bangladesh', BMC Pregnancy and Childbirth 19:235, <https://doi.org/10.1186/s12884-019-2392-6>

Islam, N. and Raihan, H. and Begum, H. (2016) 'Hygienic Behavior of Migrated Women and Health Status: A Study on Urban Slum in Sylhet City of Bangladesh', Journal of Business, Society and Science 4.

Istiak Anik S. and Khan M. A. S. A., (2012) "Climate change adaptation through local knowledge in the north eastern region of Bangladesh," Mitig Adapt Strateg Glob Change, no. 17, pp. 879-896.

Jhuma, F. (2023). 'Women Empowerment Sustainability in Informal Economic Activities: The Role of Microcredit in the Sub-urban Areas in Sylhet, Bangladesh.' The Jahangirnagar Review. <https://doi.org/10.1080/13547860.2012.640019>

Kelly, P.M and W. N. Adjer (2009) 'Theory and practice in assessing vulnerability to climate change and facilitating adaptation,' Adaptation to Climate Change, E. Lisa F. Schipper and Ian Burton (eds), London: Earthscan pp. 161-186.

Khan, A.U. and Hossen, A and, Sharmin, Z. and Jannatul Kubra, T. (2015) 'Displacement and Deplorable Living Conditions of Slum Dwellers: With Special Reference to Sylhet City,' International Letters of Social and Humanistic Sciences 46: 51-64, doi:10.18052/www.scipress.com/ILSHS.46.51

Khan, Md., M., H.; Kraemer, A. (2008). 'Socio-economic factors explain differences in public health-related variables among women in Bangladesh: A cross-sectional study'. BMC Public Health 8:254

Khanum R. Al Mahadi M. S., (2016) "Economic Empowerment of Haor Women through Duck Farming in Bangladesh," The Agriculturists 13, no. 1, pp. 18-25.

Khanom S, Tanjeela M and Rutherford S (2022) 'Climate-induced migrant's hopeful journey toward security: Pushing the boundaries of gendered vulnerability and adaptability in Bangladesh,' Front. Clim. 4:922504. doi: 10.3389/fclim.2022.922504

Koko Warner & Tamer Afifi (2014) 'Where the rain falls: Evidence from 8 countries on how vulnerable households use migration to manage the risk of rainfall variability and food insecurity', Climate and Development, 6:1, 1-17, DOI: 10.1080/17565529.2013.835707

Lane, R. and McNaught R. (2009) 'Building gendered approaches to adaptation in the Pacific, Gender and Development, 17(1): March 67-80.

Lee, E. S. (1966) 'A theory of migration,' Demography 3(1), 47-57. <https://doi.org/10.2307/2061645>

McKinsey Global Institute (2015) 'The Power Of Parity: How Advancing Women's Equality Can Add \$12 Trillion To Global Growth', McKinsey & Company.

Mosedale, S., (2005) 'Assessing women's empowerment: Towards a conceptual framework,' Journal International Development 17, 243-257.

Ministry of Planning, Statistics and Informatics Division (SID), Bangladesh Bureau of Statistics (BBS), (2016) *Report on Violence Against Women (VAW) Survey 2015*, Agargaon, Dhaka.

Ministry of Planning, Statistics and Informatics Division (SID), Bangladesh Bureau of Statistics (BBS), (2022) *Demography and Health Wing and UN Women, Preliminary Report on Time Use Survey (TUS) 2021*, Agargaon, Dhaka.

Ministry of Water Resources, Bangladesh Haor and Wetland Development Board, (2012) *Master Plan of Haor Area*, Gulshan, Dhaka.

Nahar, S.; Banu, M.; Nasreen, H., E. (2011). 'Women-focused development intervention

reduces delays in accessing emergency obstetric care in urban slums in Bangladesh: a cross-sectional study,' BMC Pregnancy and Childbirth 11:11.

Neumayer, E. and Pluemper, T. (2007) 'The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy 1981-2002'.

Njuki, J.; Eissler, S. ;Malapit, H.; Meinzen-Dick, R.; Bryan, E.; Quisumbing, A, (2022), 'A review of evidence on gender equality, women's empowerment, and food systems,' Global Food Security 33, <https://doi.org/10.1016/j.gfs.2022.100622>.

Pearse, R. (2017) 'Gender and climate change,' WIREs Clim Change 8: 451, doi: 10.1002/wcc.451

Pender, J.S (2008) 'What Is Climate Change? And How It Will Effect Bangladesh?', Briefing Paper (final draft), Church of Bangladesh Social Development Programme, Dhaka.

Raihan, H., Islam, N., Rouf, A., Begum, A., Rahman, M., Murad, S., and Das, S. (2014) 'Health Care Situation of Migrant Slum Women: Evidence from Sylhet City of Bangladesh,' Bangladesh e-Journal of Sociology 11 (1)

Robeyns, I., Morten Fibieger Byskov. (2023) 'The Capability Approach', The Stanford Encyclopedia of Philosophy (Summer 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), accessed from <https://plato.stanford.edu/archives/sum2023/entries/capability-approach/>

Roy, A. (2023) 'Women, Marriage and Migration in the Bangladeshi Enclaves in the India-Bangladesh Borderland', India Quarterly 79(1) 93-108, DOI: 10.1177/09749284221146753

Rustagi, P. (2005) 'Challenges For Economic Empowerment Of Women In South Asia,' Institute For Human Development New Delhi, Working paper no. 29.

Shadid Sams, I. (2019) 'Impacts of Climate Change Induced Migration on Gender: A Qualitative Study from the Southwest Coastal Region of Bangladesh', International Journal of Social Science Studies 7, no. 4.

UN Division for the Advancement of Women (2004) Making Risky Environments Safer, Women building sustainable and disaster-resilient communities, New York: United Nations Publications.

United Nations Children's Fund (2020), *Ending Child Marriage: A profile of progress in Bangladesh*, New York: UNICEF.

UN Women, Shamim, I. and Holliday, J. (2018) Women And Migration In Bangladesh, UN Women.

UNHCR (2005) The World's Women 2005: Progress in statistics, available from <http://unstats.un.org/unsd/demographic/products/indwm/wwpub.htm>

UNICEF (2010) Women and Girls in Bangladesh, Dhaka: UNICEF Bangladesh

UNICEF (2013) 'The Millennium Development Goals,' available from: www.unicef.org/mdg/gender.html

Vijay M. S. (2010). 'Does illiteracy influence pregnancy complications among women in the slums of greater Mumbai,' International Journal of Sociology and Anthropology, 2(5):82-94.

Wei, W., Sarker, T., Żukiewicz-Sobczak, W., Roy, R., Alam, G. M. M., Rabbany, Md. G., Hossain, M. S., & Aziz, N. (2021) 'The Influence of Women's Empowerment on Poverty Reduction in the Rural Areas of Bangladesh: Focus on Health, Education and Living Standard,' International Journal of Environmental Research and Public Health 18(13), <https://doi.org/10.3390/ijerph18136909>

Women's Environment and Development Organisation (WEDO) (2008) Gender, Climate Change and Human Security: Lessons from

Bangladesh, Ghana and Senegal, New York: WEDO.

World Bank. (2000) World Development Report 2000/2001: Attacking Poverty (World Bank: Washington, DC, USA)

Zaman, H (1999) 'Violence against women in Bangladesh: Issues and responses', *Women's Studies International Forum* 22(1): 37-48.



GRADUATION REPORT
MARION ACHACH