

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	Hyosik Kim
Student number	5914566

Studio		
Name / Theme	Global Housing: Architecture of Transition in Bangladesh Delta	
Main mentor	Ir. Rohan Varma	Design
Second mentor	Rocio Conesa Sanchez	Building Technology
Argumentation of choice of the studio	Buildings are the most closely related to people's lives, and among them, housing has a significant impact on the lives of its residents. Growing up in densely populated and crowded South Korea, I have personally encountered various housing challenges, which naturally fostered my strong interest in housing design. In particular, I am passionate about addressing societal issues through innovative housing solutions. I understand that the Global Housing Studio conducts in-depth research and analysis to tackle global housing issues. Therefore, I chose this course to gain a multifaceted understanding of housing design and to grow into a responsible architect through the research conducted in this studio.	

Graduation project	
Title of the graduation project	Nest for the future, Child-Friendly Housing for Urban Poor Children in Flood-Prone Areas of Sylhet
Goal	
Location:	Keane Bridge, Sylhet, Bangladesh
The posed problem,	Urban poor children in Sylhet face challenges such as hunger, safety concerns, and flooding due to poverty, leaving their basic needs unmet. However, they have been overlooked in urban planning, causing them to lose opportunities for a better future.
research questions and	How can housing design improve the living conditions

	of impoverished children in flood-prone areas of Sylhet city?
design assignment in which these result.	Child-Centric Housing Integrated with Flood-Resilient Design
<p>Problem Statement</p> <p>Bangladesh is experiencing rapid urbanization due to migration driven by job opportunities and climate disasters. In 1974, the urban population was 8.8% of the total population, but by 2014, it had exceeded 30%. However, cities have been unable to accommodate the influx of people, resulting in 55% of the population living in urban slums. Dhaka has around 6,000 slum settlements, and in the Sylhet division, 50,000 people live in 1,412 slums (BBS, 2014). In these circumstances, many people suffer from poor living conditions in urban slums.</p> <p>Sylhet is a large city located in northeastern Bangladesh and is the fifth-largest city in the country. Sylhet has a similar level of slum severity as Dhaka (Joseph et al, 2019). Additionally, 49.8% of the total working population in Sylhet city lives in slums. Residents in these areas live in dense areas with poor housing, suffer from food shortages, have low literacy rates, and are highly vulnerable to crime and delinquency. Due to poverty, they also face difficulties accessing basic infrastructure (Reza et al, 2019).</p> <p>In this environment, children are the most vulnerable to poverty and its associated problems. This vulnerability is reflected in the high rates of child malnutrition in the Sylhet region. According to the 2014 UNICEF Bangladesh Nutrition Report, Sylhet had the highest rates of malnutrition and stunting, and the situation has worsened every year. Particularly, children from families that migrated from rural to urban areas due to rapid urbanization experience these poverty-related issues more severely while living in slum areas. While it is generally believed that the quality of life in cities is higher than in rural areas, the poorest 20% of children in urban areas have a worse quality of life than rural children. These children are often forgotten in urban planning and suffer from environmental and health risks (Chandy/UNICEF, 2018).</p> <p>According to Maslow’s hierarchy of needs, basic needs such as food security and safety needs must be met before individuals can pursue higher-level needs, such as self-actualization (Maslow, 1943). However, due to the poverty, children are often deprived of even these essential requirements. Therefore, this study aims to explore ways to improve the lives of poor children in urban areas by presenting urgent issues faced by these children and proposing housing design as solutions.</p> <p>1. Child malnutrition</p> <p>Currently, two out of three children under the age of five in Bangladesh face food insecurity (UNICEF, 2024). As a result, these children suffer from severe malnutrition and stunted growth. Children in urban slums are considered the most vulnerable group, with 29% of girls and 37% of boys suffering from malnutrition and stunting and wasting rates exceeding 50% for both genders. While education and poverty alleviation are often mentioned as key solutions, existing child health programs have</p>	

largely excluded urban areas compared to rural regions (Rahman et al, 2021). Particularly, Sylhet city, the study area, has the highest rates of child malnutrition and stunting in the country (UNICEF, 2014). Due to the severity of this issue, addressing food security for poor children is an urgent priority.

2. Exposure of children to unsafe living conditions

Slums provide unstable living conditions with poor housing quality. As a result, many slum residents engage in the informal economy, participating in activities such as drug dealing, prostitution, human trafficking, and theft. Children are the most vulnerable to these crimes and, due to their susceptibility to peer pressure and environmental influences, are at risk of falling into criminal activities. Currently, children in slums are frequently exposed to such crimes. (Kamruzzaman et al, 2015). And such dangerous neighborhoods result in limiting children's outdoor physical activities, which negatively impacts their mental and physical well-being. (Hanapi et al, 2016). Therefore, child-centered housing design and neighborhoods are necessary to protect children from crime and ensure their health.

3. High density and unsanitary housing environment

Children living in slums experience poor housing conditions in high-density environments. These dense housing conditions negatively affect the physical and emotional well-being of the children, and they also face difficulties in their academic performance. The long-term effects of these conditions extend into adulthood (Solari et al, 2012). Additionally, unsanitary housing environments and unplanned waste disposal are particularly dangerous for children with weak immune systems. Such waste and improper sanitation contaminate water and the environment, causing severe harm to these vulnerable children (Reza et al , 2019). Therefore, it is crucial to improve these densely populated poor housing conditions and sanitation. Through housing design, improving children's health and providing them with equal opportunities is of utmost importance.

4. Vulnerability to Flooding

Slums where impoverished children live are more vulnerable to flooding, which results in poor sanitation and skin diseases. These issues arise from the structure of flood-prone houses and the surrounding environment (Braun et al, 2019). In Sylhet, as mentioned earlier, frequent floods exacerbate the situation when solid waste blocks drainage systems. (Pervin et al, 2019) Therefore, addressing the issue of flooding is essential to improve children's nutrition and overall well-being.

The Keane Bridge area, the proposed project site, aligns with the issues outlined above. Families, often comprising 6 to 8 members, live in single rooms and endure unsanitary living conditions. Additionally, due to income constraints, many children are deprived of education. During the annual floods, children are often forced to live on the streets. These challenges urgently call for solutions. Therefore, this study aims

to explore architectural solutions to ensure that the children of the Keane Bridge area can enjoy a better quality of life and prepare for a brighter future.

Main Question

How can housing design improve the living conditions of impoverished children in flood-prone areas of Sylhet city?

1. Sub question about the lives of impoverished children and their caregivers

What are the most urgent challenges faced by poor children and their caregivers, what are the causes of these issues, and are there any successful cases of addressing them?

2. Sub question about housing design

What spatial issues do impoverished children and their care-giver face, and how can housing design contribute to child-friendly neighborhood?

How can housing design address food security and income issues?

3. Sub question about flood-resistant design

How can the housing design respond to flooding issue?

Main Goal

The main goal of the 'Nest for the Future' project is to improve the quality of life of Impoverished children in Syhlet city. (Keane Bridge Area)

AIMS

Understanding of the problems faced by children and caregivers

Insights on child-centered housing design and neighborhoods

Understanding of housing design that address food security issue

Understanding of housing design that respond to flood problems

A detailed design approach to offer practical solutions for poor children's problem

Process

Method description

[A description of the methods and techniques of research and design, which are going to be utilized.]

Methodology

This research aims to improve the living condition of impoverished children and their care-givers by identifying and analyzing their issues, and finding solutions based on child-centered housing design. The most critical aspect of this research is understanding and analyzing the local context and culture to propose practical solutions. Therefore, the research will proceed in four detailed steps.

1. Data collection phase

I visited the Keane Bridge area, where I conducted interviews with the Hindu community and gained access to their homes to record videos of their living environments. Using this data, I will conduct an in-depth analysis of their housing culture and explore potential improvements. Furthermore, I plan to analyze the "dream house" sketches collected from children through a survey and incorporate the insights into the design process.

Literature review is one of the most effective ways to provide objective evidence. In this phase, documents published will be compared with the problems identified through fieldwork. Additional information will also be gathered, alongside academic papers and theories related to potential solutions. This will facilitate an objective understanding of the problem and enable the exploration of spatial theories.

2. Data analysis: digitalizing, analyzing

Data analysis will be based on the information collected in the first phase. The housing situation in the research area will be digitized to facilitate architectural analysis. Survey data will be chart-ed to identify the issues faced by impoverished children. At the same time, the analysis will consider the solutions identified during the literature review.

3. Case studies

The case study phase is intended to validate the findings of the previous phase and explore practical solutions. This phase will involve analyzing actual cases, assessing their effectiveness. The case study will focus on three main themes.

The first will be case studies of housing designed around children and their care-givers. These studies will explore how child-friendly housing is designed and how these spatial configurations can contribute to the well-being of impoverished children in Sylhet city.

The second theme focuses on solutions to food security issue. Through this case study, successful examples of addressing food security issue in urban slum areas will be researched, as well as cases where these solutions have been integrated with building design. The aim is to explore how such solutions can be incorporated into housing design.

The third theme is housing design that responds to flooding issues. Through research on various housing design strategies that address flooding, this study will explore ways to prevent impoverished children from experiencing a range of health problems caused by floods.

4. Design Phase

Based on the directions established through the processes, the design phase will commence. The final output will present a design solution that improve the living condition of poor children and their care-givers in a practical way.

Literature and general practical references

Case Studies

Thamesmead, UK

Kalindi Apartment, Bangladesh

Kazedewan apartment building, Bangladesh

South 50/53 Apartment, Bangladesh

Sanjaynagar Slum Redevelopment Project, India

Literature

1. Children-Centered Housing Design

Cunningham et al. (2007). Principles of child-friendly housing.

Solari et al. (2011). Housing crowding effects on children's well-being.

Hanapi et al. (2016). A review on environmental characteristics that influence children's physical activities in low-cost housing

McCormick. (2017). Does access to green space impact the mental well-being of children: A systematic review.

Literature about Care-givers

Kumar et al. (2019). Parental and carer mental health: The impact on the child.

Van Leer Foundation. (2023). Early childhood matters: The wellbeing issue.

2. Literature about Safe Neighborhood

Jacobs. (1961). The Death and Life of Great American Cities.

3. Flood-Resisting Design

Braun et al. (2011). Floods in megacity environments: Vulnerability and coping strategies of slum dwellers in Dhaka/Bangladesh.

Pötz et al. (2014). Multi-level safety: Water resilient urban and building design.

4. Literature about Food Security

Chowdhury et al. (2020). Rooftop gardening to improve food security in Dhaka city: A review of the present practices.

Taylor, J. (2021). The prospects of urban agriculture to address nutrition insecurity in Dhaka

Reflection

What is the relation between your graduation topic, the studio topic your master track, and your master programme?

In the MSc AUBS program, I have focused on analyzing social issues from various perspectives and exploring ways to address them through architecture. As a result, I have primarily concentrated on housing problems, one of the most prevalent societal issues, and have consistently pursued this theme throughout my MSc studies. To address these challenges, I have sought architectural solutions by integrating various fields such as housing layouts, typologies, construction techniques, and materials.

Global housing studio aims to analyze various social issues in Bangladesh from multiple perspectives and provide architectural solutions. This aligns perfectly with the research themes I have explored so far and offers a valuable opportunity to grow into a responsible architect.

My thesis focuses on the living condition of impoverished urban children in Bangladesh and aims to address this social issue through architectural interventions. To effectively tackle this problem, a holistic approach is required that not only considers architectural solutions but also incorporates aspects of urban design and integrates climate-related factors. I plan to approach this topic using the holistic design methodology emphasized in the MSc program, addressing the issue from multiple perspectives and contributing to solving social problems through architecture.

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

Many people believe that urban children enjoy a higher quality of life than their rural counterparts. Paradoxically, impoverished urban children often face more severe living conditions and lower standards of living than rural children. Bangladesh has recently experienced rapid urbanization, with increasing numbers of families migrating from rural areas to cities. As a result, many poor urban children end up living in slums, where they are among the most vulnerable, directly affected by the harsh realities of slum life. These challenges not only impact on their childhood but also limit their future opportunities as they grow older.

While many studies have addressed these problems from various perspectives, there has been little discussion about solutions, especially architectural ones. Additionally, most research has focused on Dhaka's slums, even though cities like Sylhet face equally severe slum issues. Consequently, children in Sylhet's slums suffer from dangerous living conditions, which have been largely overlooked.

This study prioritizes an architectural approach to solving the problems faced by urban poor children, focusing specifically on Sylhet city, to address the challenges of children living in non-capital city slums. Through holistic design research, the study

aims to improve the overall well-being and living conditions of impoverished urban children, while ultimately providing better opportunities for their families. The goal of the research is to meet the needs of children and create child-friendly neighborhoods through new housing design.