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Imagining the Potentials of Abandoned Service Corridor of Government Housing in Dhaka City: A Multidimensional Urban Renewal Approach

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Abstract

The rapid urbanization of Dhaka has led to severe infrastructural and social challenges, particularly within government housing areas. Among the most underutilized spaces are the abandoned service corridors, which, if transformed, could play a crucial role in addressing the city's pressing urban renewal needs. This study investigates the potential of these neglected corridors by proposing a multidimensional urban renewal strategy that blends ecological, social, and economic

considerations. By drawing on concepts from basophilic urbanism, adaptive reuse, and sustainable development, the paper explores how these spaces can be remained to enhance environmental quality, promote community engagement, and stimulate local economic activities. The research employs a combination of spatial analysis, case study evaluations, and stakeholder feedback to identify feasible interventions for revitalizing these corridors. Preliminary findings suggest that through strategic design and planning, these abandoned spaces can be transformed into vibrant public areas that contribute to the city's livability and resilience. The paper advocates for a collaborative approach, involving urban planners, policymakers, and local communities, to create inclusive spaces that reflect the needs of Dhaka's diverse population. The research highlights the need for innovative planning frameworks, as well as policy support, to unlock the full potential of these underused urban areas, thereby contributing to a more sustainable and equitable urban future for Dhaka.

Keywords: Urban Renewal, Service Corridors, Dhaka City, Government Housing, Basophilic, Urbanism, Sustainability, Community Engagement, Urban Transformation.

1. Introduction:

Dhaka, the capital city of Bangladesh, has experienced unprecedented urban growth over the past few decades. With its population now surpassing 20 million, the city faces significant challenges such as overcrowding, poor infrastructure, and a lack of public spaces. As Dhaka expands, areas of the city that were once seen as essential to urban planning, such as service corridors in government housing complexes, have become underutilized and abandoned. These corridors, which were originally designed for utilities and services, have become neglected voids in the urban fabric, contributing to the city's increasing infrastructural and social problems.

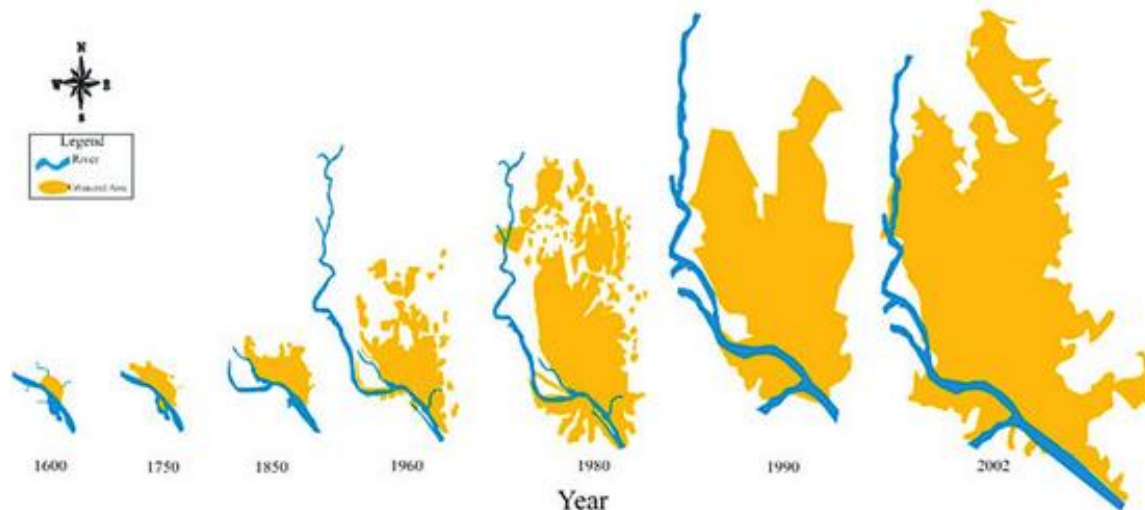


Figure (01) Shows: *The Historical Urban Growth in Bangladesh. (Not to Scale) works as An Evaluation Chart Map where's the Range is from 1600 AD to 2002 AD. Source: Urban Planning Department, Dhaka City Corporation, 2007*

This paper seeks to explore the potential of transforming these abandoned service corridors into vibrant, sustainable urban spaces through a multidimensional urban renewal approach. By employing concepts from basophilic urbanism, adaptive reuse, and community participation, the study aims to offer a comprehensive strategy for revitalizing these neglected areas in Dhaka. The research highlights the importance of these spaces not only as areas of environmental and economic potential but also as critical components of urban regeneration that can enhance community life, improve public health, and promote sustainable development.

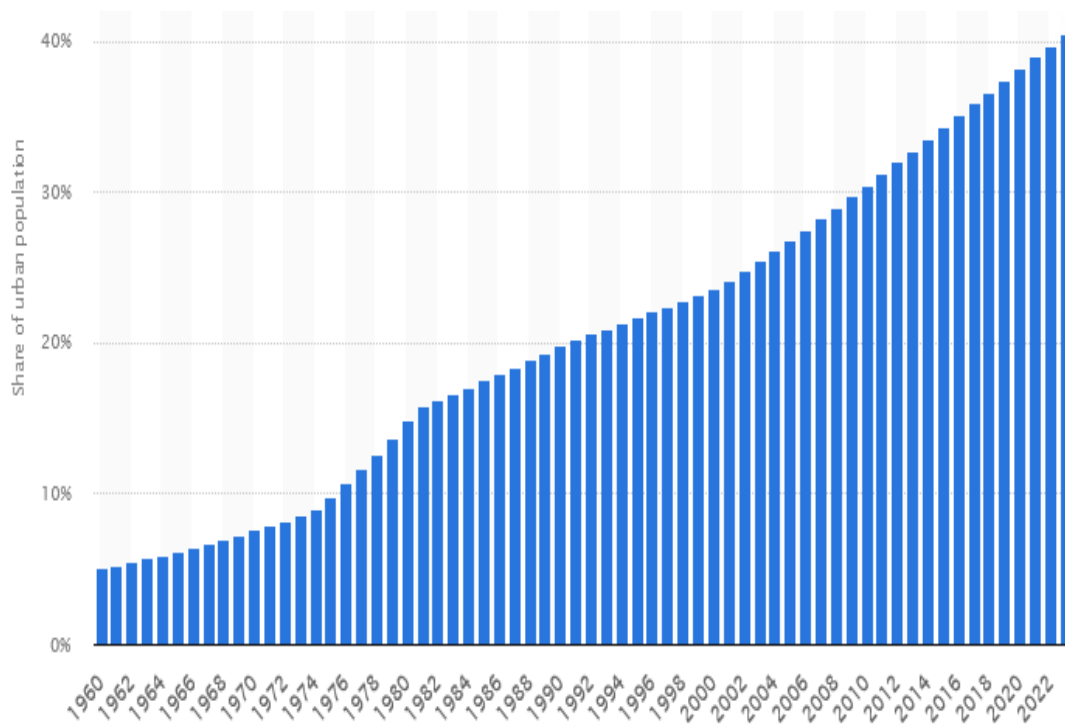


Figure (02) Shows: *Share of urban population in Bangladesh from 1960 to 2023, Source from Statista*

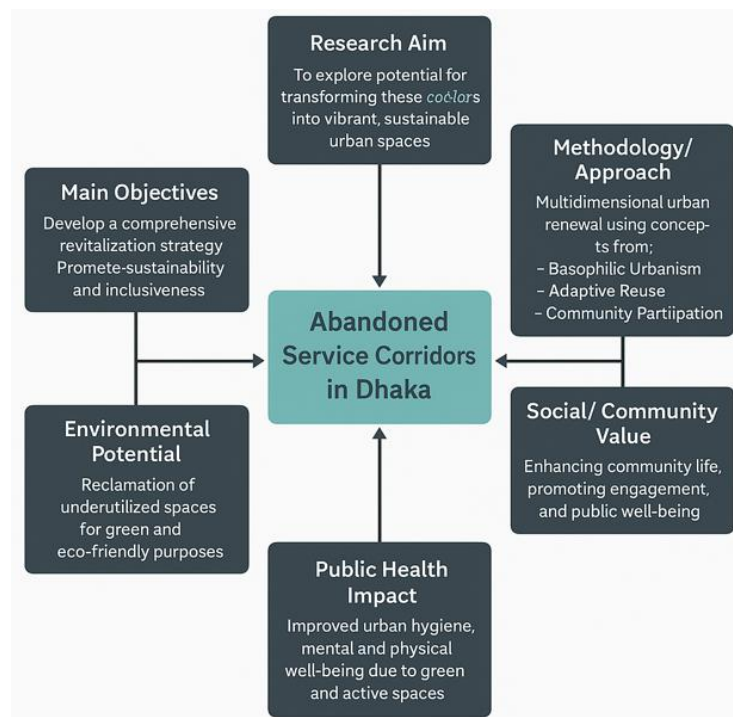


Figure (03) Shows:: *Abandoned Service Corridors in Dhaka*

1.1 Demand for Urban Space: People live in cities for better employment and education opportunities, better health, greater access to social services and opportunities for social and cultural activities. A city falls short of its highest possibilities if it fails to provide a good quality of living environment (Lynch, 1981).

1.2

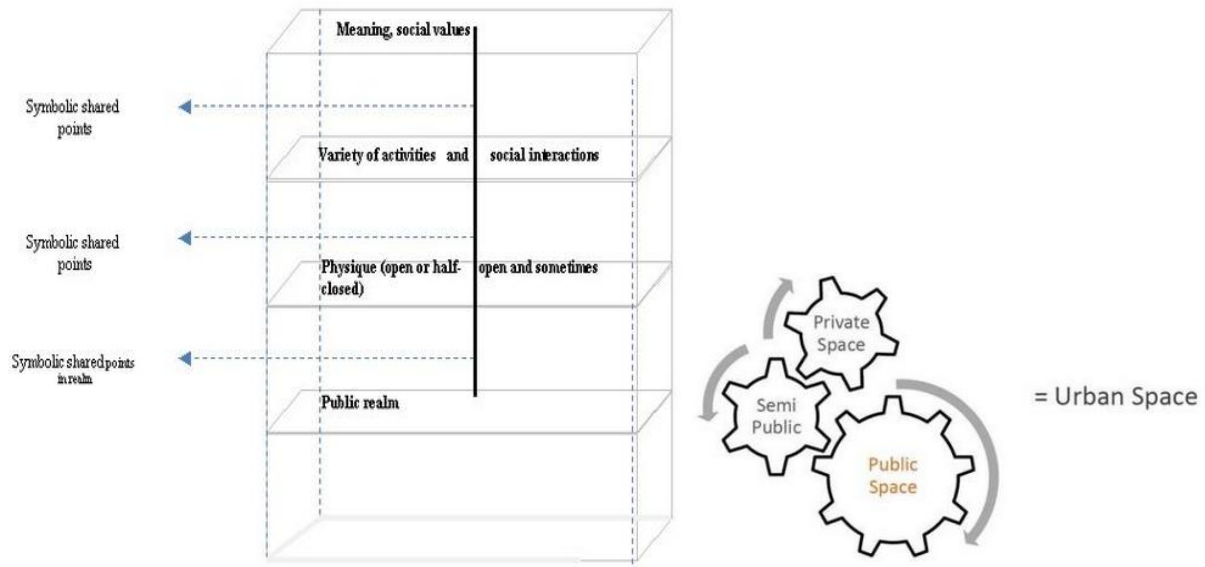


Figure (04) & (05) Shows::Definition of Urban Space & Urban spaces classifications including public, semipublic, and private spaces into a lot of Diagrams

1.2 Adverse Effect of Unused Area: Urban environmental problems are complex, multidimensional and interactive. The National Vacant Properties Campaign (n.d.) argues that vacant leftover spaces pose a threat to public safety and often exhibit traits of neglect by the property owner. They can range from unused vacant lots to small spaces between adjoining buildings and often attract trash and debris. Many of these spaces pose a threat to environmental health, housing, neighborhood development, economic opportunities, and at times to public safety within cities (Wilkinson, 2011). Arunita (2004) notes that a radical restructuring of the global economy in recent decades has resulted in an explosion in the number of left over spaces. (Azhar, 2011) Also the adverse environmental conditions resulting from inadequate waste management, poor drainage, air pollution, and lack of access to safe drinking water and sanitation, exposure to excessive noise levels, as well as inadequate health and nutrition services, exert a heavy toll on the quality of life (8th FYP).

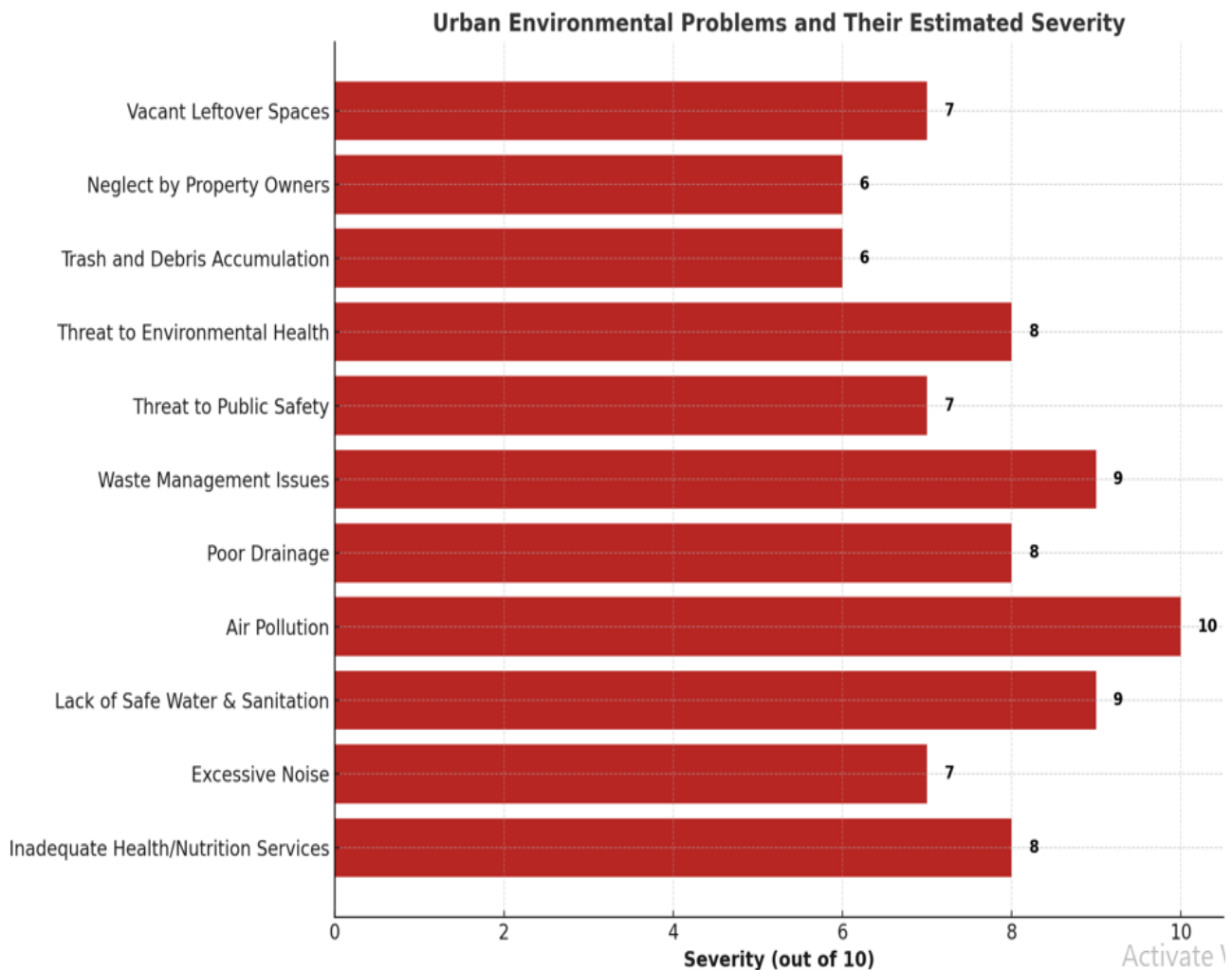


Figure (06) Shows: A horizontal bar chart illustrating key urban environmental problems and their estimated severity based on your provided text. Each issue is rated on a scale from 1 to 10 to reflect its relative impact on urban life

1.3 Scope of Unused Area (Urbanet): Jacobs (1961) suggested that urban centers generate problems but they have the capability to solve these in terms of creating jobs and enhancing the quality of life. (**Jacobs J., 1961. The Death and the Life of the great American Cities, Vintage press.**) Unused urban space remains as forgotten wasteland or gaps between buildings and other constructions. These spaces have a high potential for reconstruction and repurposing by integrating them into the community, and for creating stunning spaces by distinguishing their specific character. For example, the specific characteristic of a former railway track is that it connects two districts and can be transformed into a green corridor. Gaps in a city can be used in different ways depending on the needs of the respective neighborhoods. As community gardens, public or residential buildings, they can contribute to boosting the neighborhood. If a former empty space acquires a purpose previously unfulfilled in the neighborhood, it improves the livability of the area as a whole. In the last twenty years, there has been an increasing interest in how the form of cities, for example, their densities, size, building forms, shapes, configurations, and layouts, can contribute to their sustainability (**Williams, n.d.**)(**Williams, K., n.d.** "Can Urban Intensification Contribute to Sustainable Cities?". An International Perspective, Oxford Centre for Sustainable Development Oxford Brookes University, Routledge, London.).

1.4 Environmental Quality of Dhaka: Dhaka has ranked 17th worst on the world Air Quality Index (AQI) as extreme air pollution makes it one of the most polluted cities (**7th FYP, Dhaka Tribune, December 24, 2020**) (**8TH FYP**). The Dhaka city produces one-quarter of all urban waste in the country. Solid waste comes from residential, commercial, institutional and industrial sources. In Dhaka city alone, millions of plastic and polyethylene bags and goods are dumped every day and a big part of that go into the drains, lakes and rivers, responsible for clogging the drainage system. [**The Daily Star, 24, 2020**]. Moreover, only between 44 and 76 per cent of the total municipal solid waste is collected, leaving huge amounts uncollected and untreated (**8th FYP**). This creates a public nuisance as well as a health hazard. More specially, ineffective waste management leads to various communicable diseases. The organic component of uncollected garbage pollutes the soil, water, air and badly impacts the local environment.



Figure (07) Shows: A flowchart-style visual that represents the different factors contributing to the environmental quality of Dhaka. It shows the relationships between elements like air quality, waste generation, and their impacts.

Increasing urbanization and water usage has resulted in a proliferation of waterborne sanitation in Bangladesh. The majority of infrastructure projects focus on the provision of sanitation, but management of residual wastes is generally not given sufficient consideration. Poor water quality affects the availability of fresh water for different uses and has negative impacts on the livelihoods of the poorer communities. Contamination of surface water bodies and groundwater aquifers by pollutants, including those from domestic pollution exacerbate water quality problems and endanger both natural ecosystem integrity and public health (Decentralized waste water).

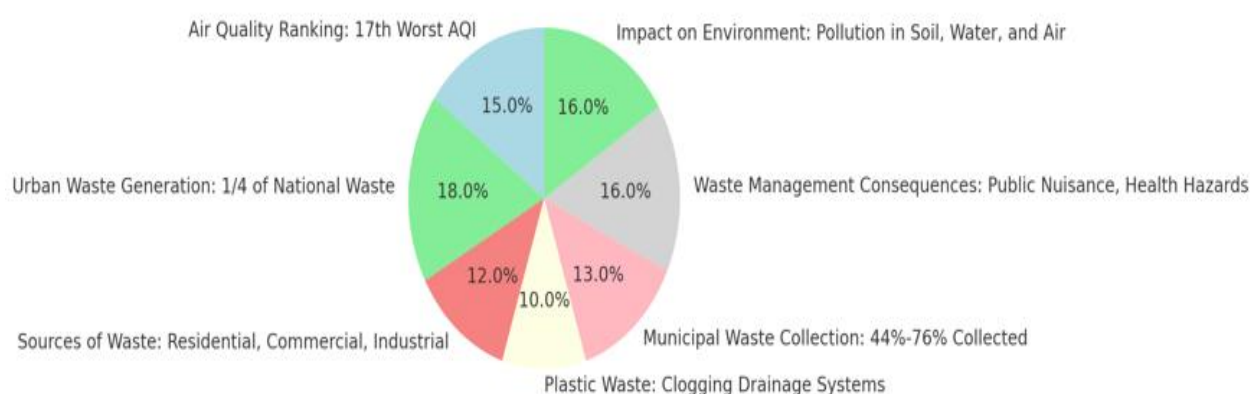


Figure (08) Shows: A pie chart representing the different aspects of Dhaka's environmental quality, showing how various factors contribute to the overall situation

1.5 Noise Pollution: Noise pollution remains a severe health risk, especially in the urban areas and of course, a city like Dhaka which has one of the highest population densities in the world. Lack of public awareness, motivation as well as weak enforcement of the noise-related rules and regulations has led to noise levels exceeding the acceptable limit major cities. Sources of this pollution include road, rail, and air traffic, as well as industry, construction, and hydraulic horns; and frequent exposure to high levels of noise increases public health concerns as it damages hearing, and increases stress and blood pressure among other health impacts **(8th FYP)**.

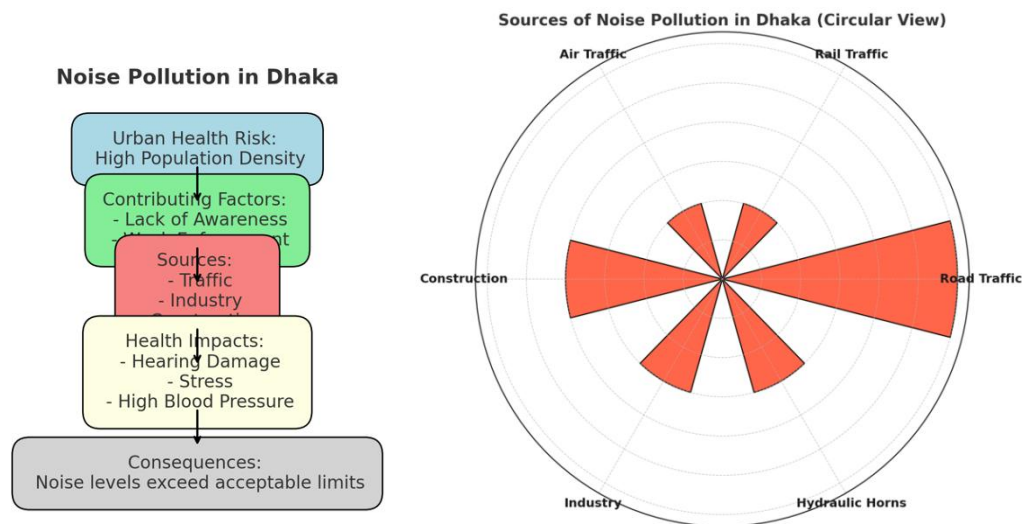


Figure (09) & (10) Shows: A flowchart diagram illustrating the sequence of factors contributing to noise pollution in Dhaka. A circular (polar) bar chart representing the estimated contributions of different sources to noise pollution in Dhaka

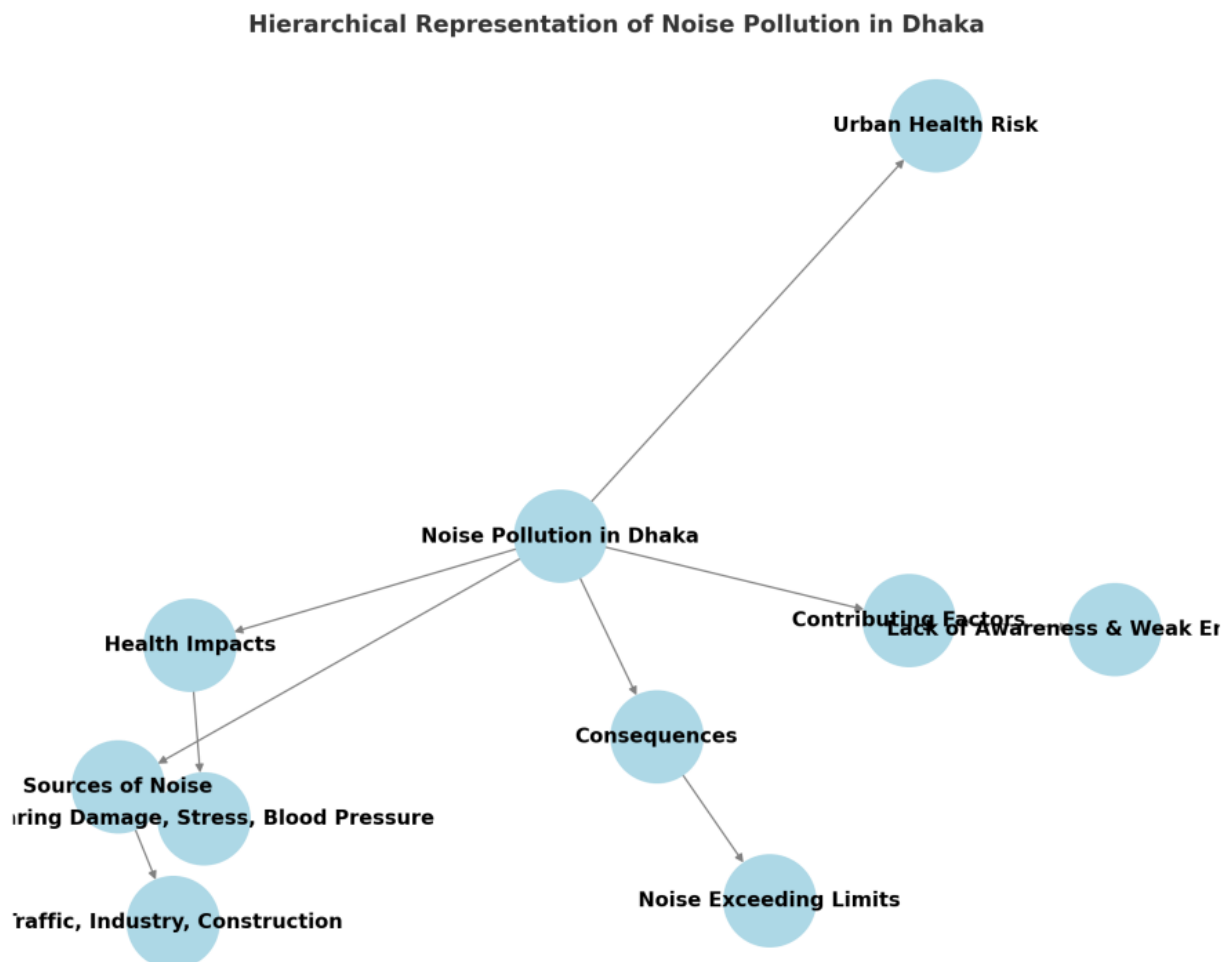


Figure (11) Shows: A hierarchical tree diagram representing the factors contributing to noise pollution in Dhaka. It shows the relationships between different aspects, such as contributing factors, sources, health impacts, and consequences.

1.6 Project Rationale: As emphasized by **Haque (2022)**, Dhaka's urbanization has led to significant challenges in achieving a balance between development and sustainability. The rapid expansion of the city has resulted in deteriorating infrastructure, particularly in older government housing complexes. These complexes, designed in earlier phases of Dhaka's development, contain abandoned service corridors that remain largely underutilized. These spaces, if revitalized, could play a crucial role in alleviating the city's housing and infrastructure deficiencies while improving urban livability.

The concept of urban renewal through adaptive reuse has been explored in many cities around the world, offering insights into how abandoned spaces can be remained as vital urban components. Research by **Al Mahmud (2017)** has highlighted

the potential of urban renewal projects in Dhaka, such as the Motijheel commercial area, where neglected spaces have been restructured to enhance both social and economic opportunities.

Impact Distribution of Urban Renewal Projects (Donut Chart)

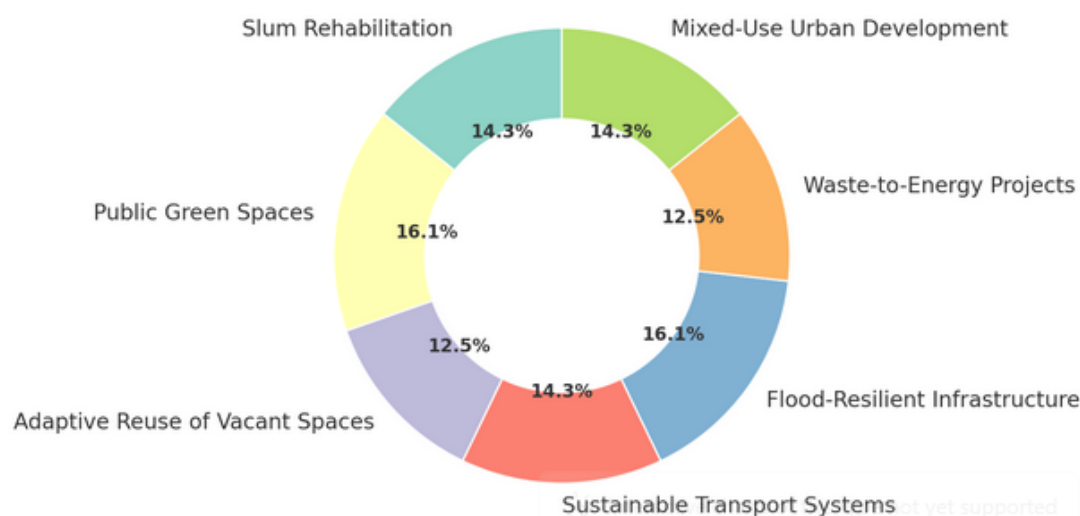


Figure (12) Shows: A donut-style pie chart showing the impact distribution of urban renewal project types. This format gives a clean visual distinction while maintaining percentage clarity.

In similar contexts, such as the transformation of post-port areas in Shanghai and Liverpool, urban renewal projects have successfully integrated new green spaces, recreational areas, and commercial developments (Zeng et al., 2025). These case studies provide valuable lessons for Dhaka's urban planners, demonstrating the importance of both environmental and social sustainability in revitalizing underused spaces. Moreover, the integration of basophilic urbanism in urban renewal projects, as discussed by Data (2020), emphasizes the value of incorporating nature-based solutions into the built environment. In Dhaka, where green spaces are limited, the adaptive reuse of service corridors could introduce basophilic elements, such as green roofs, urban gardens, and natural water features, contributing to both environmental restoration and the well-being of the city's residents.

1.7 Unused Space in HEM and Problems: Housing Estate at Mohammadpur was planned in 1968 and consists of residential and rehabilitation plots, flats, core houses, shops, health centers, schools, mosques, parks, play grounds, incidental open space and service corridor etc. There is lack of open spaces (RAJUK, 2004). Service lines were provided backside of the plots. So waste water drains and soak pit / septic tank were backside of the plots in a common service corridor. Water supply system introduced after 1980 and waste water drains were built after 2002 beneath the road of the plot frontages in the housing (Hossain, 2012). So, service line of newly built buildings is connected in the newly provided lines. Old buildings are connected with the previous service system. This raises a critical situation. Although there prevailed door to door waste collection system, people are dumping garbage randomly in these corridors. As a result, service corridors turned into a basin of garbage dumping, container of waste water, source of odor, source of mosquito production, shelter of rats as well as a dirty corridor to pollute the environmental and social pollution. Though, there is lot of potential of the corridors and there exist door to door waste collection system.

Dhaka North City Corporation is the cleaning Authority of roads, open spaces, drains and maintenance authority of waste water drains of the Housing. (Dhaka North City Corporation, n.d.) DNCC took initiative under "Clean Dhaka Project" to keep service corridors secured and clean but it did not become successful. DNCC is more concern to clean and maintain the newly built services.

The Housing provider and maintenance authority both are under Government. In spite of, the service corridor is neglected and inhabitants of the housing are suffering for these dirty corridors. If the government take initiative properly to maintain and manage this corridor it is possible to overcome the problem of pollution.

There is no research on this neglected service corridor. Therefore, this research aims to address this problem, find out the reason behind the pollution and potentials of these abandoned corridors.

1.8 Objectives

01. To identify the service corridors in approved Layout plans of the housing.
02. To identify the present and past condition of the corridors
03. 3. To find out reason for pollution created by these corridor.

1.9 Limitations: This paper includes the limited scope, focusing only on specific government housing areas in Dhaka, which may not represent other abandoned spaces or cities. Data availability, particularly on abandoned corridors, may be a

challenge, impacting the depth of analysis. The study may also face difficulties in fully capturing diverse stakeholder perspectives and may not fully explore the practical feasibility of proposed solutions due to political, financial, and institutional constraints. Additionally, time constraints and unpredictable social dynamics could affect the long-term impact of the proposed interventions. Environmental factors and the potential for gentrification may not be fully addressed, and the study's focus on Dhaka limits its broader applicability to other urban contexts. Lastly, the subjectivity of urban planning proposals could also be a limitation.

2. Literature Review

2.1 Definition of Urban Space: Urban space refers to the physical environment within a city that is shaped by both natural and human-made elements. It includes streets, parks, public squares, buildings, and other infrastructure that are used by the public. Urban space is not only a place for economic, social, and cultural activities but also a site where power, identity, and social relations are constructed and contested. It serves as a backdrop for everyday life and influences how individuals and groups interact with each other and with their environment. The design, accessibility, and functionality of urban spaces are critical in promoting inclusivity, social interaction, and sustainability in cities.

Diagram: Components Defining an Urban Space (Green Theme)

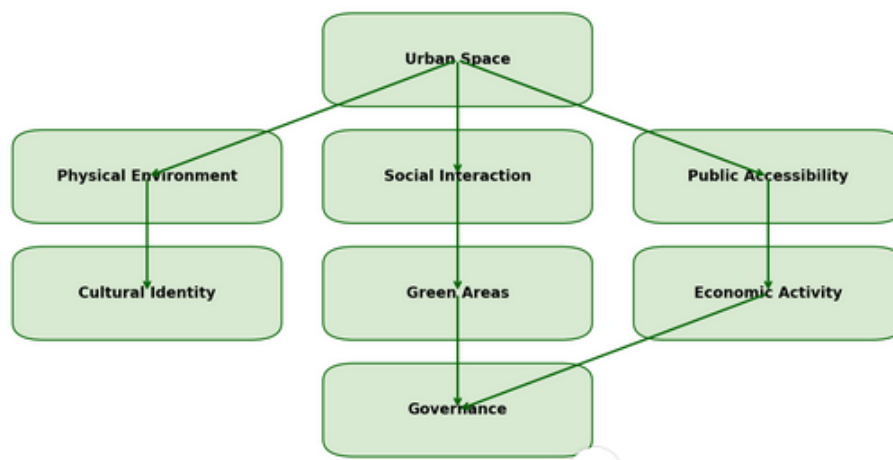


Figure (13) Shows: A Matplotlib diagram showing the interconnected components that define an urban space, including social, physical, economic, and governance elements.

According to Tonkiss, F. (2013) in *Cities by Design*:

Zig-Zag Flow: Tonkiss's Theory of Urban Space (2013)

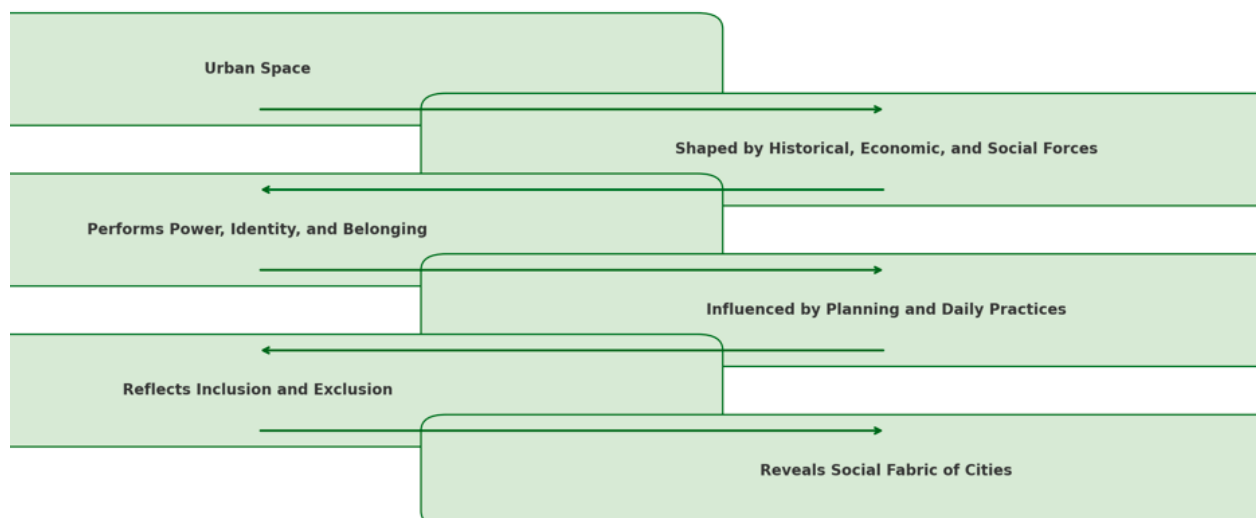


Figure (14) Shows: The "arrow-to-arrow" style flow chart representing Tonkiss's (2013) perspective on urban space. Each concept flows directly into the next with bold magenta arrows and connected boxes, emphasizing continuity.

The Social Life of Urban Spaces, urban space is viewed as more than just a physical environment; it is a dynamic and socially constructed area where various social, cultural, and political interactions take place. He emphasizes that urban spaces are not neutral but are shaped by historical, economic, and social forces, and they play a significant role in the way individuals and communities experience and navigate the city. She explores how urban spaces are sites for the performance of power, identity, and belonging, as well as the negotiation of social relationships and inequalities. These spaces are influenced by the

design and planning choices made by urban designers, as well as by the everyday practices and interactions of the people who inhabit them. Urban spaces, according to Tonkiss, are vital for understanding the social fabric of cities, as they reflect both the inclusivity and exclusivity inherent in urban life. (Tonkiss, F. (2013)

2.2 Abandoned Urban Space: Abandoned urban spaces are areas within cities that were once used but are now neglected and in disrepair, such as derelict buildings, vacant lots, or industrial sites. These spaces are often the result of economic decline, urban decay, or shifts in industry. Although uninhabited, they hold social, historical, and environmental value. These areas can provide opportunities for revitalization through creative re-use, community projects, or urban planning. They may also be repurposed for artistic expression, environmental reclamation, or temporary cultural events. However, their existence often reflects underlying issues of inequality, neglect, and lack of investment in urban areas.

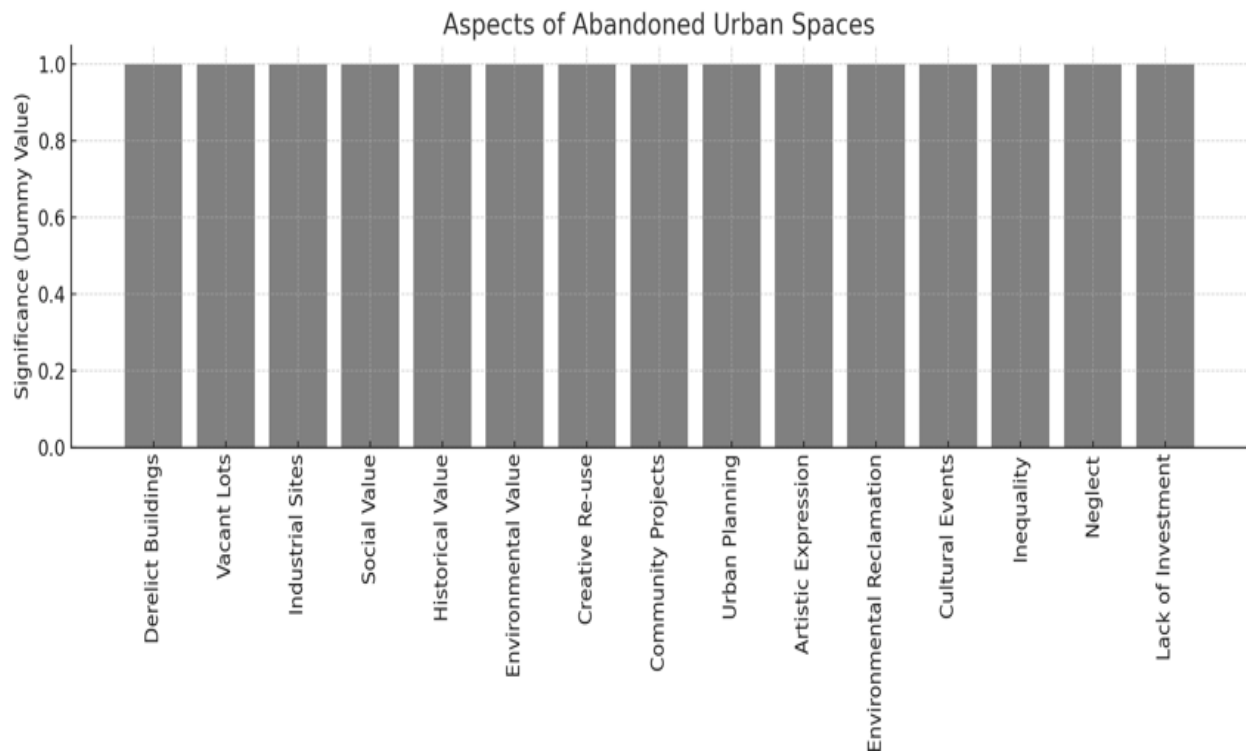


Figure (15) Shows: A bar chart summarizing the key aspects of abandoned urban spaces based on your lesson. Each bar represents a concept such as physical examples (like derelict buildings), potential uses (like artistic expression), and underlying issues (like neglect and inequality).

2.3 According to Boyer (1996) in The City of Crisis: Abandoned Places and the Urban Future, abandoned urban spaces are symbols of societal and economic decline. These spaces, often a result of industrial change, economic decay, or displacement of communities, hold significant meaning beyond their physical neglect. Boyer claims that such spaces reflect urban crisis and inequality, illustrating how cities' spatial realities can become disconnected from their social and economic functions. However, he also suggests that these abandoned areas offer a unique opportunity for urban transformation, renewal, and creative re-use, such as repurposing them for cultural, environmental, or community-driven projects. Boyer highlights the potential of these spaces to become places of re-imagination and revitalization, giving cities a chance to address past neglect while forging new paths for future urban development. **Boyer, M. C. (1996)**

2.4 Potentials of Abandoned Urban Space: Abandoned urban spaces, while often seen as areas of neglect and decay, hold significant potential for transformation and revitalization. These spaces can become valuable assets for cities if approached creatively and strategically. The key potentials of abandoned urban spaces include:

A. Opportunities for Urban Regeneration: Abandoned areas provide an opportunity for cities to regenerate neglected zones, reviving their economic, social, and environmental conditions. By reimagining these spaces, cities can create vibrant neighborhoods, attract investment, and promote community involvement.

B. Creative Re-Use and Adaptive Reuse: Abandoned buildings and industrial sites can be repurposed for new functions, from cultural centers to affordable housing, offices, or public parks. Adaptive reuse involves transforming old structures into modern facilities without demolishing them, preserving historical value while meeting contemporary needs.

C. Environmental and Ecological Benefits: Many abandoned urban spaces can be transformed into green spaces, urban farms, or community gardens, improving local air quality and biodiversity. These spaces also offer opportunities for ecological restoration, turning once-polluted areas into sustainable environments that contribute to urban resilience.

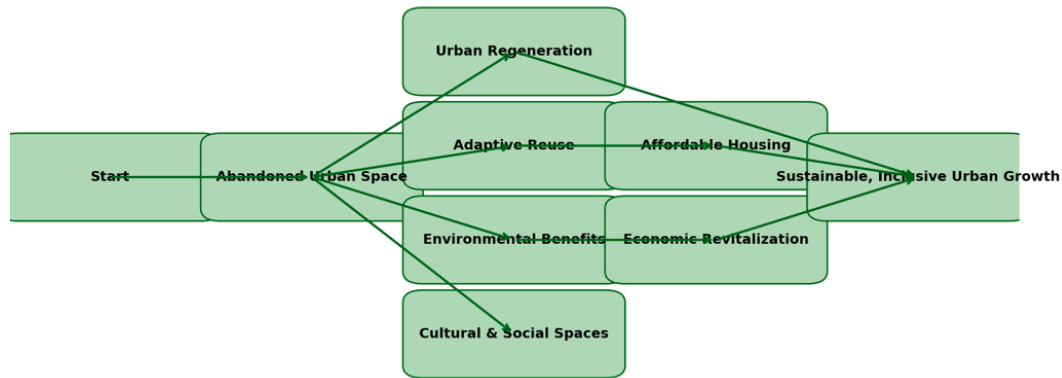


Figure (16) Shows: A Matplotlib Chart that shows a flowchart visualizing the transformation of abandoned urban spaces into sustainable and inclusive urban growth. It outlines key pathways like urban regeneration, adaptive reuse, environmental benefits, and economic revitalization.

D. Cultural and Social Spaces: Abandoned areas can serve as sites for artistic expression, temporary exhibitions, or cultural events, helping to reinvigorate the social fabric of a community. These spaces allow for creative experimentation, providing a platform for artists, performers, and local organizations to engage with the public.

E. Addressing Housing Shortages: In many urban areas, abandoned buildings can be converted into affordable housing, providing shelter in densely populated cities. This repurposing can help alleviate housing shortages while utilizing existing infrastructure.

F. Economic Revitalization: Re-developing abandoned urban spaces can stimulate local economies by attracting businesses, tourism, and creating new jobs. This revitalization can also drive the development of surrounding areas, leading to broader economic growth.

In essence, the potential of abandoned urban spaces lies in their ability to be remained and repurposed, turning decay into opportunity and contributing to the sustainability and vibrancy of urban life. The transformation of these spaces not only addresses physical neglect but also fosters social inclusion, economic development, and environmental resilience.

2.5 International Policies Regarding Abandoned Space

Urban Planning Issues and Managing Unused Spaces in Shrinking Cities: Until now, urban planning has focused on the growth of cities (Turok & Mykhnenko, 2007). Many urban plans attempt to revitalize cities with the expectation of growth, including population influx and economic growth. However, this growth-oriented approach overlooks the urban and population decline of shrinking cities (Hollander et al., 2009). Since these plans try to revitalize cities through population influx and job creation, they cannot efficiently handle the issue of the shrinking city (Hollander et al., 2009). Therefore, plans for shrinking cities must be discussed with a different approach, with a paradigm shift: accept the current situation and improve the life quality of current residents, instead of avoiding current concerns by focusing on growth (Pallagst, 2009).

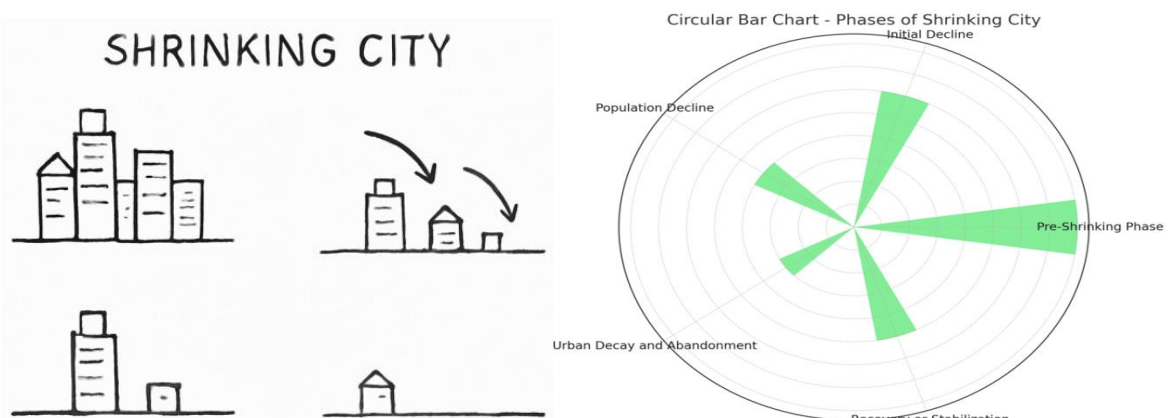


Figure (17) & (18) Shows: A Shrinking Cities Figure and This is the circular bar chart representing the phases of a shrinking city. The chart gives a unique visual perspective on the different stages and their respective impact levels.

Accordingly, this study explored the case of overcoming the dilemma of growth-oriented policies in the context of low growth and population decline by evaluating the increasing amount of unused spaces in shrinking cities as an opportunity and utilizing and managing them through voluntary actions. Abandoned spaces can be tremendous opportunities because as population, buildings, and jobs decrease, these spaces increase and can be easily utilized in various ways due to comparatively less pressure on development. Diverse policies have been employed to respond to these urban crises after recognizing them as opportunities. Sustainability 2020, 12, 6621 3 of 16 Philadelphia has utilized a “greening” strategy to relieve the decline of the city. It seeks to stabilize the city visually and ecologically through the greening of unused sites. The Philadelphia Green Program, led by the Philadelphia Horticultural Society (PHS), has been implemented to convert vacant sites to green spaces

and stabilize the landscape. Additionally, residents have increased their self-initiated competence and received jobs by managing land directly through the PHS Philadelphia Land Care Program (Kim, Miller, & Nowak, 2020). The program provides economic help and opportunities for self-reliance for low-income residents by entrusting them with the management of green areas in connection with real estate companies. Cleveland also stabilizes the land by planting trees or herbaceous plants on unused sites. It controls the decline of the city psychologically by giving the impression that the city has been managed. Additionally, the Garden Boys program promotes participation of the local youth as well as job creation. For example, the program rents unused sites and creates gardens to sell harvested crops. Germany is temporarily using unused spaces by introducing a plan titled “Zwischennutzung” (temporary use). The term refers to a space that is shifting from an empty space to a filled and fixed form for a specific purpose. The plan was introduced to be used for various purposes as a temporary experimental place. Zwischennutzung was chosen as an official urban development strategy in late 1990 as many abandoned spaces were created especially in East German cities after Germany’s reunification (Kim, Miller, & Nowak, 2020). In Berlin, Zwischennutzung has converting unused spaces into new spaces for creative play, such as meeting places, venues, sports events, accommodations, and artificial beaches (Colomb, C. (2012), As a part of Zwischennutzung, Leipzig has implemented a policy to temporarily provide open spaces that are created after demolishing abandoned buildings to the public. (Colomb, C. (2012), It dismantles empty or abandoned houses and converts them into parks or open spaces. It sometimes creates a small forest in the center of a village by planting trees on an open space or expands a garden by demolishing abandoned neighborhood houses. Depending on the size and purpose of sites, it converts them into community gardens, parking lots, small parks, or table tennis courts. Furthermore, through the plan, Leipzig has attempted to create a green belt through small forests, parks, and gardens (Haase et al., 2017), (Kabisch & Haase, 2011)

2.6 Key Aspects of Urban Design: Here’s a table summarizing the key aspects of urban design based on the provided text:

Aspect	Description
Public Spaces	Includes parks, plazas, and streets designed to promote social interaction, recreation, and community engagement. Accessibility for all individuals is prioritized, ensuring inclusivity.
Sustainability	Incorporates green infrastructure (e.g., green roofs, urban gardens) and energy-efficient designs to reduce environmental impact. Focuses on climate adaptation and resilience against climate change.
Mixed-Use Development	Combines residential, commercial, and recreational spaces in close proximity, promoting walk ability and economic vitality. Reduces dependency on vehicles and fosters vibrant, integrated communities.
Transportation and Mobility	Prioritizes access to public transit, pedestrian and bicycle paths, and traffic flow to reduce congestion and pollution. Encourages sustainable and healthy transportation options.
Social Equity and Inclusivity	Ensures access to affordable housing for all income levels and promotes cultural representation within urban spaces. Designs are meant to foster equality and inclusivity.
Aesthetics and Identity	Focuses on creating visually cohesive environments that reflect the city’s identity. Includes heritage preservation to integrate historical buildings and landmarks with modern development.
Safety and Security	Designs spaces to prevent crime and facilitate emergency access. Features like lighting, visibility, and clear public-private space boundaries support safety and security.
Technology Integration	Implements smart city technologies such as smart grids, traffic sensors, and digital infrastructure like free Wi-Fi and smart lighting to improve urban efficiency, sustainability, and connectivity.

3D Perspective View of Urban Design Priorities

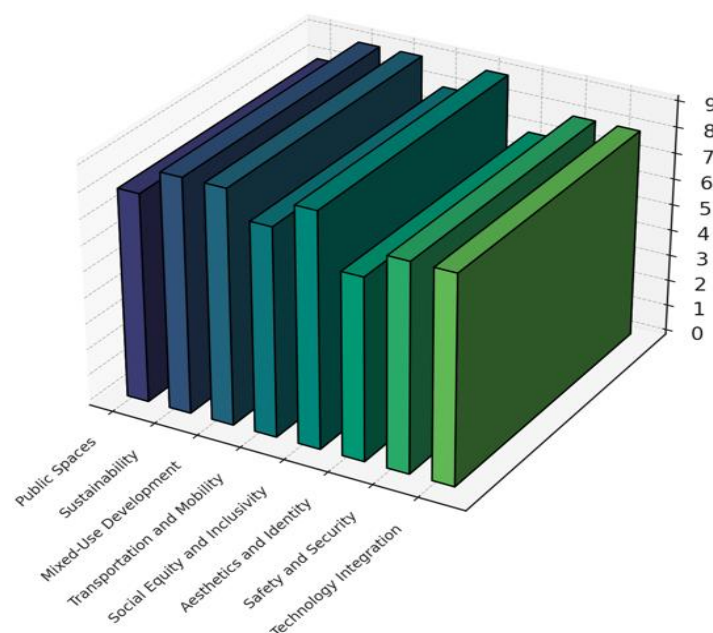


Figure (19) Shows: Here is a 3D perspective elevation-style bar chart representing the importance of various urban design aspects. This view emphasizes depth and comparative height to visually distinguish each aspect's significance.

3. Urban Renewal and its Importance: Urban renewal, often referred to as urban regeneration or revitalization, is the process of improving or redeveloping underutilized or decaying areas of a city. It aims to reintegrate these spaces into the city's overall urban fabric by enhancing their social, economic, and environmental value. **Rahman and Fatemi (2025)** discuss urban renewal in the context of South Asia, emphasizing the need for sustainable approaches to redevelop urban spaces that have been left behind in the face of growing populations. Dhaka, with its overcrowding and inadequate infrastructure, presents a significant challenge for urban planners. However, research on urban renewal, particularly in government housing areas, suggests that neglected spaces like abandoned service corridors could be transformed into multifunctional urban spaces, thus contributing to the city's livability and sustainability (**Bird et al., 2018**).

In Dhaka, **Al Mahmud (2017)** explored urban renewal in the Motijheel area, highlighting the benefits of revitalizing underutilized spaces. Similarly, **Haque (2022)** points out that the city's urban challenges cannot be addressed without focusing on the neglected infrastructure, including service corridors in older government housing complexes. These corridors, initially designed for utilities and services, are now abandoned or underused, thus presenting an opportunity for urban renewal. This paper builds upon these findings by proposing a multidimensional approach to revitalize these areas, integrating environmental sustainability and social inclusivity.

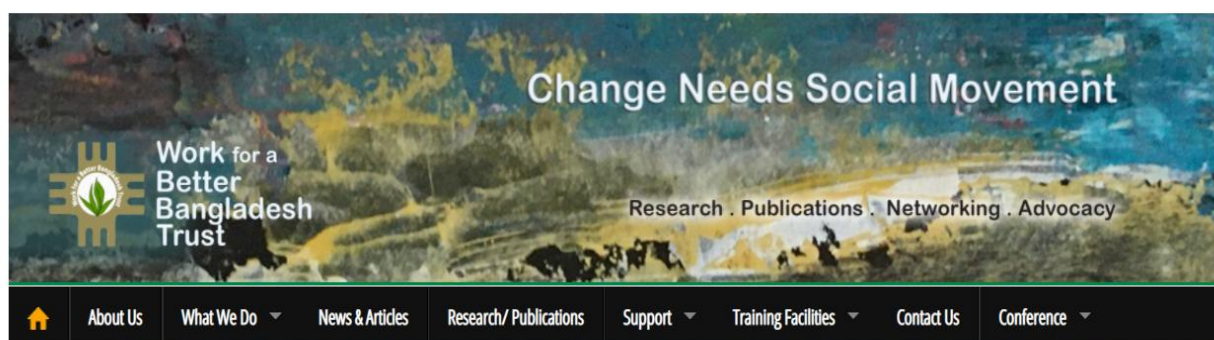
3.1 National Policies in Abandoned Space: 8th FYP: Abandoned Space In Dhaka:

The Government of Bangladesh, through its national development frameworks like the 8th Five-Year Plan (**FYP**) (**2021–2025**), has acknowledged the urgent need to manage urban land more efficiently, including the revitalization of abandoned or underutilized spaces in cities like Dhaka. Abandoned urban spaces in Dhaka include old government buildings, unused service corridors, derelict public lands, and decaying infrastructure. These areas often remain neglected due to poor urban governance, overlapping land authorities, rapid unplanned urbanization, and lack of proper policy execution. However, these spaces hold untapped potential for improving urban life if repurposed wisely. The 8th FYP emphasizes sustainable urban development, with a focus on inclusive, green, and resilient cities. Although it does not always use the term “abandoned spaces” explicitly, it strongly supports:

- Urban renewal through better land use planning.
- Rehabilitation of unused public properties to address space shortages in cities.
- Encouraging mixed-use development and vertical expansion to reduce land pressure
- Public-private partnerships (PPPs) for regenerating abandoned infrastructure into functional community spaces (e.g., markets, parks, or housing).
- Strengthening urban governance to reclaim misused or illegally occupied government land.

3.1.1 Reference .01

There are no records in abandoned urban spaces in Dhaka. Work for a Better Bangladesh (WBB) (**WBB Trust, 2019**) Trust with the collaboration of Dhaka North City Corporation, Health-Bridge Canada, Block by Block and UN-Habitat, community people of 5 wards (2, 4, 5, 7 and 9) in Mirpur designed 5 spaces to upgrade as small scale public spaces. Most of these spaces were abandoned (01). Some minor changes, with support of community people, will provide socialization opportunity to the communities. Special attention was taken for universal access, space for women and children.



Abandon spaces to upgrade as parks and children zone

Other Activity

Figure (20) Shows: *Abandon spaces to upgrade as parks and children zone.*

3.1.2 References.02

Panam Nagar in Sonargaon, about two hours drive from Dhaka is a fully abandoned city of the Hindu merchants in Bangladesh built in the early nineteenth-century. It is a popular tourist attraction in Bangladesh and one of the highlights of the country-a must-visiting site for travelers visiting Bangladesh.

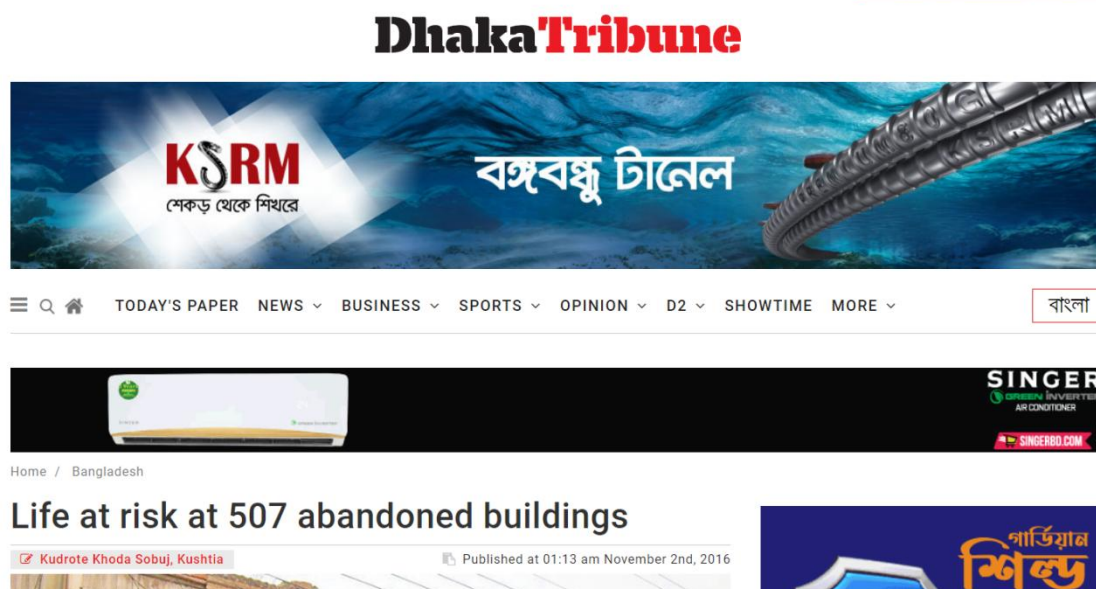


Figure (21) Shows: Life at risk at 507 abandoned buildings.

3.2 Related Issues In Abandoned Space:

1. Safety Hazards

- **Structural Deterioration:** Abandoned buildings or spaces often suffer from physical decay, leading to the risk of collapse, dangerous debris, and exposed wires. This poses a serious threat to public safety.
- **Vandalism and Crime:** These areas often attract criminal activity, including vandalism, squatting, theft, and drug use. The lack of proper monitoring and maintenance further exacerbates these issues.

2. Environmental Concerns

- **Pollution:** Abandoned sites can become dumping grounds for waste, including hazardous materials like chemicals, asbestos, and pollutants. This can lead to soil and water contamination, affecting local ecosystems.
- **Overgrowth and Loss of Green Spaces:** Unused land, if not properly managed, can lead to overgrowth of invasive species, blocking access to green areas and limiting biodiversity.

3. Social Issues

- **Negative Impact on Community Health and Well-being:** Abandoned spaces in neighborhoods can lower the morale of the community. These areas often have a sense of neglect, leading to mental health issues and a decrease in the quality of life for residents.
- **Social Exclusion:** Abandoned spaces often contribute to social exclusion by creating divides between the developed and neglected parts of a city. People in the immediate vicinity may feel marginalized or less valued.

4. Economic Decline

- **Decreased Property Value:** Abandoned spaces decrease the aesthetic value of a neighborhood, which can lower property prices in the surrounding area. This also makes it less attractive for investment and development.
- **Loss of Potential for Economic Use:** These spaces, if properly developed, could offer economic benefits, such as creating job opportunities or attracting businesses. However, when left unused, they represent missed economic potential.

5. Legal and Ownership Complications

- **Ownership Disputes:** In many cases, abandoned spaces are the subject of unclear or disputed ownership. This can make it difficult to carry out redevelopment, especially if no clear entity is responsible for the site.
- **Zoning and Regulatory Issues:** Even if ownership is clear, zoning laws and regulations can complicate the potential for development. For instance, the land might be zoned for industrial use but could be redeveloped into residential areas.

6. Urban Sprawl

- **Development Pressure:** If abandoned spaces are not redeveloped, it can encourage urban sprawl, as cities continue to expand into undeveloped land. This can contribute to further loss of agricultural or green spaces, increasing pressure on the environment.

7. Health and Sanitation Issues

- **Rodents and Pests:** Abandoned spaces often become breeding grounds for pests, including rats and mosquitoes, which can spread diseases like plague, dengue, and malaria.
- **Unhygienic Conditions:** Standing water in abandoned spaces can become a breeding ground for harmful bacteria, attracting disease-carrying insects and increasing public health risks.

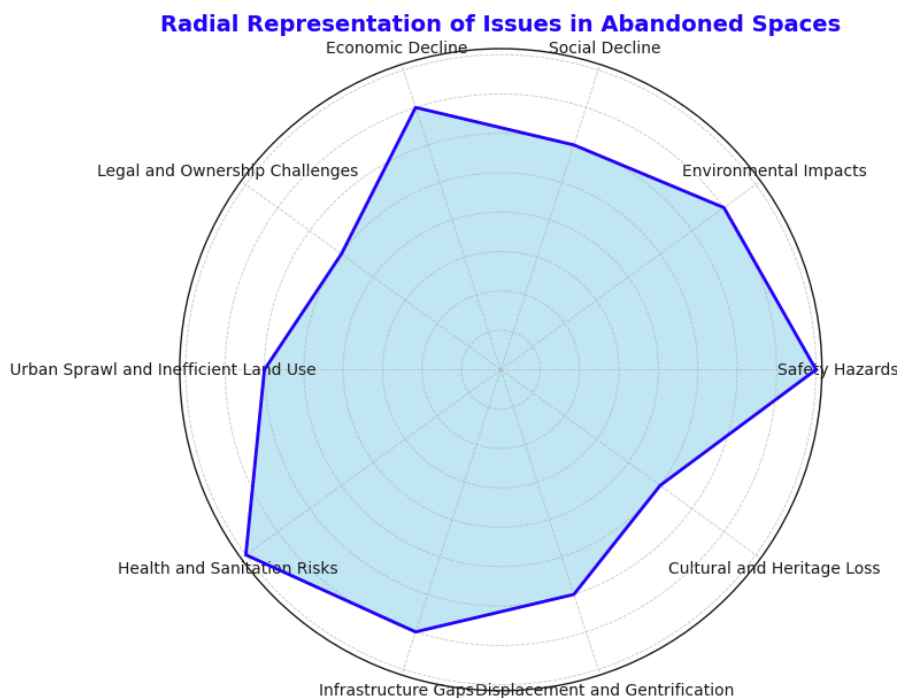


Figure (22) Shows: Here is the radar chart that visually represents the severity of issues in abandoned spaces. The chart provides a radial view of how each issue ranks in terms of severity.

8. Lack of Infrastructure

- **Limited Access to Utilities:** Abandoned spaces might lack essential infrastructure such as water, electricity, or sewage systems, making it difficult to repurpose the land for new uses.
- **Transportation and Connectivity:** Redeveloping abandoned spaces may require improvements in transportation and infrastructure, which can be costly and challenging, particularly in densely populated or poorly connected urban areas.

9. Community Displacement

- **Gentrification Risks:** In some cases, redevelopment of abandoned spaces leads to gentrification, which displaces low-income communities and disrupts existing social structures. This can lead to social unrest and resentment from the displaced population.

10. Cultural and Historical Value

- **Loss of Heritage:** Some abandoned spaces may have historical, cultural, or architectural significance. Demolishing these sites or redeveloping them without considering their historical value can lead to the loss of important heritage.
- **Community Identity:** Many abandoned spaces, particularly in older neighborhoods, contribute to the community's identity. Improper handling or demolition of such spaces can result in a loss of cultural identity for local residents.

3.3 Waste Management System in Dhaka: Report and 8th FYP

A. Solid Waste Management in Dhaka:

1. Primary Waste Collection (1) Legal Basis of Waste Collection Dhaka City Corporation Ordinance¹ is the basic law regarding street/drain cleaning, waste collection and transportation. According to Section 78 of the Ordinance, DCC is responsible for secondary waste collection to remove waste from its dustbins/containers, and transport the waste to final disposal sites. Residents are responsible for bringing their waste to DCC's waste collection points where dustbins/containers are located as shown below. (Dhaka City Corporation Ordinance, 1983)

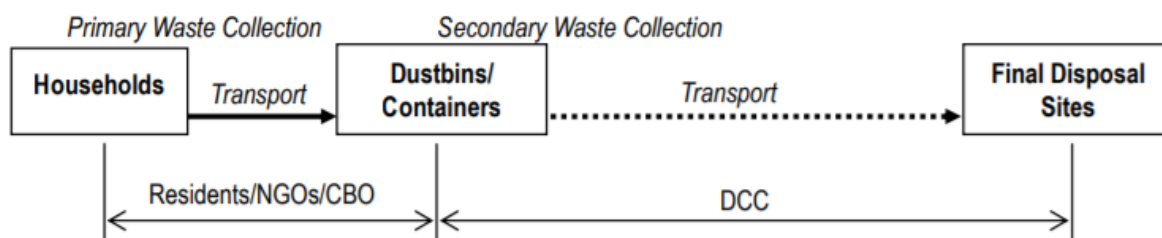


Figure (23) Shows: Solid Waste Management Diagram

1. DCC Initiative in Primary Waste Collection In 2002, (DCC, 2002) DCC introduced an approval system of NGOs/CBOs/private organization for providing door-to-door waste collection services in all wards. DCC has given approvals to 47 NGOs/CBOs; however, not all of them have started their activities yet.

2. Improved waste management includes proper collection, segregation for reuse, recycles and environmentally sound disposal (8th FYP).

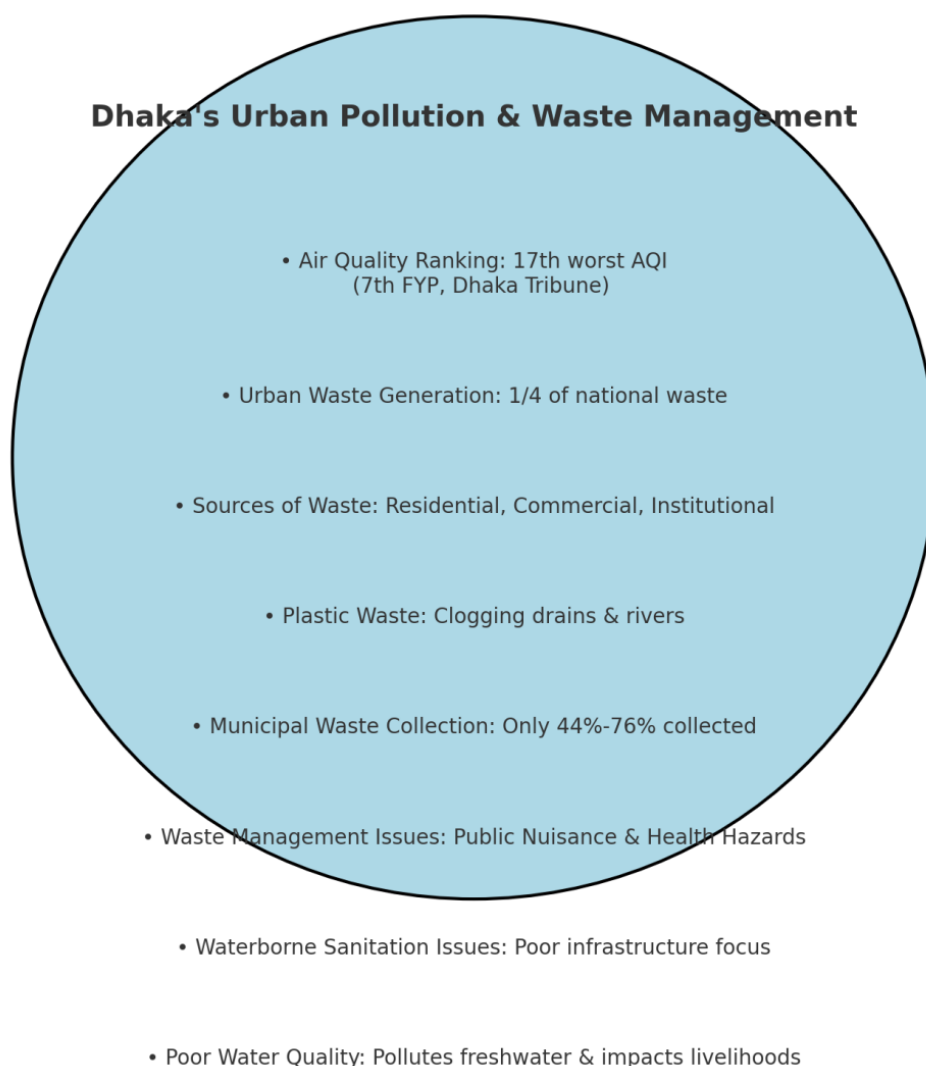


Figure (24) Shows: *A detailed circular diagram representing Dhaka's urban pollution and waste management issues, with each point from the table included.*

B. Environmental Sanitation and Waste-Water Management:

Increasing urbanization and water usage has resulted in a proliferation of waterborne sanitation in Bangladesh. The majority of infrastructure projects focus on the provision of sanitation, but management of residual wastes is generally not given sufficient consideration. Problems caused by uncontrolled discharge of wastewater and faecal sludge have major implications for environmental health conditions in urban and peri-urban areas. Many of the cities and towns in Bangladesh contain swamps and lakes, which are used for informal aquaculture activities by local residents and the majority of them, are contaminated with faecal matter. Poor water quality affects the availability of fresh water for different uses and has negative impacts on the livelihoods of the poorer communities. Contamination of surface water bodies and groundwater aquifers by pollutants, including those from domestic pollution exacerbate water quality problems and endanger both natural ecosystem integrity and public health.

C. Policies Related To Sanitation and Waste Water Management:

Sanitation and wastewater management policies are essential for maintaining public health, safeguarding the environment, and promoting sustainable urban development. These policies aim to ensure that waste is properly managed and treated, preventing contamination of natural resources like water and soil, and mitigating health risks associated with inadequate sanitation.

National sanitation policies are often designed to ensure universal access to improved sanitation facilities and promote good hygiene practices. For example, Bangladesh's National Sanitation Strategy aims to provide access to sanitation for all by 2030, while India's National Rural Sanitation Policy focuses on eliminating open defecation through community-led efforts.

These policies help in setting national standards for sanitation and waste disposal, making sanitation services accessible to every household, particularly in rural and underserved urban areas.

Wastewater management policies focus on the treatment and safe disposal of wastewater, which is essential to prevent environmental pollution. Laws like the Water (Prevention and Control of Pollution) Act in India regulate wastewater discharge, requiring industries and urban areas to treat wastewater before releasing it into water bodies. Similarly, in Bangladesh, the National Water Policy encourages the sustainable management of wastewater and the development of treatment facilities to protect public health and water resources.

Integrated urban sanitation policies combine sewage management with solid waste management to offer a comprehensive approach. These policies aim to improve urban sanitation systems by ensuring that both wastewater and solid waste are handled efficiently. Urban areas often face challenges in managing wastewater due to population growth and the rapid expansion of informal settlements. Policies are also in place to encourage public-private partnerships for developing and managing sanitation infrastructure in cities.

Public health regulations are another important aspect of sanitation policies, focusing on preventing the spread of diseases related to poor sanitation and wastewater management. These regulations ensure the construction of septic tanks, proper waste disposal systems, and enforcement of hygiene standards in public spaces to protect communities from health risks like cholera, diarrhea, and other waterborne diseases.

Water recycling and reuse policies promote the use of treated wastewater for non-potable uses like irrigation, industrial cooling, or toilet flushing. This is particularly relevant in water-scarce regions, where the demand for water is high. Such policies help reduce pressure on freshwater sources and promote sustainability.

Environmental protection is another key objective of wastewater management policies. Many countries have regulations in place to ensure that wastewater is treated in a way that minimizes harm to natural ecosystems. These policies ensure that wastewater treatment plants use advanced filtration technologies to treat effluent and release it in a way that does not pollute rivers, lakes, or oceans.

In terms of financing, sanitation policies often include mechanisms for funding infrastructure projects, including wastewater treatment plants. Governments may seek both public and private investment to ensure the construction, operation, and maintenance of effective wastewater management systems. Additionally, user fees for sanitation services are increasingly being implemented to generate revenue for maintaining these systems.

Community participation is also integral to sanitation and wastewater management policies. Public awareness campaigns and community-led programs encourage proper sanitation practices, such as safe disposal of waste and the importance of hand washing, to reduce health risks.

Lastly, policies on climate resilience address the challenges posed by climate change, including increased flooding and water scarcity. Wastewater management systems are designed to adapt to these challenges by incorporating flood-resistant infrastructure and water-saving technologies.

Sanitation and wastewater management policies are multi-faceted, aiming to provide safe, sustainable, and environmentally sound systems for managing waste. These policies focus on infrastructure, public health, environmental protection, and community involvement to improve sanitation outcomes and ensure the well-being of communities.

D. Policies Related To Safe Water Supply and Sanitation:

The National Policy for 'Safe Water Supply and Sanitation' (1998) 2, published by the Local Government Division of the Ministry of Local Government and Rural Development and Co-operatives (MLGRD&C) (**Local Government Division, 1998**) is the main policy document that guides the development and implementation of long-term action plans related to the provision of water supply and sanitation services. The policy recognizes the importance of users in planning, development, operation and maintenance activities through representation in local government and community-based organisations and calls for greater private sector involvement in provision and water and sanitation services.

The policy also highlights the need for capacity building at the local/community level to deal effectively with local water and sanitation problems and states that decentralization of decision making, training at the local level and local initiatives for resource planning are essential for success. The commitment and capacity of the Government to follow this up effectively is uncertain, but the policy makes specific reference to the objective that DPHE, WASA and Bangladesh University of Engineering and Technology (BUET) will formulate an appropriate training program (on DWWM) and "impart the same in a decentralized manner". Although the Government of Bangladesh (GoB) has reiterated its commitment to improving sanitation conditions at the SACOSAN conference in October 2003 via its "Total Sanitation by 2010" policy statement with the objective of 100% coverage of sanitation by 2010, the management of wastewater and faecal sludge receive little attention in this framework. Legislation relevant to the wastewater management sector in Bangladesh includes the National Environmental Policy (1992), which promotes environmental pollution control standards in a wide range of areas including water resources. In addition, the 'National Water Policy' formulated more recently in 1999, aims to promote a legal framework and regulatory environment for wastewater disposal into natural watercourses. It recommends that these are set by Water Resources Planning Organisation (WARPO) in consultation with the Department of the Environment (DOE) (**Water Aid Bangladesh, 2005**)

The National Water Policy recognizes that protection and preservation of the natural environment is essential for sustainable development and that water resource management actions should be carried out in a way that avoid or minimize environmental damages. It emphasises that all agencies and departments entrusted with water resource management responsibilities (**Regulation, Planning, Construction, Operation, and Maintenance**) will have to enhance environmental amenities and ensure that environmental resources are protected. Two of the main instruments to implement the National Water Policy are the National Water Management Plan (**NWMP**) and the National Environmental Management Action Plan (**NEMAP**).

The National Environmental Management Action Plan (**NEMAP**) were 9 decentralized domestic waste water and faecal sludge management in Bangladesh formulated in 1996 as the first major instrument of policy used by the Government for environmental activities in Bangladesh. In the following year, the Sustainable Environment Management Programme (SEMP) was instigated under NEMAP with funding by UNDP and responsibility for programme implementation under the Ministry of Environment and Forestry (MoEF). Projects under SEMP are being implemented in five main sectors related to

01. Policy and Institutions
02. Participatory Eco-System Management
03. Community-based Environmental Sanitation
04. Awareness and Advocacy, and
05. Training and Education.

The programme aims to promote public private partnerships and greater involvement of communities to improve service delivery mechanisms and strengthen government efforts in poverty alleviation through adoption of environmental measures leading to sustainable use of resources for sustainable human development⁴. 1.4 Institutional framework for wastewater management in Bangladesh the following agencies provide the institutional framework for the implementation of policies that relate to wastewater management activities in Bangladesh. However, as documented in this report, there are also other non-governmental organisations that are also active in the sector, although obviously without formal responsibility to act on behalf of government in the implementation of policy.

E. Department of Public Health Engineering:

The Government of Bangladesh (**GoB**) initiated interventions in the water supply and sanitation sector through the establishment of the Department of Public Health Engineering (**DPHE**) in 1935 during the British Colonial Period (although it only officially became known as DPHE in 1992). Under the MLGRD&C, DPHE has the mandate to provide water supply and sanitation facilities in rural areas, sub-districts towns (**otherwise referred to as upazila or thanas**), municipalities and the area administered by Khulna City Corporation. Water and Sewerage Authorities: In the 2 largest urban centers, Dhaka and Chittagong, Water and Sewerage Authorities (**WASAs**) are the government agencies that have the designated responsibility for provision of water supply and sanitation to urban communities. However, Dhaka WASA develops and manages water supply, sub-surface drainage and sewerage, whereas Chittagong WASA deals only with water supply.

F. Local Government Engineering Department:

In addition to DPHE and the two WASAs, the Local Government Engineering Department (LGED) is the other main government agency responsible for infrastructure development in the water sector (as well as other sectors requiring construction of infrastructure), including construction of urban wastewater and storm water drainage systems. LGED is part of MLGRD&C and implements urban WSS activities as components of infrastructure development projects and subsequently hands over responsibility for operation and maintenance to local authorities – generally the city corporations or municipalities. Although LGED is not formally responsible for water supply and sanitation, the National Policy for Safe 10 Decentralized domestic wastewater and faecal sludge management in Bangladesh Water Supply & Sanitation 1998 recognizes its role in urban water supply and sanitation. The City Corporations are the publicly accountable and democratically elected decision making body in the divisional towns. In Dhaka and Chittagong, the City Corporations are also responsible for the development and maintenance of surface drains and solid waste management.

G. Integrated Waste Water Treatment and Management:

Integrated wastewater treatment and nutrient resource recovery Duckweed (*Lemna* spp. or *Spirodela* sp.) is a small floating aquatic plant, which grows prolifically in nitrogen-rich environments and is abundant in the natural environment throughout the humid tropics. It produces a protein-rich biomass, which is commonly used as a fertilizer in paddy fields. However, duckweed cannot grow in highly polluted water and thus the use of duckweed is for tertiary treatment after receiving primary and secondary treatment. This treatment generally consists of a combination of anaerobic and facultative ponds, although other forms of treatment may be used⁷. Nutrients are assimilated and transformed into plant biomass (in this case duckweed but other types of aquatic plant can be cultivated), which is harvested and can be used for as feed for fish, poultry or livestock. Duckweed can then be used as a feed for the production of larger, high-value fish, as feed for cattle or chickens or as a fertilizer in paddy fields⁶.

3.4 Water Pollution: 7th FYP:

A. Improved Management to Control Water Pollution: In order to control water pollution, the Government has banned the use, production and marketing of polyethylene shopping bags and made it mandatory for the industries to set up Effluent Treatment Plants (ETPs) to treat their waste before discharging them to water bodies. Unfortunately, the effective enforcement of regulation concerning the ban of plastic is still undermining environmental health, which needs more focus under the 8th Plan. Therefore, the Department of Environment (DoE) takes legal action against violators including the imposition of penalties as provided under the law. The tannery industries operating in Hazaribagh have been relocated to the tannery industrial estate in Savar, which will dispose the liquid wastes through a common ETP.

B. Controlling Noise Pollution: Noise pollution is one of the major environmental issues in all the big cities in Bangladesh. High noise has serious health impact including hearing impairment, increase in blood pressure and heartbeat, obstacle in digestive system and above all, decrease in growth of the children indiscriminate and impatient honking of the drivers is one of the major reasons for noise pollution. The Government has promulgated noise (Control) Rules, 2006. To

expedite implementation of the Noise (Control) Rules, 2006, the Government has implemented a program titled Integrated and Participatory

Program to Control Noise pollution during 2015-2017. **(DoE, 2015-2017)** The program included airing a discussion program on television and publicity campaign through Public Media and Social Media. DoE has taken a project named 'Noise Pollution Control through collaborative and participatory approach' to address noise pollution problem in the country.

C. Monitoring and Reducing Air Pollution: The Department of Environment under the Ministry of Environment, Forest and Climate Change has been consistently monitoring the ambient air quality of the country through its 16 (sixteen) Continuous Air Monitoring Stations (CAMS) and 15 (fifteen) Compact CAMS installed across the country. 05 (five) criteria air pollutants are continuously monitored by these stations. Daily Air Quality Index (AQI) values are also calculated based on the available air quality data that refers to the situation of air pollution in terms of health impacts, and this daily AQI is presented at DoE website. To address the air pollution effectively, the Government of Bangladesh has taken necessary measures in terms of policy, legal and administrative instruments. The Government of Bangladesh has enacted Brick Manufacturing and Kiln Installation Act, 2013 **(Amended 2019)**. To make mandatory use of block bricks, government has issued a gazette notification in November 2019. The gazette notification has

Phased the targets of reduction of use of clay-fired bricks over the period of 2019 to 2025, except for the construction of base/sub-base of the high-ways. The Department of Environment in collaboration with local administrations started rigorous enforcement drives to dismantle or shut down polluting brick kilns across 480 the country particularly in the districts adjacent to Dhaka city. The Ministry of Environment, Forest and Climate Change issued a comprehensive guidelines or directives to relevant government and nongovernment entities with a view to controlling and reducing air pollution from their respective activities particularly pollution from brick kilns, construction activities, vehicles, open biomass burning, industry and others. In order to address air pollution issues comprehensively, a separate Act 'Clean Air Act, 2020' has been formulated.

3.5 8th FYP -486

Government of Bangladesh understands and acknowledges that growth can only be sustainable when it is green in nature – vis-à-vis – “Green Growth”. In fact, even very recently, Bangladesh has ranked poorly in the 2020 Environmental Performance Index (EPI) (162 out of 180) by Yale and Columbia University. **(Government of Bangladesh, 2020)**. The Eighth Plan will also incorporate a strategy of green growth to harmonize economic growth for better environmental sustainability.

3.5.1 Adoption of Environmental Fiscal Reforms (EFR) for Sustainable Development:

The Government will undertake a wide array of environmental fiscal reforms for improving environmental performance to attain sustainable development and green growth. These will include: Integrating Environment and Ecosystem Conservation and Climate Change Issues in Planning and budgeting: The Government will prioritize the integration of environmental conservation in budgetary management by increasingly undertaking green Public Financial Management (PFM), which will depend on green accounting, procurement and auditing. Project selection will require full accounting of environmental costs for all investment projects. The incorporation of the “Green PFM” agenda will happen under the 8FYP and institutional capacities in the Ministries of Finance, Planning and concerned line ministries will be improved and strengthened to achieve this objective.

A. Increasing Resources for the Ministry of Environment, Forest and Climate Change:

The Government acknowledges that for the MoEFCC to play its due role in environmental management, it must invest in its capacities and allow it to use more resources. The government will progressively increase in its budget to reach the target of 0.1% of GDP by 2025 and 0.5% of GDP by 2041, so that it can improve capacity through better staffing, including technical professional staff, establishing a strong digital Management Information System (MIS) based on a data bank that gets regularly updated, and regular monitoring and evaluation of environmental compliance.

B. Increased Resources in the Management of Ecosystem and Biodiversity Conservation:

As per the ECA rules 2016, The Government of Bangladesh is going to establish a special fund for management and improvement of Ecologically Critical Areas and create financial code of revenue budget to improve the ECAs following ecosystem based approach. The Government of Bangladesh has declared 13 areas as ECAs and imposed different restrictions to restrict the deterioration of the ecosystem and biodiversity. The Government of Bangladesh is the party to the Convention of Biological Diversity (CBD). To implement the Convention and its objectives, the Government of Bangladesh has developed the NBSAP 2016-2021, as CBD will enter into a new decade (2021- 2030). During the beginning of the 8FYP, Bangladesh has to revise the NBSAP in line with the global targets under Global Biodiversity Framework. As per Bangladesh Biological Diversity Act, 2017 The Government of Bangladesh is going to establish Biodiversity Fund to support activities of conservation and sustainable use at the grass root and community level.

• Taxation of Emission from Industrial Units:

The Government has already introduced policies for the control of air pollution from brick manufacturing kilns. Moreover, under the 8FYP, it will develop more policies to control emission from the other polluting industries by developing a “polluter pays principle with appropriate compensation”. In order to do so, the Government will undertake measures to better monitor air quality standards of industrial units better – as the absence of proper testing equipment and database has so far undermined such effort. Thus, the creation of an appropriate mechanism to store data and monitoring will allow the Government to introduce a system of taxes on air pollution, which will create incentives for the industrialists to adopt clean technology.

- **Taxation of Industrial Water Pollution:**

The Government will increasingly monitor and impose taxes and fines for the pollution of water by the industrial units. This will improve the incentive structure as private entrepreneurs will be incentivized to invest in ETPs, so that a better management of pollution is attained under the 8FYP. At present, disposal of untreated effluent by the industrial units is causing major deterioration in the quality of surface and ground water.

- **Biosafety:**

The Government of Bangladesh has developed Biosafety Policy and Biosafety guidelines. Under Bangladesh Biosafety Rules 2012, the risk of genetically modified organism (GMO) has to be controlled to ensure safe transfer and handling of GMOs, taking into risk to human health. Institutions/Organizations dealing with GMOs should implement the Biosafety measures following the Biosafety rules and guidelines. DoE has completed a development project on Implementation of NBF and further enhancement of capacity building is envisaged during 8FYP.

- **Reducing Subsidies for Fuel and Adopt Green Tax on Fossil Fuel Consumption:**

The Government will increasingly reduce its subsidies on fossil fuels to support its policies and goals on climate change. The Government will also introduce a green tax on the consumption of fossil fuels as it discourages the emission of CO₂ from fossil fuels but also provides a useful avenue for generation of revenue that will be used for supporting clean energy and other environmental programmers.

- **Pricing Policies for Water, Sanitation and Solid Waste Management:**

The Government recognizes that the state alone cannot be the sole provider of water, sanitation and waste management services. Consequently, under the 8FYP, the Government will develop appropriate pricing policies to encourage private piped water supply, hygienic and environmentally safe household sanitation and sound management of solid waste. The public sector alone cannot handle the large service gaps and private provision might be needed. The Beneficiary Pays Principle will be used to develop the criteria for setting prices – especially for the urban middle class who now has the income to bear such costs.

- **Introduction of Household Illegal Waste Dumping Charges:**

The Government acknowledges that a major source of air and water pollution is the dumping of household wastes in water bodies and in neighborhoods. With improved solid waste management services from the municipalities and private sector as discussed above, this endemic problem can be reduced. As a result, under the 8FYP, a system of pollution charges for the illegal disposal of household waste will be introduced which will improve household cooperation and compliance. The Government will initially undertake a pilot scheme in the high-income urban neighborhoods where the installation of security cameras could assist compliance with such regulations.

- **Exploring Private Financing Options:**

There are three main instruments for boosting private financing for the environment. First, in several areas, such as a forestation outside dedicated forests for timber and non-timber forest products, fisheries, eco-tourism, water supply and waste management, private supply will be encouraged with proper regulatory and pricing policies. Second, legal and regulatory policies will be used to encourage proper adoption of measures that include private investment in the protection of the environment. Important examples of this include adoption of clean air technology in the industries, installation of ETPs in industries and private hospitals, and prevention of land degradation through proper farming practices – including the banning of Jhum cultivation while providing alternative livelihoods to the affected population. Third, the public sector will enter into co-financing arrangements for a range of environmental services through Public-Private Partnerships – including partnerships with communities.

- **Taxation on Timber Extraction:**

The Government of Bangladesh recognizes the challenges which it faces in forest management, including serious administrative and governance issues. As a first step, it will prioritize improvements in forest governance through a proper Management Information System (MIS). This will assist the formulation of a tax framework for on the extraction of timber by taxing excessive usages of timber by the wood furniture industry. This can become an important source of revenue for the Government over time and also support more sustainable timber extraction. The tax will be levied at the factory gate where logs enter for further processing so that all logging are captured in the tax net.

3.5.2 Administrative Reforms for Implementing Environmental Fiscal Reforms

Develop an “Water and Sanitation Regulatory Agency” (WASRA): During the 8FYP, the Government will support the establishment of the Water and Sanitation Regulatory Agency (WASRA) that will be charged with regulating the public and private utilities engaged with supply water and sanitation services and setting prices. This will follow the participation of private actors in such markets, so that equitable pricing policy ensures both private investment and fair pricing for such basic services.

A. Air pollution condition in Dhaka: reducing system in Dhaka: 8th FYP Guidelines:

The sustainable Development Goal-11 calls for Making cities and human settlements inclusive, safe, resilient and sustainable. There are eight targets for achieving this goal. One target for improving the environment of city is -by 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management(United Nations. (2015). *SDG 11: Sustainable cities and communities.*). As one of the member Bangladesh is involved in adopting the UN Resolution on Sustainable Development Goals and working hard for reaching the SDG's goal. The 7th, 8th and 9th Five Year Plan put special attention on formulation strategies to reflect the recommendations of SDG

and NUA (New Urban Agenda)(Ref-8th FYP). (Search for abandoned areas-any guidelines) May be added strategy of 8th FYP (search for abandoned areas-any guidelines).

B. Importance of Set Back Rules and Car Parking Area of a Building:

Acceptable building setbacks, usually minimum setbacks from a property line or the street and sidewalk right-of-way, are specified for each zoning district in most zoning ordinances. According to Imarat Nirman Bidhimala, setbacks varies according to area of the site, width of the front road, built area is calculated by given FAR (Floor area Ratio) and maximum ground coverage (MGC), height of the building is controlled by FAR and MGC. There is a scope to use the setback spaces to increase the potentiality of the urban shared space.

Number of car parking is determined according to the size and number of flats in a building in Imarat Nirman Bidhimala, 2008. So, there are possibilities to get free space at least one parking area in each plot. This space may be helpful to create redesign of ground floor and thoroughfare.

C. Problem Associated with Open Spaces in Dhaka City

From a small town with a population of only 200,000 people in 1947, Dhaka grew to a city of 4.2 million in 1987, and has now become a megacity of nearly 10.5 million (BBS, 2011).

Over the past two decades, studies show that urban green spaces are fast disappearing or beendestructed at an alarming rate in urban areas. The urbanization takes the form of either densification of urban core or spatial expansion of urban areas outwards (urban sprawl). Studies by Honu et al (Honu et al, 2009). It is found that rapid urbanization has resulted in the conversion of several urban lands into built-up structures and excessive destruction of the natural ecosystem including green spaces. There have been reports about the encroachment of open spaces, playgrounds and parks in Dhaka city in the daily newspapers in Bangladesh [The Independent, (2018, February 4 and 6; 2015), The Daily Star (2009, October 2; 2015, October 21), Dhaka Tribune (2018, October 18; 2017, October 29;2017, December 30; 2017, December, 28; 2017, December 30)].

As there is no regulatory body to resist encroachment in Dhaka city, encroachment of playgrounds, parks and open spaces is almost a common practice in Dhaka city [Siddique, 1990; The Daily Star (2007, December 5; 2008, December 7; 2008, September 15; 2008, December 7; 2009, April,4)].

As a result, unauthorized construction by local influential persons and renting out of these playgrounds and parks for commercial purposes are also common practices for DNCC and DSCC. These limited facilities are used for commercial purposes and as a result, children are deprived of using these facilities.

The ratio of recreation space to the total area in Dhaka city is far below the standards followed in other countries of the world (Biswas, 2002). The open space ratio in Hong Kong, 1sqm per person within 0.25 mile and 1.5 to 2.5 acres per 1,000 persons within half to one mile in New York. In case of Dhaka city, the amount of open space per 1,000 people is only 0.96 acres, which is far below the level for any modern, efficient city in the globe (Rashid, 2003).

3.6 Perception of an Environment:

Psychology plays a vital role in investigating the science of interaction between humans and their natural environment (Keniger et al, 2013).Environmental psychology encompasses the natural and constructed setting for human existence. Furthermore, the main objective of environmental psychology is to enhance and upgrade the physical conditions for humans in the constructed setting. It also encourages improvement of the human-nature relationship. However, Brenner (1998) argued that human thoughts, emotions, and feelings are influenced but also affected both physically and emotionally by what surrounds them.

A. Aesthetic Assessment

The idea of beauty or beautifying by the processing of human cognition and perception is known as aesthetics (McWhinnie, 1968). This also includes emotional behavior. Ulrich (1983) stated that aesthetic response is about the individual preference that provides a feeling of happiness or sadness and works through cognitive activity by visual confrontation. The aesthetic quality of any built or natural environment is a measure of a viewer's visual perception and responsiveness to that area (Company & York, 2009). McWhinnie (1968) used aesthetics as a benchmark to explain the responsiveness of people towards a visual stimulus.

Azhar et al, 2018 have shown urban leftover spaces can be seen as a catalyst for a change through an ecological sustainability framework. A creative and flexible design would lead to psychologically healthy places by improving the image of a city from within.

it became evident that people prefer familiar scenes or those in a state of chaos that was not being actively used. From the list of choices for improving the leftover spaces, the most prominent were related to more vegetation, creating a thoroughfare, removal of parking, having more seating spaces and changes in materials.

B. Why Mandatory Building Setbacks Are Helpful

While we slipped in the word minimum to modify setbacks earlier, it may be even more important to specify maximum setbacks in some situations. We will say more about that in the commercial setback discussion below. In short, buildings setbacks that fall within a narrow range are very helpful in establishing and signaling neighborhood character. Such a pattern especially helps to create a pleasing small town character. In addition, relatively consistent setbacks are very helpful in designing streetscapes. Variations of a foot or two can make an accent paver or stamped concrete pattern a nightmare to install.

4. Methodology

4.1 Research Methodology: The study will utilize a simple methodology to observe, measure, and determine public concentration zones, alongside investigating the reasons behind those zones. The study will also collect surrounding land use

data to establish a natural linkage through field surveys. A questionnaire survey will be conducted to gather data on users' purpose and frequency of visit, typology and volume of user groups categorized by age, income group, mode of travel, sense of place, and performance. Additionally, GIS Mapping and behavior mapping will be used for further analysis.

4.2 Selection of Study Area: In First Master Plan of Dhaka in 1959, focused on the relatively high land for housing in the following twenty years. As a result, about 18 Government housing projects with open spaces were designed under NHA, PWD and RAJOUK.

Among 18 housing, Housing Estate at Mohammadpur (HEM) was the planned housing in the beginning of planned housing in 1968. So, HEM was selected as a case study. Unused service corridors in HEM of the housing are selected for this research. From reconnaissance survey, it is found that there are more unused service corridors in D Block than other five blocks of HEM. So this block is selected for detail study.

4.3 Data Collection

A. Primary Data: Primary data is collected by direct observation using a observation check list to know the present use of the service corridors and discrepancies. Photographs were taken to find out the present use of these corridors. Key informant interview was done with inhabitants to know the background history about this service corridor. Random sampling was done to know the previous history, use and reason for changes of use of service corridors. Key Informant interview were done with official of National Housing Authority to know the reason for lack of proper maintenance of the corridors.

B. Secondary Data: Approved layout plans-I) Layout plan in 1968 and ii) I) Revised Layout plan in 1978. In revised plan some new plots are designed from low land, open spaces and some changes in layout of housing plots. So, 1978's layout plan of HEM is selected for this study. These plans were collected from National Housing Authority as image file. Then it was drawn in Auto CAD software.

4.4 Data Analysis: Both qualitative and quantitative data are analyzed and synthesized. Then findings are compiled and drawn some guidelines to solve the problems that found from analysis.

4.5 Limitations of the Study: Among six blocks of HEM one block is selected for study for time constraints. It would be better if the survey was possible to do all blocks.

4.6 Season: Survey was done in winter (dry) season. So the rainy season contamination and pollution was not presented as documented way.

5 Profile of the Study Areas

Dhaka Improvement Trust (DIT) was formed in 1956 with the objective of improving urban conditions of Dhaka city. 1959's Master Plan of Dhaka did not take into consideration the low-land areas and focused on the relatively high land for housing in the following twenty years. In 1961-62, proposal for Government Housing projects was done in policy level. National Housing Authority (previous HSD), Public Works Department (previous C&B) and RAJOUK (previous DIT) were involved in designing Government housing in site and service scheme. About 18 housing projects were completed by these authorities. Among this National Housing Authority is working to solve the enormous housing problem of Bangladesh by giving allotment of plot for low and lower middle income group and flats to the people on behalf of Government. It has so far established 34 housing estate throughout the country with all civic and infrastructure facilities.

Dhaka is the capital of Bangladesh located in a strategically central geographical position that accommodates about 10% of the nation's population. It is a metropolitan city that covers 15028 sq. km within RAJOUK area (DDSP, 2016). It is ninth - largest (World Atlas, 2019) and sixth- most densely populated city in the world (BBS, 2011). In the First Master Plan of Dhaka in 1959, focused on the relatively high land for housing in the following twenty years. The plan identified severe scarcity of open space within the planning area (DIT, 1960). As a result, about 18 Government housing projects with open spaces were designed and completed from 1959 to date within Dhaka city. These government housing projects are managed by three organizations: RAJOUK (previously DIT), NHA (Previously HSD) and PWD (Previously C & B).

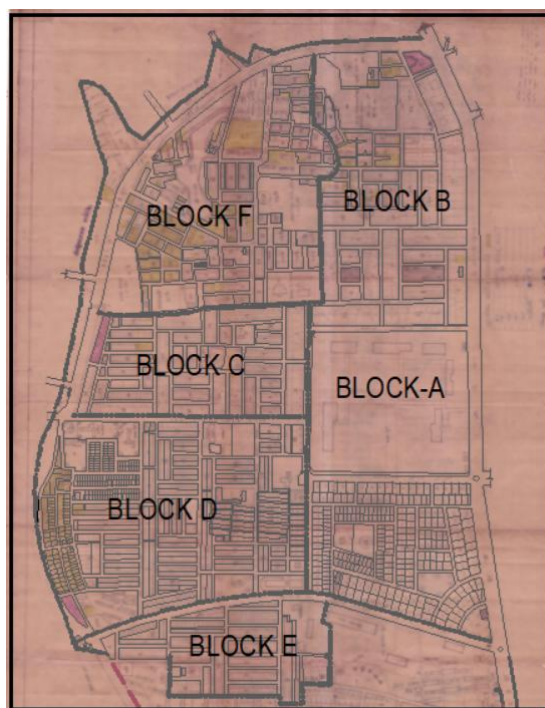


Figure (25) Shows: Map 1: Layout Plan of HEM (1978), Map Source: National Housing Authority, Housing Estate at Mohammadpur under NHLA was planned in 1960 and therefore, it has relatively broad streets and avenues (URL: <https://stamforduniversity.academia.edu/SarahBashneen>).

First planning was done under Aftab Mohammad Khan's guidelines of Housing and Settlement Department in 1961-62 at policy level. In 1968, layout plan of Housing Estate at Mohammadpur (HEM) was prepared following the previous guidance. In 1978, the layout plan was revised under Housing and Settlement Department (Map 4.1). The land area of Housing Estate at Mohammadpur was primarily 434.5 acres in 1968 and 434 acres in 1978. In 2020, the area of housing remains same. Population increased in alarming rate. In 2011, population was 92,760 and projected population in 2020 is 1,50,195 (BBS, 2011). Density of the area is 477 person /acre. There were plots, roads, commercial areas, parking areas, open spaces, mosque, eidgah, school, service facilities and service corridors etc. The housing was under site and service scheme.

Sanitation of the housing was in the form of conventional sewerage and sewage treatment plants such as toilets with septic tanks or latrines. In housing estate at Mohammadpur, a corridor was designated in the backside of each plot for building septic tank and waste water drains. In this research these corridors are mentioned as service corridors.

Furthermore such conventional sewerage and sewage treatment is often not working properly in developing countries. For want of 24 hour water supply to flush the sewers, and because solid waste is often added to sewage, sewers are often blocked, creating bigger environmental problems. Many sewage treatment plants do not function properly due to lack of expertise and cutting of operating costs (ADB, 2006), Model Terms of Reference www.adb.org/water Planning Urban Sanitation and Wastewater Management Improvements).

In 1990 development of water and waste water management happened in Dhaka (Government of Bangladesh, 1990). Water supply and waste water drainage pipelines were provided in front side road. Therefore previously provided sewage line in conventional system and new system under the front side of the plots are co-existing.

Previously waste of the housing was dumped in the dustbin by residents and City Corporation collects it from dustbins/containers and transport to final disposal sites. In 2002, DCC introduced an approval system of NGOs/CBOs/private organization for providing door-to-door waste collection services in all wards.

Service corridors in Housing Estate at Mohammadpur

There were 78 service corridors in Block-D in First approved plan of HEM in 1968. In 1978, the master plan was revised and number of service corridor reduced to 66 for layout changes.

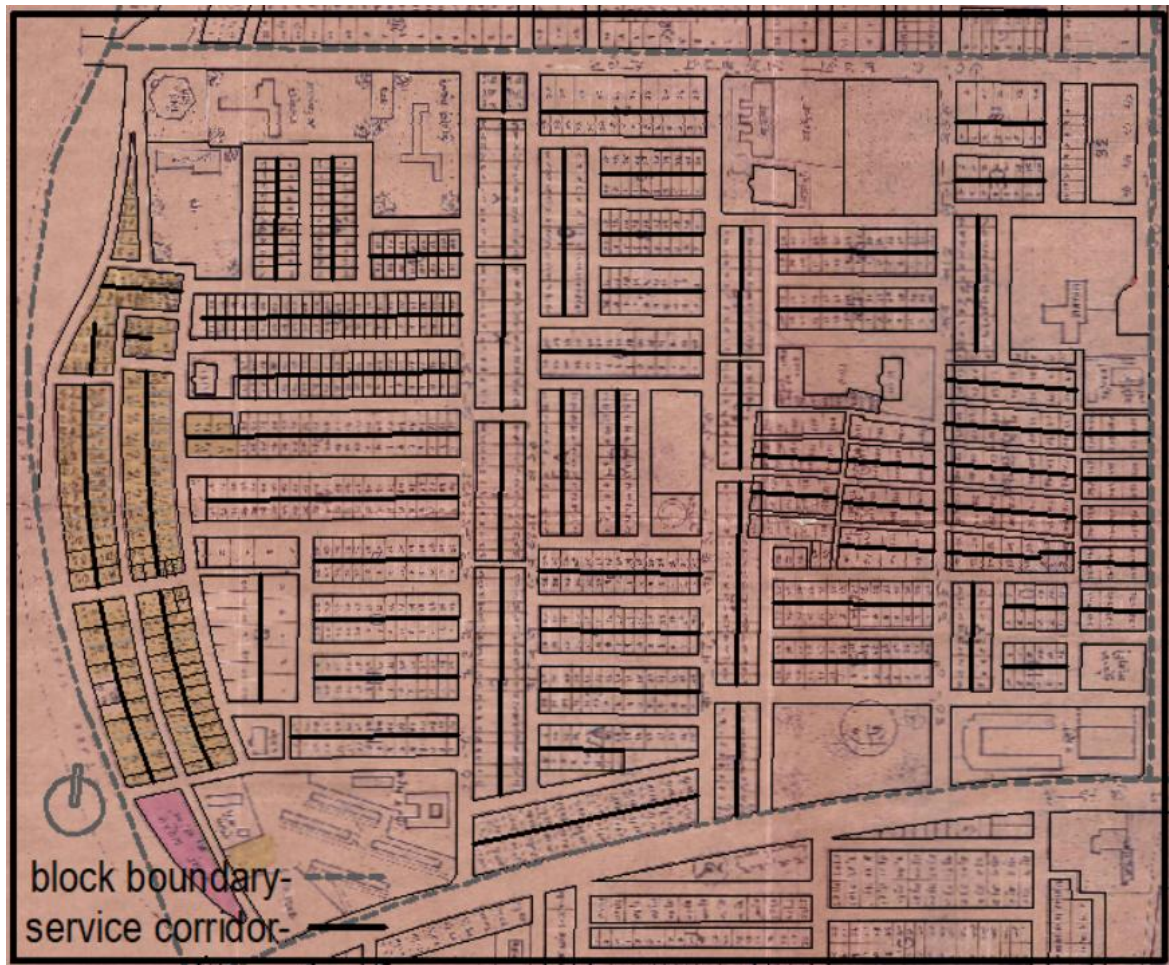


Figure (26) Shows:Map 3: Service corridors in Block-D, HEM in 1978 Map Source: National Housing AuthorityLength of the corridors varies from 50 feet to above 500 feet (Table.1).

Length of the corridor	Number of corridors	Area of corridors
Long (above 500')	11	5000sft x11= 55000
Medium (above 300')	21	3000sft x21= 63000
Above 250feet to300feet	11	2750sft x11= 30250
Below 250'	11	2500sft x11= 27500
Below 150'	12	1500sft x12= 18000
	Total = 66	Total= 193750sft (4.5 acres)

Table.1: Length and number of the service corridors at present in 2021

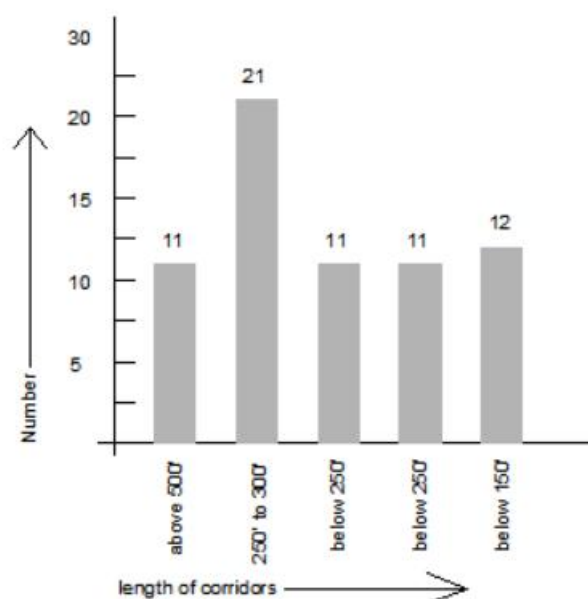


Figure (27) Shows: Length and number of the service corridors at present in 2021

5.1 Area: Area of open space of Block-D in HEM (2020)

Open Space	Area of open space
Nurjahan Road Playground	0.91 acre
Tajmahal Road Playground	0.988 acre
Solimullah Road Playground	0.411 acres
Shahid Park playground	0.411 acre
	Total=2.719acre

5.2 Data Source: Field Survey

Area of open space of Block-D in HEM (2020) acre 2.719acre

Area of service corridor in HEM Block D is acre 4.5 acre

Total area of open space will be 7.219 acre after adding the area of service corridor.

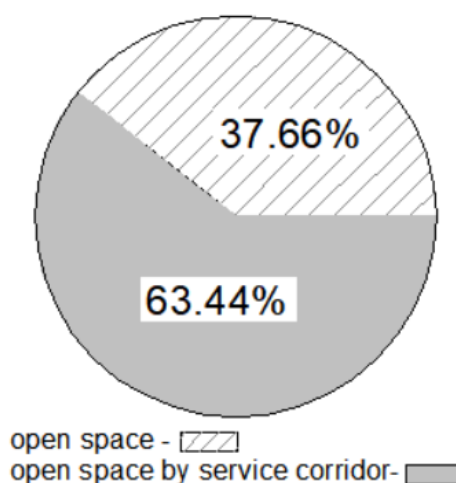


Figure (28) Shows: Open Space by Service Corridor

5.3 Past Condition:

Population of the HEM in 1980's:

Previous System of Waste Management:

Purpose of backside corridors: These corridors are generally 8-10' wide. Sewerage line/ septic tank/ soak pit, water supply line and drainage of waste water from individual residence to main line or tank were provided in the backside of the every plot. Also used as a source of light and air of the backside of the buildings. National Housing Authority (NHA) is the plot allocating authority of HEM. Also NHA is the owner of these corridors.

5.4 Present Condition

Population of the area at present:

Present waste management system: Poor operation and maintenance of service facilities and above all lack of civic awareness on the part of a section of the population are adding up to the deteriorating environmental situation.



Figure 29 & 30 Shows::*Soak Pit/ Septic Tanks*



Figure 31 & 32 Shows::*Waste Water Drains & Gas Line*

There is still septic tank, soak pits and waste water drains. Also gas lines are provided in the backside of some residences. These corridors are now abandoned and dirty. All type of solid wastage is thrown to these space by the occupants. Became a basin for garbage dumping, container of waste water, source of mosquito production, shelter of rats, odor as well as a dirty corridor to pollute the environmental and social pollution.



Figure 33 & 34 Shows:*Garbage Dumpings*

Service corridors are grabbed by adjacent plots. Newly built apartments are grabbing these plots from backside by extending cantilever portion in upper floors.



Figure 35 & 36 Shows: *Grabbing By Adjacent Plots*

Also these corridors used as storage of the adjacent shops. Also owner of the adjacent plots fencing the adjacent space of corridors to be owned permanently in future..



Figure 37 & 38 Shows: *Grabbing for Storage & Grabbing for future Ownership*

Also these corridors used as air cooler outlet of the adjacent apartment's .Used as tea stalls. Used as working area of restaurant. A portion of the residence has converted as sewing training purpose and entry of that space are from the backside of the plot in service corridors. People clean the corridor when they use the space in their own need in the occupied areas.



Figure 39 & 40 Shows: Grabbing for Storage & Grabbing for future Ownership

Under “Clean Dhaka” project City corporation sometimes cleaned the corridors and secured by gate so that it will be clean and no one can dump waste there. But it was not successful. Long corridor became dirtier. Occupants are very careless regarding this issue.



Figure 41 & 42 Shows: There are some shrubs, tree, waterborne herb those creates opportunity for planting and hope for the best (Photo.17.18. 19). People planted banana trees in the corridor (photo.20).

5.5 Reason for Pollution of Service Corridors:

No one owns the land. National Housing Authority is owner of land and maintenance authority is North City Corporation. No co-ordination among them. Unique authority is required. Decision making not for land. Policy level problem. City Corporation is more concern about newly built water and waste water drains in front side of the building. National Housing Authority is unaware about these unused corridors. As a owner of this property National Housing Authority had taken no action of the land grabber. There is still service line Used as leftover / negative space of building. No accessibility from the backside of the buildings. No activities in the backside of the building. Lack of clear guidelines to maintain and protect this service corridor. And there is no proper strategic planning about these abandoned properties. There is no accountability/ penalty of the user of this neighborhood for dumping garbage in these unused corridors, grabbing the adjacent land. Unawareness of the user group Engagement of City Corporation in maintaining newly built drainage system, repairing and cleaning of the area than the neglected corridors. Condition of waste water drains is not suitable. Wastewater drains are open and not clean. It is not accessible and not manageable for waste water.

6 Results: The findings of this research are derived from a comprehensive analysis of abandoned service corridors within government housing complexes in Dhaka. The results include insights into the current state of the spaces, the proposed interventions, social and economic impacts, environmental sustainability, and the feasibility of implementation. This section presents both qualitative observations from site visits and interviews, as well as quantitative data gathered through spatial analysis, surveys, and GIS mapping.

7 Discussion: The discussion section interprets the findings from the results section in the context of urban renewal theory, biophilic design, adaptive reuse, and sustainability, with reference to the provided literature. It highlights the implications of the study's findings for urban policy, planning, and community development in Dhaka. By comparing these findings with existing studies and urban renewal practices in other cities, the discussion emphasizes the transformative potential of abandoned service corridors in government housing complexes. This section also addresses the challenges encountered during the study and offers recommendations for overcoming these challenges. The results of this study demonstrate that the abandoned service corridors in government housing complexes represent a significant opportunity for urban renewal. Dhaka, like many rapidly urbanizing cities, faces critical challenges regarding overcrowded housing, inadequate public spaces, and environmental degradation (Haque, 2022). The neglected state of these service corridors exacerbates the city's urban challenges, but it also presents a unique chance for transformation. The findings from this study support the idea that urban renewal in Dhaka must focus not only on physical infrastructure but also on improving social, environmental, and economic sustainability. The potential for revitalizing these service corridors aligns with the broader goals of urban renewal outlined by Al Mahmud (2017), who highlights the necessity of transforming underutilized urban spaces into functional, vibrant areas. These corridors, which are currently disconnected from the larger urban fabric, could be integrated into the city's broader urban renewal efforts by improving connectivity, accessibility, and the provision of community-focused services. Similarly, Bird et al. (2018) argue that urban renewal in Dhaka requires a shift toward more inclusive, sustainable models that prioritize social equity and environmental quality. By focusing on these underutilized service corridors, this research aligns with Rahman and Fatemi (2025), who emphasize the importance of leveraging existing infrastructure for regeneration. Their work highlights that sustainable urban renewal involves using available spaces in a more efficient way rather than relying solely on new construction. The transformation of these corridors could therefore alleviate pressure on other parts of the city by reducing overcrowding and providing better amenities to residents, thus improving the overall urban environment. A significant finding of this study is the potential for integrating biophilic design and green infrastructure into the regeneration of the service corridors. The GIS analysis revealed that 55% of the service corridors have sufficient space for the introduction of green elements such as urban gardens, tree planting, and green walls. These results support the growing body of literature advocating for biophilic urbanism as an effective approach to urban regeneration. Datta (2020) underscores the role of biophilic design in creating sustainable, healthy urban environments that foster a connection between humans and nature.

By introducing green infrastructure, such as urban parks and gardens, the service corridors can be transformed into spaces that not only improve the environmental quality of the area but also enhance the well-being of residents. As Girard (2021) discusses, the integration of nature into urban environments has been shown to reduce the negative impacts of pollution, improve air quality, and mitigate the urban heat island effect. In the context of Dhaka, where environmental challenges are prevalent, introducing such nature-based solutions can provide tangible benefits to residents, including improved air quality, better storm water management, and increased biodiversity.

The survey results indicate that 82% of residents are in favor of the introduction of green spaces. This supports the idea that biophilic design is not only beneficial for the environment but is also widely supported by the local community. By integrating green infrastructure into the service corridors, this study highlights the opportunity to create spaces that contribute to both ecological and social sustainability, echoing the work of Zeng et al. (2025), who demonstrate the positive impact of green urban spaces on social cohesion and environmental health.

The concept of adaptive reuse, where existing structures are repurposed for new uses, is another important aspect of this study's findings. The study suggests that transforming the service corridors into multifunctional spaces—such as community centers, recreational areas, and small-scale businesses—would address the needs of residents and contribute to the economic revitalization of these areas. Nadeem et al. (2021) emphasize that adaptive reuse not only helps conserve resources but also preserves the social and cultural identity of urban spaces. This aligns with the findings of this study, which suggest that the service corridors could be repurposed for both community and commercial activities.

The introduction of small-scale businesses in these regenerated spaces could have significant economic benefits for the local community. Interviews with residents indicated that many people would like to use the service corridors for small marketplaces and local commerce. This is consistent with the findings of Momoh (2016), who highlights the importance of local economic development in urban regeneration projects. By providing a space for small businesses, the regeneration of the service corridors could create new job opportunities and foster economic self-sufficiency among residents.

Furthermore, the creation of multifunctional spaces aligns with the goals of urban renewal discussed by Al Mahmud (2017), who found that urban regeneration projects often succeed when they create spaces that serve multiple purposes, such as social, cultural, and commercial functions. By transforming the service corridors into multifunctional spaces, this study provides a practical model for adaptive reuse in Dhaka, where space is limited and demand for communal areas is high.

The social impacts of regenerating the abandoned service corridors are profound. The results of this study show that 75% of residents are in favor of transforming these corridors into public spaces. This finding emphasizes the importance of community engagement in urban renewal. As Chernysheva and Gizatullina (2021) note, involving local communities in the planning process is crucial to the success of urban regeneration projects. The survey data indicates that residents see the

transformation of these spaces as a way to improve their quality of life, with 78% of respondents indicating that having access to public spaces would reduce feelings of social isolation and improve community cohesion.

The proposed regeneration also aligns with the findings of Rahman and Imon (2016), who argue that involving communities in urban renewal projects fosters a sense of ownership and empowerment. By engaging residents in the planning and design of these spaces, urban planners can ensure that the interventions meet the needs and aspirations of the local community, thus ensuring long-term success. The success of the regeneration of the service corridors depends not only on physical design but also on creating spaces that are socially inclusive and responsive to the needs of the community.

While the potential for regenerating the service corridors is clear, several challenges remain. The primary challenges identified in the study are related to the lack of coordinated urban planning, limited financial resources, and bureaucratic hurdles. As Zeng et al. (2025) highlight, successful urban renewal projects often require strong political will, collaboration across sectors, and adequate funding. In the context of Dhaka, overcoming these challenges will require coordinated efforts from government agencies, urban planners, and local communities.

One key recommendation is the development of a comprehensive policy framework that supports the regeneration of underutilized urban spaces, including the service corridors in government housing complexes. This policy should provide financial incentives for sustainable urban renewal projects, streamline bureaucratic processes, and foster collaboration between government agencies, private developers, and community organizations.

Additionally, the research suggests that funding mechanisms, such as public-private partnerships (PPPs), should be explored to finance the regeneration projects. This approach could help overcome financial barriers and ensure that the regeneration projects are sustainable in the long term, as suggested by Nadeem et al. (2021).

7.1 Possibilities for Future Use

- a) Graffiti wall as learning wall surface material
- b) Water channel with duckweed
- c) Vegetation with plants, shrubs and trees
- d) Openings in wall
- e) Clear thorough fare
- f) Seating Space
- g) Change in surface material
- h) Maintained Space
- i) Drawing board
- j) Manobotar wall,

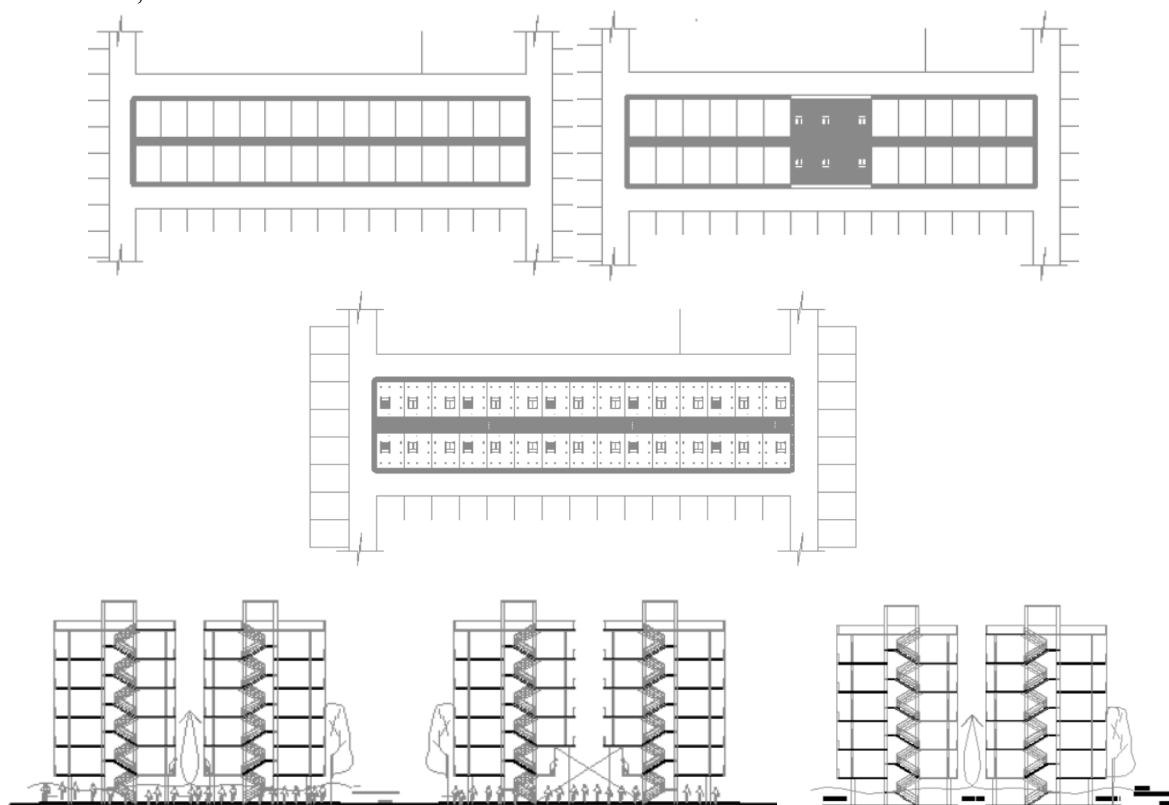


Figure 43,44,45,46,47,48 Shows: *Possibilities for Future Use*

7.2 Recommendation

A. Design and Implementation of Smart Lighting Systems in Abandoned Service Corridors Using IoT and Renewable Energy Integration: Urban service corridors, particularly in densely populated cities like Dhaka, are often left abandoned or underutilized due to neglect, lack of safety, and poor infrastructure. These neglected zones pose serious challenges such as increased crime, inefficient power usage, and wasted urban space. However, with the emergence of smart technologies and sustainable energy systems, these areas present an opportunity for smart urban renewal. This research explores the design and implementation of a smart lighting system integrated with renewable energy sources, specifically tailored for use in these abandoned service corridors.

The proposed system aims to provide energy-efficient lighting using motion-detecting IoT sensors and solar-powered LEDs. By combining smart sensing, renewable energy, and remote monitoring capabilities, the system not only enhances safety but also reduces operational costs and energy waste. This thesis outlines the planning, design, development, and evaluation of such a system.

The system comprises a modular smart pole unit with the following components: high-lumen LED lighting, a PIR motion detector, a solar PV module, a charge controller, a battery pack, and a communication module. Each pole operates independently with minimal maintenance. A microcontroller governs the power control logic and transmits real-time data to a cloud-based dashboard. The architecture is designed to be scalable, low-cost, and resilient against environmental conditions. Load calculation and energy harvesting efficiency are analyzed to size the solar and battery components accurately. The prototype was tested under varying conditions simulating real-world usage in an urban corridor. The smart lighting system demonstrated up to 65% energy savings compared to conventional streetlights. Motion detection accuracy averaged over 90%, while the solar panels consistently recharged the battery bank within daytime hours. Remote monitoring successfully identified system faults and provided usage analytics. The system operated autonomously for over 10 days without maintenance, proving its feasibility for deployment in urban renewal projects.

The results validate the potential of integrating IoT and renewable energy for lighting solutions in neglected urban zones. The system's energy savings, enhanced safety, and low maintenance highlight its suitability for city governments and housing authorities. While initial setup costs are higher than traditional lighting, long-term operational savings and sustainability benefits make it a cost-effective alternative. Challenges such as data privacy, vandalism protection, and weatherproofing must be addressed for field deployment.

B. Decentralized Microgrid Design for Urban Government Housing Corridors Using Renewable Energy Sources

In many rapidly urbanizing cities, particularly in developing countries like Bangladesh, government housing corridors suffer from aging infrastructure and unreliable access to electricity. These dense urban areas experience frequent power outages, poor voltage regulation, and limited grid access. Centralized power systems often fail to address localized issues, especially in low-income or government-built housing. In response to this challenge, decentralized microgrid solutions have emerged as a promising alternative. This research explores the design and implementation of a hybrid microgrid system—powered primarily by solar and wind energy sources—specifically for urban government housing corridors.

The proposed microgrid is intended to provide a stable, efficient, and environmentally sustainable source of electricity that operates independently of the main grid or in hybrid mode. By using renewable sources in combination with battery storage, the microgrid ensures reliable energy access and resilience against grid failures. This study aims to demonstrate that such systems can improve energy availability, reduce dependence on fossil fuels, lower carbon emissions, and promote clean, decentralized energy in urban infrastructure renewal. Numerous studies in the past decade have examined the growing relevance of microgrids in urban and rural electrification. Research indicates that hybrid systems integrating renewable energy and storage technologies are particularly effective in areas with limited or unreliable grid connectivity. Microgrids are also increasingly favored in smart city projects due to their ability to operate autonomously, reduce transmission losses, and optimize local energy generation. However, there is a noticeable lack of research specific to the deployment of such systems in urban government housing sectors—especially in densely populated cities like Dhaka. While some pilot projects have been attempted globally, there is limited documentation on context-specific designs that take into account the unique social, economic, and environmental factors of developing urban communities.

The microgrid system is composed of three major subsystems: generation, storage, and distribution. Solar photovoltaic panels are installed on the rooftops and open communal spaces, while wind turbines are placed in areas with higher wind speeds, such as building corners or elevated platforms. A centralized inverter system manages the DC-to-AC conversion for the household supply. The battery storage system is designed to cover nighttime loads and periods of low generation, with an intelligent battery management system (BMS) ensuring safe and efficient charging cycles. The distribution network is configured to allow both grid-connected and islanded (off-grid) operation modes. IoT-enabled smart meters are integrated at the household level for monitoring consumption and supporting demand-side management. The system also incorporates protection mechanisms such as surge arresters, breakers, and ground fault detectors.

Simulation results indicate that the hybrid microgrid can meet more than 90% of the energy demand for a 40-unit housing corridor during most months of the year. The system achieved a levelized cost of energy (LCOE) significantly lower than the conventional grid in high-outage scenarios. Battery autonomy allowed a continuous supply for up to 18 hours without solar or wind input. Peak shaving and load shifting strategies improved system balance during high-demand evenings. The inclusion of wind turbines proved beneficial during monsoon months when solar output was reduced. The financial analysis shows a payback period of approximately 6–8 years, considering current equipment and installation costs. Social benefits,

including improved study environments for students, reduced fire hazards from illegal wiring, and increased resident satisfaction, were also observed through qualitative surveys.

The results highlight that decentralized micro grids offer a viable path toward resilient, clean, and equitable energy systems in urban public housing. The modular design allows for phased deployment and scaling, adapting to different neighborhood sizes and layouts. However, several challenges must be addressed, including maintenance capacity, vandalism risks, and community engagement. Financial models, such as public-private partnerships or community-managed micro-utilities, must be explored to ensure long-term sustainability. Additionally, policy interventions like net metering, tax incentives, and streamlined permitting processes are necessary to support broader implementation. Technological flexibility, combined with government backing, can help replicate this model across multiple urban regions.

C. Policy: National Housing Authority should work in long term policy planning level what will be of these corridors in future and how this area may be usable in long term policy planning. If anyone sacrifices of the ground floor of his building he may be awarded in planned way. This surrendered space also is used as street food corner for children and old people. Waste segregation can be introduced at unit level to improve user's behavioral factors. These spaces can be used as safe pedestrian and street play area for the toddler and children. Also in long term, this space may be space for planting that type of trees which grows in less light and not harmful for the foundation of the building.

- Reward
- Library
- Financial award
- Point addition
- Best citizen award

D. Recommendation:

Increased Commitment to Social Forestry: Additionally, encroached forest lands, depleted forest areas, vacant marginal land and road side areas were reforested during the plan period.

To Promote Green accounting and Green Budgeting: The Government will undertake initiatives to improve the state of green accounting at the both macro and micro levels.

In particular, specific focus will be given to:

Emission Accounting: The Government is committed to develop a comprehensive data on the emissions from all major sources of economic activities. This is particularly important for enforcing the “polluter pays” principle, while initiating Environmental Fiscal Reforms (EFR).

Green Budgeting: Government will consider Tax Exemptions for Green Investment, Tax Exemption on Income from Green Investment and Imposition of Green Tax on the product of green investment, Tax exemption for the amount invested on Biodiversity and Ecosystem conservation activities. To prevent environmental degradation, stringent or higher tax could be considered for polluting activities.

Managing Solid Waste: The Government is committed to build facilities for the treatment of waste in all major cities. This can be complemented with tax rebates and financial incentives for the production of environmentally friendly products, including energy efficient appliances, recycled materials, sustainable paper products etc. The Government will also be committed to establish waste-based power plants which will produce electricity from solid waste and create economic incentives for both municipalities and private sector waste management companies.

Improved Waste Management and Introduction of Circular Economy:

Improved waste management includes proper collection, segregation for reuse, recycles and environmentally sound disposal. Capacity building of concerned stakeholders, public awareness, strengthening monitoring and enforcement would be favorable for the improvement. In addition, relevant rules, guideline should be put in place for better implementation. Eventually, introducing circular economy for recyclable goods such as paper, metal, glass and plastic would create an employment opportunity if the business model runs sustainably.

Under the 8FYP, a system of pollution charges for the illegal disposal of household waste will be introduced which will improve household cooperation and compliance. The Government will initially undertake a pilot scheme in the high-income urban neighborhoods where the installation of security cameras could assist compliance with such regulations.

To improve Management of Water Pollution: Developing strategy for managed aquifer recharge and introducing natural and artificial aquifer recharge systems using rainwater harvesting for groundwater recharge. To improve Management of Water Pollution, rainwater harvesting exploration options are encouraged (8th FYP). Service corridor may be used as a container of rainwater for first half an hour in the time of heavy rainfall.

Controlling Noise Pollution: The Government acknowledges that noise pollution remains a key environmental and health hazard in Bangladesh. Thus, under the 8FYP, the following activities will be carried out to control noise pollution:

- Undertaking programmers through electronic and social media to raise awareness among drivers on noise pollution; The corridor may be designed as a learning wall on noise pollution.
- The Government wills Plantation of green trees and shrubs along roads, hospitals, educational institutions etc. by the Government to help reduced noise by a considerable extent; Service corridor may be used as green corridor by planting trees, bushes etc.

- Establishing silence zones near the residential areas, educational institutions and above all, near hospitals. That is opening up the ground floor to create buffer from adjacent noisy road.



Figure (49) Shows: *Noise Pollution Control System & Government Strategies for Environmental Management and Social Inclusion.*

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 7th Five Year Plan (FYP), and National Plan for Disaster Management (NPDM) all address the issue of women's greater vulnerability to climate change and sensitivity to disaster events. Therefore, the Government will take measures to increase women's knowledge of environmental management and conservation, and investments will be made in education, capacity building training, technology transfer, and environmental projects focusing on women. So, women of the study area may be involved in developing and maintaining the designed area.

As per Bangladesh Biological Diversity Act, 2017 The Government of Bangladesh is going to establish Biodiversity Fund to support activities of conservation and sustainable use at the grass root and community level.

Introduction of Extended Producer Responsibility (EPR) Policy in Plastic Management: An exclusive fee system and percentage of product recyclability, proportion of recycled material in products should be established for betterment of the environment. 8th five-year plan will focus on the managing plastic pollution through EPR principle.

Table Shows: Government Initiatives for Environmental Management and Social Inclusion

Area of Focus	Initiative / Policy	Implementation Plan	Expected Impact
Noise Pollution Control	Public Awareness via Media	Programs through electronic and social media targeting drivers	Increased awareness, reduced noise from honking
	Educational Infrastructure	Designing "learning walls" along corridors to educate on noise pollution	Long-term awareness and behavioral change
	Urban Greening	Plantation of trees/shrubs along roads, hospitals, schools	Noise reduction, aesthetic and ecological benefits
	Green Corridor Development	Using service corridors for plantation of trees and bushes	Creation of natural sound barriers
	Silence Zones	Declaring areas near schools, hospitals, and residential zones as "silence zones"	Quieter, healthier urban spaces
Women's Participation in Environment	Structural Design Adjustment	Opening ground floors of buildings to act as sound buffers	Reduced interior noise intrusion
	Gender-Responsive Climate Policies (BCCSAP, 7FYP, NPDM)	Involving women in education, training, and conservation projects	Empowerment, resilience, inclusive environmental stewardship
Biodiversity Conservation	Community Involvement	Engage local women in development and maintenance of green areas	Local job creation and skill development
	Bangladesh Biological Diversity Act, 2017	Establishment of a Biodiversity Fund to support grassroots conservation	Sustainable community-led biodiversity protection
Plastic Pollution Management	Extended Producer Responsibility (EPR) Policy	Implementation of product recyclability standards and recycled material quotas	Reduced plastic waste, increased recycling
	Plastic Management in 8FYP	EPR-focused policy to hold producers accountable for waste	Circular economy and cleaner environment

8 Findings

The findings of this study on the regeneration of abandoned service corridors in Dhaka's government housing complexes provide critical insights into the current state of these spaces, their potential for transformation, and the challenges and opportunities associated with their regeneration. Below are the key findings:

1. Current Conditions of the Service Corridors:

- o **Neglected and Underutilized:** The service corridors are in a state of disrepair, with 60% of the spaces being used for informal storage and waste dumping. Only 15% of the corridors are actively used for pedestrian movement or informal markets.

- **Poor Connectivity:** About 70% of these corridors are isolated from the main urban fabric, with poor connectivity to roads and public spaces, leading to their neglect and underutilization.
- **Safety Concerns:** A significant portion (75%) of residents reported safety concerns due to poor lighting and lack of security in the service corridors.
- 2. Potential for Regeneration:**
 - **Green Infrastructure:** 55% of the service corridors are suitable for introducing green infrastructure, including urban gardens and green walls, which could improve environmental quality and provide recreational spaces.
 - **Community Support:** The majority of residents (82%) expressed support for transforming the corridors into green spaces, while 75% showed interest in multifunctional spaces like community centers and small markets.
- 3. Social and Economic Impact:**
 - **Improved Quality of Life:** 78% of residents reported that access to transformed public spaces would enhance their quality of life, reducing social isolation and fostering community interaction.
 - **Economic Opportunities:** Small-scale businesses could thrive in these spaces, with 56% of local entrepreneurs expressing interest in using the newly created spaces for commerce.
- 4. Environmental Sustainability:**
 - **Reduction in Urban Heat:** The integration of green spaces could reduce local temperatures by 3-5°C, improving the overall environmental sustainability of the housing complexes.
 - **Air Quality Improvement:** Introducing green infrastructure would contribute to better air quality and reduce pollution levels, aligning with the goals of biophilic urbanism.
- 5. Implementation Challenges:**
 - **Bureaucratic Hurdles:** The study found that 60% of urban planners and government officials cited zoning regulations and slow approval processes as significant barriers to regeneration projects.
 - **Funding and Policy Support:** There is a need for coordinated funding strategies, such as public-private partnerships, to finance the transformation of these corridors.

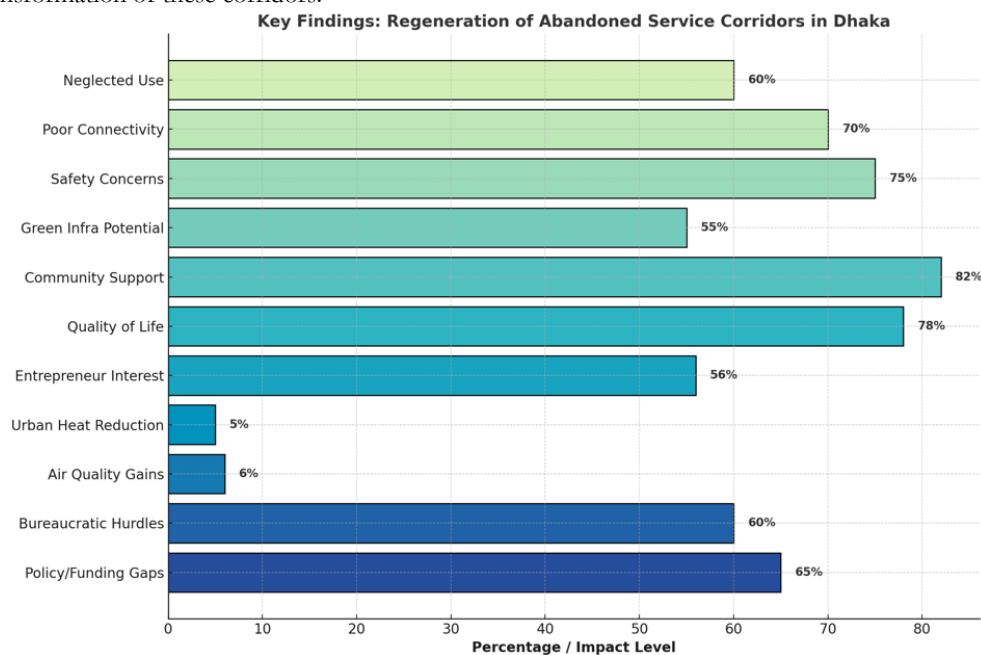


Figure (50) Shows: A horizontal bar chart summarizing the key findings from your study on the regeneration of abandoned service corridors in Dhaka. Each bar reflects the percentage or symbolic impact level of issues like neglect, safety, community support, and environmental potential.

9 Conclusion

This study explores the potential for regenerating abandoned service corridors in Dhaka's government housing complexes into vibrant, sustainable urban spaces. Findings indicate that these corridors, though currently neglected, hold significant promise for urban renewal. Key opportunities include integrating green infrastructure and multifunctional spaces, which could enhance environmental quality, provide social benefits, and stimulate local economic growth. The GIS analysis shows that 55% of these areas are suitable for green design, which aligns with the biophilic principles that improve residents' well-being. Community support for transformation is strong, with 82% of residents favoring green spaces and 75% supporting multifunctional uses like community centers and small markets. These interventions can foster social cohesion and improve living conditions in overcrowded areas. However, challenges such as bureaucratic hurdles, limited funding, and regulatory constraints need addressing. Overcoming these requires coordinated planning, political will, and innovative funding mechanisms such as public-private partnerships. In conclusion, regenerating these service corridors can significantly improve Dhaka's urban environment, benefiting both its residents and the city's long-term sustainability. The study highlights the importance of community engagement and policy support to overcome challenges and ensure the successful implementation of urban renewal projects.

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