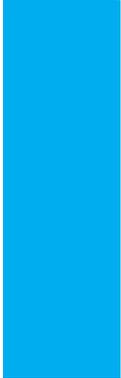


Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information		
Name	Youri Doorn	
Student number	5307988	
Studio		
Name / Theme	Global Housing Design Architecture of Transition in the Bangladesh Delta	
Main mentor	Dick van Gameren	Architecture
Second mentor	Rocio Conesa	Architecture
Professor	Marina Tabassum	Architecture
Research mentor	Frederique van Anandel	Architecture
Argumentation of choice of the studio	<p>Choice of studio -</p> <p>I chose this studio because it offers a rare and valuable opportunity to tackle architectural challenges in a completely different cultural and environmental context. Working on a project in Bangladesh presents unique complexities, social, economic and climatic, that are very different from what I've encountered before. This makes it both challenging and deeply enriching.</p> <p>The issues faced in this region, such as housing insecurity and climate vulnerability, are shared by many countries globally, making them urgent and highly relevant. Being part of this studio allows me to contribute to solutions for these pressing problems while showcasing what I've learned during my study years. It's an opportunity to push the boundaries of my knowledge and engage with architecture's potential to address critical global challenges.</p> <p>Choice of Topic –</p> <p>I chose this topic because it addresses urgent challenges at the intersection of climate change, urban poverty, and housing insecurity. The 2022 floods in Sylhet highlighted the vulnerability of slum residents and the pressing need</p>	

	<p>for affordable, sustainable housing solutions that enhance resilience without displacing communities.</p> <p>This topic aligns with my passion for using architecture as a tool for social equity and environmental sustainability. By focusing on flexible housing, I aim to empower residents, respect their socio-cultural ties, and explore innovative solutions to global issues of urbanization and climate adaptation. It represents a meaningful opportunity to create impactful, context-sensitive design while contributing to broader professional and academic discourses.</p>
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Graduation project	
Title of the graduation project	Climate-Resilient flexible Housing for Sylhet’s Slums
Goal	
Location:	Sylhet, Bangladesh
The Posed Problem	<p>In June 2022, heavy upstream rainfall caused rivers in Sylhet to overflow, resulting in severe flooding. Approximately 7.2 million people in Sylhet and surrounding districts were affected, with 500,000 evacuated to emergency shelters and millions displaced. While Bangladesh regularly faces monsoon floods, recent events such as those in 1988, 1998, 2004, 2017, and 2020 have become increasingly destructive due to factors like climate change, deforestation, hill erosion, unregulated development in wetlands, and reduced river navigability (Zahid, n.d.). With 80% of Sylhet submerged, nearly 1.3 million homes were damaged, and many lives were lost.</p> <p>What makes recovery increasingly difficult is the compounding effect of these floods, which strain both community resilience and government resources. Each disaster leaves lasting damage, eroding infrastructure, livelihoods, and savings, making it</p>

harder for residents to rebuild. As people continuously lose homes and belongings, they face deeper poverty, making subsequent floods even more devastating. With limited recovery time between floods and insufficient adaptation measures, affected populations are trapped in a cycle where each event worsens their vulnerability, pushing them further into crisis. Sylhet's slum residents face compounded vulnerability due to recurring floods, climate change, and economic precarity, which render their homes increasingly uninhabitable and their livelihoods unstable. Existing housing solutions are often unaffordable and unsuitable for the region's environmental conditions, leaving residents in a cycle of poverty with few options to improve resilience or economic stability. Slum relocation schemes, intended to improve living conditions, have been largely unsuccessful, with issues such as loss of livelihood, overcrowding, disrupted education, limited job opportunities, and poor infrastructure in relocated areas (Kapse et al., 2012). Inefficiencies in government planning, including inadequate housing provisions and a lack of tenant security, have led to failures in resettling residents, forcing many to return to their original locations or rent out their new homes. This research seeks to explore flexible housing models as a means to address these dual challenges, enhancing affordable, climate- resilient housing without requiring relocation.

Flexibility

The study by Dhar et al. (2013) explores how flexible housing design can enhance resource efficiency and affordability in Khulna, Bangladesh. Flexible design, based on N. John

Habraken's "support and infill" system, separates permanent structural elements from adaptable spaces, allowing homes to accommodate changes in family size, economic needs, and technological advancements over time. This approach minimizes the need for costly renovations, reduces material waste, and extends the lifespan of buildings, offering a sustainable solution for residents in developing countries.

In Khulna, 29% of households modify layouts to house more people, 19% adapt spaces for new businesses, and 13% make changes due to family structure shifts. However, rigid building designs impose significant financial burdens during renovations. Flexible housing addresses these challenges by incorporating features like centralized staircases, modular construction, and column-free layouts, which allow easy reconfiguration of living spaces. Additionally, prefabricated components and locally sourced materials further reduce construction and renovation costs.

The study emphasizes the need for flexible design policies in Sylhet, particularly to meet the needs of middle- and lower-income households who frequently alter their homes. Public-private partnerships and government incentives could promote this approach, ensuring affordable housing solutions that adapt to residents' evolving needs. By integrating flexibility into urban planning Sylhet can achieve more sustainable housing, optimized resource use, and improved living conditions for its growing population.

The use of modern materials and construction methods has also limited

	<p>residents' involvement in the building process, further reducing opportunities for future modifications (Das et al., 2021)</p> <p>The study identifies modular design, prefabricated components, and transformative building features as potential solutions to enhance adaptability in contemporary homes. It also underscores the importance of involving end-users in the design process to ensure spaces align with their needs and preferences.</p> <p>Recommendations include integrating semi-outdoor spaces, utilizing rooftops as community areas, and designing structural systems that allow flexible reconfigurations. These strategies aim to balance adaptability with the constraints of high-density urban environments, addressing the housing challenges of a rapidly urbanizing Bangladesh.</p>
<p>Research Question</p>	<p>This research explores the urgent need for climate-resilient, affordable housing in Sylhet's slums, where residents face the dual challenges of urban poverty and climate change. The focus is on developing flexible housing models that enhance living conditions, support local economies, and ensure resilience to flooding and other climate impacts. By incorporating community engagement, the study aims to identify design strategies that are both practical and culturally appropriate for Sylhet's slum residents.</p> <p>How can flexible housing models be designed, using community engagement, enhance climate resilience and affordability for slum residents in Sylhet, Bangladesh, without requiring relocation?</p>

<p>Design Assignment in which these result.</p>	<p>Hypothesis The integration of community-driven flexible housing models, utilizing affordable and culturally appropriate design features and building materials, will result in enhanced climate resilience and improved living conditions for Sylhet’s slums. By ensuring that housing development does not require relocation, these models will contribute to long-term social and economic stability, while protecting residents from the impacts of climate change and flooding.</p> <p>Aim This research aims to develop flexible housing models for Sylhet’s slum residents that enhance climate resilience and affordability. The focus is on integrating community engagement to ensure that the solutions are practical and culturally appropriate. A key outcome of this research is to come with a design for residents to build climate-resilient homes based on their existing living spaces, without requiring relocation.</p> <p>By analyzing the potential impact of the proposed flexible housing models, this research aims to offer valuable insights that can guide policymakers, urban planners, and community organizations in implementing these interventions.</p>

Process

Method description

This study employs a qualitative research design, using a combination of data collection methods and participatory techniques to gain in-depth insights into the housing needs, preferences, and challenges of slum residents in Sylhet. The qualitative approach is particularly suitable for this research, as it allows for an exploration of socio-cultural factors, resident perspectives, and community dynamics

that are not fully captured by quantitative methods. A mixed- methods approach, including case studies and site visits, is utilized to contextualize findings and enhance the applicability of proposed housing solutions.

Data Collection

Primary data collection will take place during my visit to Sylhet, Bangladesh, in December 2024. The goal of the visit is to gather comprehensive and relevant information while respecting the socio-cultural context of the community. Multiple methods will be employed to capture the diverse factors influencing housing resilience and affordability:

Semi-structured interviews with Residents

Semi-structured interviews will be conducted with slum residents. These conversations will focus on housing needs, preferences, economic activities, and specific challenges residents face, such as income limitations and exposure to climate-related risks. An interview guide will be developed to cover these themes systematically. By directly engaging with residents, the research aims to incorporate local perspectives into the design of self-help housing models.

Photographic Documentation

Photographs will serve as visual documentation of the housing conditions and community layout within Sylhet's slums. These images will capture socio-cultural aspects and highlight the existing housing vulnerabilities, contributing to a holistic understanding of the built environment. These visual insights will also facilitate more effective engagement with residents during interviews, as photos can prompt discussions about housing challenges and aspirations.

Site Visits

Site visits will be conducted across several slum areas to assess both unique characteristics and commonalities among them. Following an initial evaluation, one specific slum will be selected for more detailed study. This targeted approach will facilitate a deeper understanding of the chosen community's challenges, opportunities, and housing needs, ultimately guiding the development of tailored housing solutions that respect their specific circumstances.

Material Data Collection

Information on locally available materials and construction techniques will be gathered to explore options for affordable, climate-resilient housing. This will involve observing current material use and identifying practical materials that residents can easily access and afford. The goal is to ensure that any proposed materials align with community needs and available resources.

Literature Review

A comprehensive review of literature on flexible housing, climate-resilient housing, and informal settlements will provide key theoretical frameworks and best practices. This includes examining studies on community participation in housing, socio-cultural factors in housing design, and affordable construction methods. These insights will

contextualize the research findings and inform the design of housing models appropriate for Sylhet's slums.

Case Studies

More relevant case studies from other urban areas facing similar climate challenges will be analyzed to identify sustainable and affordable construction techniques. Comparative analysis with Sylhet's data will highlight transferable practices and potential adaptations for Sylhet's unique conditions. These case studies will provide valuable precedents, guiding the design of locally viable, climate-resilient housing solutions.

Community Engagement Techniques

To foster meaningful resident involvement, participatory research tools such as community mapping and drawing exercises will be used to help residents visualize their ideal housing setups. These tools will enable residents to convey their housing aspirations more effectively and actively contribute to shaping the design. This participatory approach aims to integrate local perspectives, empowering residents to have a role in the development of self-help housing models.

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Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The topic aligns closely with the studio topic **"Global Housing Design Architecture of Transition in the Bangladesh Delta."** Both emphasize housing solutions that address the dual challenges of urban poverty and environmental vulnerability in the context of the Global South. The studio's thematic focus on transitional architecture for regions facing rapid change provides an ideal framework to explore the socio-environmental and economic complexities of Sylhet's slums. By engaging with local communities and addressing their unique needs, the project embodies the studio's ethos of integrating global challenges with context-specific, human-centered design approaches.

The research directly connects to the Architecture master track by emphasizing the design of built environments that respond to pressing social, cultural, and environmental issues. The track's focus on creating sustainable, equitable, and innovative architectural solutions aligns with the project's goals of enhancing resilience and affordability for marginalized communities.

At the broader level of the AUBS programme the project reflects the programme's emphasis on interdisciplinary approaches to global challenges. The combination of participatory design, climate-resilient strategies, and socio-cultural considerations bridges architecture with urbanism and sustainable development. This interdisciplinary approach is central to the AUBS programme's mission of producing professionals capable of addressing complex urban and architectural challenges.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The need for affordable, climate-resilient housing in Sylhet, Bangladesh, highlights an urgent issue shared by many rapidly urbanizing regions worldwide. Informal settlements face severe challenges such as poverty, health risks, and environmental degradation, all of which are exacerbated by climate change. Addressing these challenges through innovative housing solutions can improve residents' quality of life, promote social equity, and support the Sustainable Development Goals.

This research specifically examines how climate change disproportionately impacts low-income communities in Sylhet's slums, intensifying their vulnerabilities and hindering their access to adequate housing. By engaging directly with residents to understand their needs, preferences, and challenges, this study aims to design self-help housing models that are both affordable and resilient to climate-related risks. The research makes a significant contribution by offering scalable, community-based strategies that can be adapted to other similar contexts globally.

Traditional housing interventions often require relocation, which disrupts socio-cultural ties and economic networks vital for community stability. This research prioritizes in-situ development, respecting residents' social connections and enhancing their economic security. By involving slum residents in the design and implementation process, the study empowers communities, equipping them with skills and resources to maintain and adapt their housing over time.

Beyond its immediate application in Sylhet, the research provides valuable insights for professionals, including policymakers, urban planners, architects, and humanitarian organizations. Its findings contribute to the scientific discourse on climate resilience, offering practical, sustainable solutions that can guide future urban development strategies.

Ultimately, this research amplifies the voices of Sylhet's slum residents, advocating for housing solutions that align with their socio-cultural realities and address their unique needs. By bridging theory and practice, it aims to enhance the lives of vulnerable communities while contributing to global efforts to create equitable, climate-resilient urban environments.