SHIFTING HOMES

Exploring how to integrate the housing needs of rural-urban migrants into a modular design system to reduce the current and expected affordable housing shortage in Sylhet.

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Research plan
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Shifting Homes: Integrating the specific housing needs of rural-urban migrants
into a modular design system to reduce the current and expected affordable housing shortage in Sylhet.

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CONTENTS

01. **INTRODUCTION**

Bangladesh is highly vulnerable to extreme climate events such as droughts, heavy rainfall, tropical cyclones, and storm surges due to its physiographical location (Rawlani & Sovacool, 2011). Climate change worsens the frequency of these disasters (Moniruzzaman et al., 2018; Rana & Ilina, 2021), resulting in extreme migration. Every year, hundreds of thousands of climate migrants must evacuate due to both sudden-onset disasters, such as cyclones, floods, river erosion, and landslides, and slow-onset disasters, such as sea-level rise and salinization (McDonnell, 2019).

Natural disasters significantly contribute to rural-urban migration in Bangladesh by undermining agricultural productivity and triggering food crises. These events leave rural populations without stable employment, forcing many to migrate to urban areas in search of work (Anik & Khan, 2012). While environmental factors play a role, economic reasons remain the primary drivers of this migration, particularly the availability of job opportunities in cities (Hossain, 2001).
In rural regions, growing unemployment, land scarcity, and a lack of resources have intensified economic hardships, pushing many residents to seek better living conditions in urban centers (Chowdhury et al., 2012; Ullah, 2004; Hossein, 2001).

Rural-urban migration has been a major contributor to urban growth, accounting for nearly two-thirds of urban expansion (Hossain et al., 2016). Data reinforce that almost all migrants from rural poor families end up in slums (Ullah, 2004), especially those who are landless (Khan et al., 2015). However, not all migrants are able to find immediate shelter in these slums. Many start their urban lives by squatting in temporary locations, slowly attempting to secure a place in the slums. This process is often challenging, as finding accommodation in slums can be difficult without family connections or networks (Ullah, 2004).

The living conditions in slums are often characterized by poor accessibility, lack of open space, and very high population densities (Khan et al., 2015). The overall quality of urban housing in Bangladeshi cities has reached critical levels concerning residential density, occupancy ratios, and structural conditions (Khan et al., 2015). Despite these challenges, studies indicate that rural-urban migration has a positive impact on the socio-economic status of migrants. Most migrants experience improvements in their social and economic conditions after moving to cities, contributing to poverty reduction and increased livelihood opportunities (Chowdhury et al., 2012).

According to study results, rural-urban migrants report higher incomes and more properties than non-migrants, demonstrating that migration is a beneficial livelihood strategy (Hossain et al., 2016). Although migrants frequently live in substandard conditions in slums, their overall living standards increase when compared to their rural origins (Haque & Islam, 2012). For low-income groups, the location of their housing is often just as important, if not more so, than the quality of the housing itself (King et al., 2017). This represents a harsh reality, as migrants prefer closeness to economic possibilities over housing conditions, emphasizing the sacrifices they must make in the urban setting.

When focussing on the study area, the second-tier city Sylhet, is seen as the 3rd most attractive city for internal migration in Bangladesh (Arefin et al, 2021). The projections show that the city's population will increase by 155,436 people between 2024 and 2029, reaching a total of 1,154,810 residents (World Population Review, n.d.). Rural-urban migration will account for 60% to 66% of this growth, meaning that over 100,000 rural migrants are expected to move to Sylhet in the next five years (Hossein, 2001). This rapid expansion, primarily driven by rural-urban migration, demonstrates the urgent need for affordable housing to accommodate this inflow.

02. **LITERATURE REVIEW**

As Sylhet undergoes rapid urbanization, mostly driven by rural-urban migration, the city's housing crisis has become a critical concern. Mass housing has emerged as a potential solution to address the housing demands of low-income migrants. However, the effectiveness of mass housing projects, particularly in addressing the needs of rural-urban migrants, remains debated (Alao, 2009). This literature review explores the development, challenges, and potential improvements of mass housing projects in rapidly urbanizing contexts, with a particular focus on its applicability in Sylhet.

Mass housing is commonly defined as the construction of high-density, standardized housing to address housing shortages in urban areas, particularly for low-income populations (Alao, 2009). The primary advantage of mass housing is its ability to provide affordable housing rapidly, achieved through cost-effective building methods and the efficient use of labour (Dawood et al., 2020, cited in Patel & Paneria, 2021). As rapid urbanization increases demand for housing, particularly in developing cities like Sylhet, mass housing is viewed as a critical solution to accommodate growing populations and prevent the rise of informal settlements (Woetzel et al., 2014). However, while the concept of mass housing addresses the immediate need for shelter, its implementation raises significant concerns regarding quality, user satisfaction, and social integration.

A major critique of mass housing is its failure to meet the specific needs of end-users, particularly low-income migrants. The "one-size-fits-all" approach to housing design is widely criticized for prioritizing construction efficiency over residents' well-being (Beng et al., 2015). This approach often results in homes that are poorly suited to the socio-cultural and practical needs of rural-urban migrants, who may have distinct household structures, space requirements, and cultural practices (Alao, 2009; Neuwirth, 2005, cited in Khan, 2019). Mahadevia et al. (2013) emphasize that housing projects often overlook these factors because end-users are rarely involved in the planning and design process. The lack of community participation during the design phase leads to dissatisfaction, as end-users find themselves living in environments that do not reflect their needs or expectations (Mahadevia et al., 2013).

Another key issue with mass housing projects is their location on the urban periphery, where land is cheaper, making it easier to construct affordable housing (Fairus & Zairul, 2023). However, this distance from city centres often isolates low-income residents from employment opportunities and essential services, increasing social and economic challenges. Woetzel et al. (2014) and Shah et al. (2015) argue that the cost of travelling to city centres for work, combined with the social isolation caused by peripheral housing developments, limits the potential for rural-urban migrants to integrate into the urban economy. Croese et al. (2016) further note that housing closer to job opportunities in the city centre becomes unaffordable for the urban poor, forcing many into overcrowded, substandard housing or informal settlements. While mass housing has relocated many poor individuals, it has failed to provide them with quality living conditions or address underlying poverty issues (Mahadevia et al., 2013).

Literature consistently points to a significant gap between the housing provided through mass housing projects and the actual needs of the rural-urban migrants. Croese et al. (2016) highlight the increasing number of individuals in cities without access to adequate, secure, and affordable housing as evidence of the insufficiency of current housing projects. King et al. (2017) argue that the success of housing projects depends on considering residents' cognitive and socio-cultural factors, which influence their satisfaction and long-term well-being. Housing programs that incorporate participatory approaches are generally more successful because they take into account the specific needs and experiences of the end-users (King et al., 2017; Shah et al., 2015).

While the benefits of participatory housing development have been widely acknowledged, their application in large-scale housing projects remains limited (Shah et al., 2015). Mass housing projects typically continue to follow top-down approaches that neglect community involvement and fail to create inclusive housing solutions (Croese et al., 2016; King et al., 2017). Mota and Van Gameren (2018) argue that there is a need for new housing models that integrate local social and spatial practices with mass housing design. The challenge lies in developing scalable solutions that incorporate local knowledge while addressing the broader housing needs of urban populations. Small-scale participatory projects, although more inclusive, are often dismissed as insufficient to tackle the large-scale housing challenges faced by cities like Sylhet (Croese et al., 2016).

One of these mentioned benefits of mass housing projects, namely affordability, can be further addressed and strengthened through the use of modular design systems. Modular homes are constructed either partially or entirely in factories, where three-dimensional "modules" are prefabricated and later assembled on-site (Woetzel et al., 2014; Yakubu, 2024). These prefabricated homes offer a practical and affordable solution for low-income communities in Asia (Holland, 2018). Prefabricated homes have gained popularity as they can be built 50% faster than traditional homes while also reducing pollution by half (Yakubu, 2024). Moreover, the industrial production of building modules on a large scale significantly reduces costs. Standardized modules are manufactured and assembled in various configurations to meet different housing needs, offering both cost-efficiency and flexibility (Husein & Shariq, 2018) without comprimizing on quality (Smith & Narayanamurthy, 2008).

This flexibility allows users to easily customize or expand their homes as their needs evolve (Chris, 2023). This adaptability is crucial for addressing the social needs of end-users, making the homes more suitable for their lifestyles (Jimenez-Moreno, 2018). A focus on variability in design, emphasizing liveability rather than aesthetics, is essential to ensure that housing projects align with the preferences of end-users (Fairus & Zairul, 2023; Jimenez-Moreno, 2018). This flexibility through the use of modular design systems can be a way to better integrate the needs of rural-urban migrants into the design, which is a mentioned shortcoming of mass housing projects.

Based on the above literature review, the main problem addressed in this research is the inadequacy of existing housing solutions which create a big housing shortage for the rural-urban migrants in Sylhet. The current mass housing projects tend to fail to meet the needs of these migrants. The small-scale projects that do meet the needs of these migrants, aren't designed to become part of a large-scale housing project. This means that there is a research gap in finding an effective solution to integrate the needs of the end user into a large-scale housing project. By studying these needs and implementing them into a large-scale modular housing project, the goal is to reduce the affordable housing shortage for the urban poor in Sylhet.

03. **PROBLEM STATEMENT**

There is a significant gap between the houses being developed and the actual needs of the rural-urban migrants (Croese et al., 2016). The increasing number of migrants lacking adequate, secure, and affordable housing highlights the inadequacy of existing housing solutions (King et al., 2017). This will become an increasingly significant problem in Sylhet. It is expected that in the next five years, over 100,000 rural-urban migrants will move to the city, all of whom will be seeking affordable housing in the city centre, close to where they can find employment (Hossein, 2001). Addressing the issue of adequate, secure, and affordable housing in and around urban areas is crucial for improving equity, boosting economic productivity, and enhancing environmental sustainability in cities. This focus leads to a better quality of life and greater equality of opportunity, resulting in a more dynamic urban environment (King et al., 2017). Access to decent and affordable housing is vital for the health and well-being of individuals (Woetzel et al., 2014). Without sufficient affordable housing options in well-serviced areas, rural-urban migrants often find themselves living in slums on the outskirts of cities, far from essential infrastructure, social networks, and employment opportunities (King et al., 2017).

While mass housing has been proposed as a potential remedy for this housing shortage, many current projects have consistently failed to meet the specific needs of low-income migrants. These initiatives often feature standardized, "one-size-fits-all" designs that overlook the socio-cultural and spatial preferences of the urban poor (Beng et al., 2015). Although there is a broad recognition of the importance of including communities in housing development, efforts to engage these groups have been inconsistent (Shah et al., 2015). Small-scale participatory projects are often dismissed as insufficient to address the large-scale housing challenges cities face (Croese et al., 2016).

04. **THEORETICAL FRAMEWORK**

As previously stated, Sylhet is rapidly urbanizing, and the city is expected to grow significantly in the coming years. The existing housing infrastructure is insufficient to meet this demand. The urban poor face an extreme shortage of suitable housing, frequently ending up in slums with inhumane living conditions. To address the housing crisis, large-scale mass housing projects have been proposed frequently as a potential solution.

In *Tower and Slab: Histories of Global Mass Housing* (2012), Urban examines the history of mass housing projects around the world, analyzing how these projects emerged in various contexts and were shaped by political, economic, and cultural factors. His findings suggest that many mass housing projects began with utopian visions but the reality can be much harsher. Common issues include isolation due to a lack of humanity in design, urban segregation, and the concentration of poverty on the city outskirts. Despite these challenges, Urban acknowledges that mass housing is an effective, affordable, and feasible solution to address immediate housing shortages for the urban poor. By examining both sides of mass housing, this study aims to focus on strategies that build on the positive aspects while reducing the negatives.

Habraken's *Supports: An Alternative to Mass Housing* (1972) and Hamdi's *Housing Without Houses* (1995) align with this perspective, as both critique large mass housing projects. Habraken argues that the uniformity and marginalization of mass housing lead to a lack of individuality, identity, and social cohesion in cities. He advocates for a more flexible system in which independent housing units are placed on a supportive framework. This structure can be seen as an open framework that allows residents to design their own living environments. By prefabricating housing components, Habraken suggests that residents gain more freedom in the design and execution of their homes while the architect focuses on the supporting structures. He proposes a flexible structure with a long lifespan, combined with individual customization by residents with a shorter lifespan. This allows for adjustments based on residents' needs without changing the building itself.

Hamdi extends this concept by advocating for a "support-based" rather than a "provision-based" approach to housing. This support-based method values user participation and empowerment in the process. Like Habraken, Hamdi advocates for flexibility and resident participation, but he further emphasizes enablement. He argues not only that residents should be able to customize their homes, as Habraken suggests, but also that they should actively participate in the development process. In essence, Hamdi's work calls for a paradigm shift in housing policy, moving from merely constructing physical houses to supporting communities in creating functional, adaptable living environments.

Hamdi also notes that the level of resident participation should be decided case by case. This research aligns with this idea, recognizing that in Sylhet's context, along with the goal of a large-scale project, the active enablement that Hamdi describes may not fit the intended design process. In *A Ladder of Citizen Participation*, Arnstein (1969) presents a "ladder of citizen participation" with eight levels, ranging from manipulation (the lowest level) to citizen control (the highest). This ladder is used to determine the level of participation for this research. The high level of participation Hamdi envisions can be classified under levels 6/7, where citizens have significant input. Arnstein argues that at this level, a strong community foundation is needed so that leaders with the necessary knowledge and financial resources can be appointed. Additionally, both parties must invest significant effort and commitment; residents, therefore, need to contribute substantially—an aspect Hamdi also acknowledges as a critical point. This research builds on the assumption that the knowledge and structure required for this level are lacking, which could lead to an inefficient and poorly managed project.

Instead, this research focuses on level 5 participation. At this level, residents have a say by providing active advice, but the right to judge and decide on the legitimacy or feasibility of the advice remains with the architect. This allows for housing to be built collaboratively so that it meets residents' needs while enabling architects with the necessary expertise to apply their skills.
To understand the residents' needs in a way that aligns with level 5 participation, this study uses part of Hamdi's (1995) research approach. His approach consists of three parts: observing and listening, collecting stories, and workshops. To tailor this method to the level 5 participation, only the first part—observing and listening—is used. This structured approach is further divided into three parts and applied across three different scales: *Frame* (refers to the social, economic, and physical aspects of people and places), *Fabric* (involves looking at how different elements fit together, finding strong connections that can be improved, and weak areas that need support), and *Function* (understanding how spaces are used). This analysis is conducted at the neighbourhood, block, and unit levels. Hamdi argues that this systematic approach gives the researcher a full understanding of the physical and social structures of the community. This knowledge base is then used in the design process, and resident participation concludes here.

To address the positive aspects of mass housing described by Urban (2012) and to incorporate the flexibility and participation advocated by Habraken (1972) and Hamdi (1995), a modular design system is used. In *The Future of Modular Architecture* (2021), Wallance offers a detailed, forward-looking perspective on how modular architecture can help solve major challenges such as urbanization, housing shortages, and sustainability. Wallance sees modular housing as an industrial product made up of modules that offer efficiency, sustainability, affordability,

and flexibility. This system enhances the positive aspects of mass housing—efficiency, speed, and cost-effectiveness. Additionally, the flexibility aligns with the views of Habraken and Hamdi, countering the negative aspects of mass housing, such as a lack of identity, uniformity, and social cohesion.

Based on these theories, this research focuses on designing a modular housing system that incorporates insights from the target group, enhancing the positive aspects of mass housing while addressing its drawbacks.

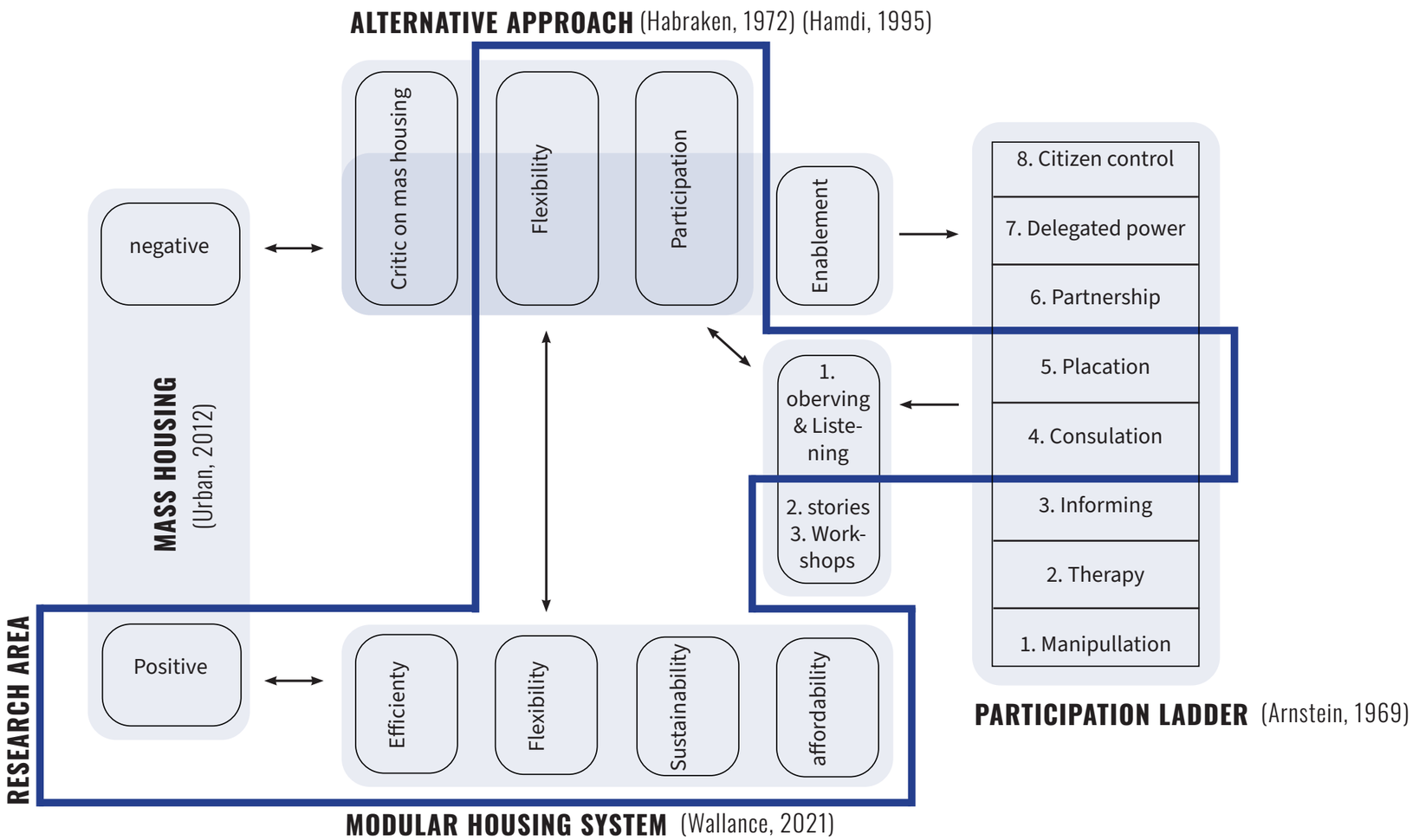

Figure 2: Theoretical Framework diagram.

05. **RESEARCH QUESTION**

This research aims to develop a modular design system with the potential for large-scale housing projects in Sylhet that effectively addresses the specific housing needs, socio-cultural preferences, and affordability requirements of rural-urban migrants, to reduce the current and expected affordable housing shortage in Sylhet for the rural-urban migrants. In order to find a fitting solution, the research question is as follows:

How can **the needs of the rural-urban migrants** be integrated into a **modular design system** to create a **large-scale housing project** which reduces the affordable housing shortage in Sylhet?

1. What are the specific housing needs and socio-cultural preferences of rural-urban migrants in Sylhet?

2. What scale of modularity best align with the housing needs and cultural preferences of rural-urban migrants in Sylhet?

3. How can modular design systems enhance the scalability and affordability of large-scale housing projects?

This thesis hypothesises that integrating the socio-cultural needs and housing preferences of rural-urban migrants into modular housing design will improve the effectiveness of mass housing projects, resulting in a more affordable, adaptable, and scalable solution to reduce the current and expected affordable housing shortage in Sylhet.

Figure 3: Child infort of her home, Sylhet, Bangladesh.

06. **GOAL/AIMS**

The goal of the research is to develop a modular design system with the potential for large-scale housing projects in Sylhet that effectively addresses the specific housing needs, socio-cultural preferences, and affordability requirements of rural-urban migrants, to reduce the current and expected affordable housing shortage in Sylhet for the urban poor.

To achieve this goal, the research aims of the project are:
1. Identifying the specific housing needs, socio-cultural preferences, and spatial requirements of rural-urban migrants in Sylhet.

2. To determine the most suitable level of modularity that can effectively meet the identified needs and preferences of the rural-urban migrants.

3. To explore how modular design systems can be utilized to create affordable and scalable solutions for large-scale housing projects.

Figure 4: Housing situation in Sylhet, Bangladesh.

07. **METHODOLOGY**

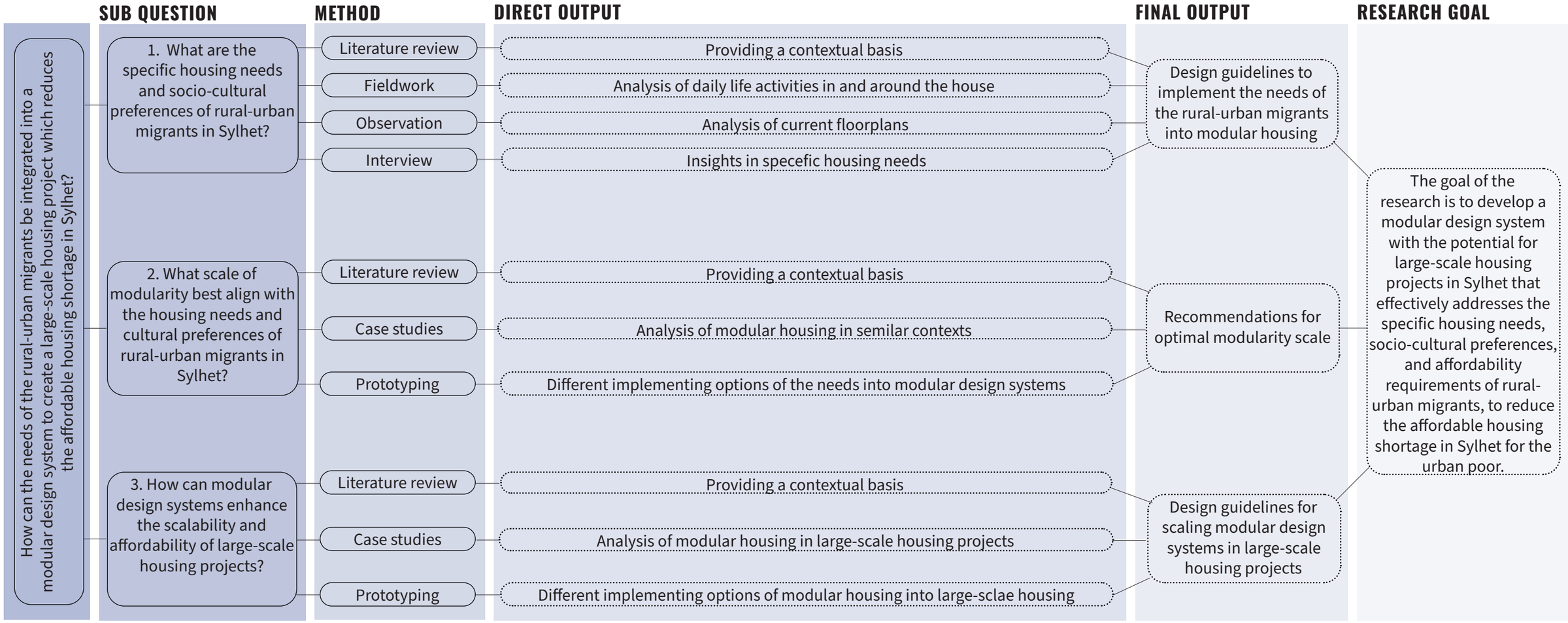

Figure 5: Methodology diagram.

PROBLEM STATEMENT

The main problem addressed in this research is the inadequacy of existing housing solutions which create a big housing gap for the rural-urban migrants in Sylhet. The current mass housing projects tend to fail to meet the needs of these migrants. And the small-scale projects that do meet the needs of these migrants, aren't designed to become part of a bigger system.

RESEARCH QUESTION

How can the needs of the rural-urban migrants be integrated into a modular design system to create a large-scale housing project which reduces the affordable housing shortage in Sylhet?

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RESEARCH GOAL

The goal of the research is to develop a modular design system with the potential for large-scale housing projects in Sylhet that effectively addresses the specific housing needs, socio-cultural preferences, and affordability requirements of rural-urban migrants, to reduce the affordable housing shortage in Sylhet for the urban poor.

08. RESEARCH SCHEME

1.dentifying the specific housing needs, socio-cultural preferences, and spatial requirements of rural-urban migrants in Sylhet.	2. To determine the most suitable level of modularity that can effectively meet the identified needs and preferences of the rural-urban migrants.	3. To explore how modular design systems can be utilized to create affordable and scalable solutions for large-scale housing projects.
METHODS		
Literature review Fieldwork Observation Interview	Literature review Case studies Prototypes	Literature review Case studies Prototypes
OUTPUT		
Design guidelines to implement the needs of the rural-urban migrants into modular housing	Recommendations for optimal modularity scale	Design guidelines for scaling modular design systems in large-scale housing projects

09. RELEVANCE

Rapid urbanization is a global phenomenon and one of the greatest challenges of the 21st century. Many cities around the world face severe issues due to rapid growth, including overcrowding and a significant shortage of housing. This research is relevant not just for Sylhet, but for similar problems recognized globally.

The need for housing is particularly urgent in the Global South, where countries like Bangladesh are highly vulnerable to extreme climate events such as droughts, heavy rainfall, tropical cyclones, and storm surges (Rawlani & Sovacool, 2011). Climate change increases the frequency of these disasters (Moniruzzaman et al., 2018; Rana & Ilina, 2021), which drives large-scale migration. Every year, hundreds of thousands of climate migrants are forced to leave their homes due to sudden disasters like cyclones and floods, as well as slow-onset events like sea-level rise and salinization (McDonnell, 2019). This has made the housing shortage in urban areas of Bangladesh an urgent problem, expected to worsen in the coming years.

Research focused on affordable and rapid housing solutions in Sylhet is essential for addressing these challenges. The solutions developed can not only meet the immediate needs of residents but also provide insights and strategies that can be adapted to cities facing similar crises worldwide.

10. DEFENITIONS

Mass housing
The construction or springing up of a relatively high number of residential buildings in an area in a relatively short period of time due to high demand (Alao, 2009).

Modular housing
Separate elements of a building that are prefabricated in isolation, then combined with other modules to create a unit (Larsson, n.d.).

Prefabrication
Off-site fabrication, often to a custom specification, of building components that may comprise all or part of a completed building (Wallance, 2021).

Rural-urban migration
When people move, either temporarily or permanently, from a rural area to an urban city (StudySmarter, n.d).

Urban poor
The segment of the population living in cities who experience poverty and face significant challenges such as inadequate housing, limited access to education and healthcare, and high unemployment rates (Fiveable, 2024).

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12. **ILLUSTRATION CREDITS**

Figure 1 (front page):
Salahuddin P. (2024). *Flooded house in Sylhet, Bangladesh.* Edition. https://edition.cnn.com/2024/06/22/asia/bangladesh-flooding-sylhet-climate-intl-hnk/index.html

Figure 2:
Theoretical framework diagram. By author.

Figure 3:
Majority World. (2023). *Child infort of her home, Sylhet, Bangladesh.* https://www.gettyimages.nl/detail/nieuwsfoto%27s/the-continuous-rains-of-the-last-few-days-have-caused-nieuwsfotos/1750023245?adppopup=true

Figure 4:
Pacific Press. (2015). Housing situation in Sylhet, Bangladesh. https://www.gettyimages.nl/detail/nieuwsfoto%27s/woman-went-to-someone-elses-house-to-cook-the-flood-water-nieuwsfotos/487065892?adppopup=true

Figure 5:
Methedology diagram. By author.

Figure 6:
Research diagram. By Authore.