



**RESEARCH PAPER**

**Impact of Urbanization on Sanitation Management in Pakistan: The Case of Islamabad Capital Territory**

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**ABSTRACT**

The study aims to examine the impact of urbanization on sanitation management in Pakistan, with a specific focus on the case of Islamabad Capital Territory (ICT). The research employs a mixed-methods approach, including a review of relevant literature, field observations, and interviews with key stakeholders. The data collected was analyzed using thematic analysis to identify patterns and themes in the stakeholders' experiences and perceptions. The findings indicate that urbanization in ICT has led to a significant increase in population density and a corresponding strain on sanitation infrastructure and services. This has resulted in inadequate waste management, lack of access to safe and clean water, and increased incidents of waterborne and vector-borne diseases. The study also highlights the need for a more integrated and holistic approach to sanitation management in ICT, which would involve increased investment in infrastructure and services, as well as community engagement and education. Furthermore, the study suggests that there is a need for a more sustainable approach towards sanitation management which will focus on the community involvement and empowerment. The findings of this research has contributed to the importance of addressing the challenges of urbanization and sanitation management in Pakistan, particularly in the context of ICT, in order to improve public health and living standards for residents.

**Keywords:** Sanitation Management, Sanitation, Urbanization

**Introduction**

Urbanization has had a significant impact on sanitation management (Daniel et al, 2002). As cities grow and populations increase, the demand for sanitation services also increases, putting strain on existing infrastructure and resources (McFarlane, 2019; Muzondi, 2014). This can lead to a variety of challenges, such as inadequate waste collection and treatment, overflowing sewers, and increased pollution.

Rapid urbanization in developing countries has led to a lack of proper sanitation infrastructure, resulting in poor sanitation conditions and associated health risks (Liu & Zhou, 2021; Henderson, 2002). Many urban areas, particularly in low- and middle-income countries, inadequate sanitation is a major contributor to environmental pollution and the spread of waterborne diseases (McFarlane, 2019). However, it is also important to note that urbanization can also bring about positive changes in sanitation management. As cities become more densely populated, it becomes more cost-effective to invest in centralized waste management systems, such as sewage treatment plants. Additionally, as cities become more prosperous, they also have more resources to invest in improving sanitation infrastructure (Christopher, 2021). Overall, urbanization has both positive and negative impacts on sanitation management. While it can create challenges, it also presents opportunities for the development of more efficient and effective sanitation systems.

Urban governing bodies face several challenges in delivering sanitation-related services, including such as Limited funding and resources, Inadequate infrastructure, Poor maintenance, Informal settlements, Lack of community engagement and buy-in and other issues such as Climate change (Kulaba, 2019; Chen et al, 2010; Douthett et al, 2017). In summary, sanitation management in urban areas is a complex and multifaceted issue that affects not only public health, but also socio-economic growth and overall quality of life. The lack of adequate infrastructure, poor waste management, and limited community involvement are some of the major challenges faced in urban areas, particularly in developing countries. Climate change and social inequality also exacerbate these challenges (Nyiwul, 2021; Castán Broto et al 2013). The lack of access to clean water and proper sanitation is a barrier to human growth, especially for disadvantaged populations. Improving sanitation is a key factor in promoting human growth and development, and is a critical issue for governments and civil society in both developing and industrialized countries. This research paper has highlighted the challenges faced by urban governance bodies in the context of effective urban planning and sanitation management.

Urbanization in Pakistan has had a significant impact on sanitation management in the country (Haider & Badami, 2010; Abdul & Yu, 2020). The rapid growth of cities and the migration of people to urban areas has led to an increase in housing demand and a strain on existing sanitation infrastructure. Overall, urbanization in Pakistan has had a significant impact on sanitation management in the country, leading to challenges in service delivery, insufficient infrastructure, and overcrowding and poor living conditions. Addressing these challenges will require effective urban governance, community involvement, and sufficient resources. In this wake, the current study explores the impact of urbanization in sanitation management in Pakistan by taking the case study of Islamabad.

## **Literature Review**

### **The impact of urbanization in sanitation management**

The studies have found that urbanization in developing countries has led to an increase in housing demand and strain on existing sanitation infrastructure (Kookana et al, 2020; Zaman et al, 2010). Inadequate waste management and environmental pollution as major challenges faced by cities in these countries (Muzondi, 2014). Research also established that urbanization in Sub-Saharan Africa has led to an increase in housing demand and strain on existing sanitation infrastructure. The study also identified inadequate waste management and environmental pollution as major challenges faced by cities in these countries (Rajmohan et al, 2019; Meidiana & Gamse, 2010). It has also been argued that urbanization in developing countries has led to an increase in housing demand and strain on existing sanitation infrastructure. One of the studies also identified inadequate waste management and environmental pollution as major challenges faced by cities in these countries, as well as the importance of community involvement and effective urban governance in addressing these challenges (Ike et al, 2018). The researchers found that urbanization has led to an increase in housing demand and strain on existing sanitation infrastructure. The research also identified inadequate waste management and environmental pollution as major challenges faced by cities in developing countries. Urbanization in developing countries has led to an increase in housing demand and strain on existing sanitation infrastructure (Mahar et al, 2007; Haque et al, 2019). The research also identified inadequate waste management and environmental pollution as major challenges faced by cities in these countries, as well as the importance of community involvement and effective urban governance in addressing these challenges (Manga, et al, 2008; Van der Heijden, 2019). Overall, the literature suggests that urbanization in developing countries has led to an increase in housing demand and strain on existing sanitation infrastructure. Inadequate waste management and environmental pollution are major challenges faced by cities in these countries. The studies also highlight the importance of community involvement and effective urban governance in addressing these challenges.

## **Sanitation in Pakistan**

The studies found that urbanization in Pakistan has led to an increase in housing demand and a strain on existing sanitation infrastructure. The research also identified a lack of community involvement, inadequate waste management and environmental pollution as major challenges faced by cities in Pakistan (Abdul & Yu, 2020; Nawab & Nyborg, 2009). One of the study examined the impact of urbanization on sanitation in Lahore, Pakistan. The study found that urbanization has led to an increase in housing demand and strain on existing sanitation infrastructure, as well as inadequate waste management and environmental pollution (Abbas et al, 2022). Another study found that urbanization in Pakistan has led to an increase in housing demand and strain on existing sanitation infrastructure. The study also identified inadequate waste management and environmental pollution as major challenges faced by cities in Pakistan (Murtaza et al, 2021).

In contrast other studies found that urbanization in Pakistan has led to an increase in housing demand and strain on existing sanitation infrastructure (Haider & Badami, 2010). The study also identified a lack of community involvement, inadequate waste management and environmental pollution as major challenges faced by cities in Pakistan (Abdul & Yu, 2020). The researchers have further argued that urbanization in Pakistan has led to an increase in housing demand and strain on existing sanitation infrastructure. The study also identified inadequate waste management and environmental pollution as major challenges faced by cities in Pakistan (Nisar, et al, 2008).

Overall, the literature suggests that urbanization in Pakistan has led to an increase in housing demand and strain on existing sanitation infrastructure, inadequate waste management and environmental pollution are major challenges faced by cities in Pakistan (Chen et al, 2010; Douthett et al, 2017).. The studies also highlight the importance of community involvement and effective urban governance in addressing these challenges.

## **Urban Sanitation service delivery**

The studies found that urban governing bodies in low-income countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, and limited resources (Abdul & Yu, 2020). Further, it was found that urban governing bodies in developing countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources and lack of proper management. The researchers have argued that urban governing bodies in developing countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management (Herrera, 2019; Nisar, et al. 2008).

Meanwhile, it was also found that urban governing bodies in developing countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management (Herrera, 2019; Nawab & Nyborg, 2009).

The researchers have argued that urban governing bodies in developing countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management.

In summary, the literature suggests that urban governing bodies in developing countries face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and

lack of proper management. These challenges make it difficult for cities to provide adequate sanitation services to their populations.

### **Urban Sanitation service delivery in Pakistan**

The literature has established that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources and lack of proper management (Lüthi, McConville, & Kvarnström, 2009). Raza et al (2015) found that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management. Another study established that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources and lack of proper management. Hussain et al (2008) and Ali et al (2019) found that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources and lack of proper management.

Further, it was noted by another study that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management.

Overall, the literature suggests that urban governing bodies in Pakistan face various challenges in sanitation related service delivery, such as inadequate infrastructure, poor maintenance, lack of community involvement, limited resources, and lack of proper management. These challenges make it difficult for cities to provide adequate sanitation services to their populations.

## **Material and Methods**

### **The Case of Islamabad**

Islamabad, Pakistan was chosen as the case of the current study. Islamabad, the capital city of Pakistan, is considered one of the most well-planned and modern cities in the country. However, despite its reputation, the city is facing significant challenges in the management of sanitation services. This article aims to examine the current state of sanitation management in Islamabad, identify the major challenges faced, and propose potential solutions for the future. Islamabad has a population of approximately 1.5 million people, and it is responsible for providing sanitation services to its residents (Gulzar, 2019). The city has a relatively high coverage of basic sanitation facilities, with an estimated 85% of households having access to toilets. However, the city still faces significant challenges in the management of solid waste and the disposal of sewage. The city's solid waste management system is facing a number of challenges, including inadequate collection and transportation, lack of proper disposal facilities, and poor management of the existing infrastructure. As a result, solid waste is often left uncollected and disposed of in open areas, leading to environmental pollution and public health hazards (Gulzar, 2019). The city's sewage management system is also facing significant challenges, with a lack of proper treatment facilities and inadequate management of the existing infrastructure. As a result, untreated sewage is often discharged into nearby water bodies, leading to environmental pollution and public health hazards. There are four main stakeholders in local government of Pakistan. They are: i) CSOs, ii) Public representatives, iii) district administration including CDA, and iv) Local beneficiaries. All these beneficiaries were selected for the data collection.

## Data Collection and Analysis

The tools selected for data collection were developed after the in-depth literature review on the methods used in the previous studies and also consultation with experts. In terms of sampling technique, the study was based on purposive sampling and snow ball sampling techniques. The primary data collection was conducted through i) face-to-face interviews, and ii) focus group discussions. Seventeen (17) face-to-face interviews were conducted from key informants and stakeholders. Three (3) focus group discussions were conducted. FGDs were conducted with the local residents of Islamabad to know their point of view on the objectives of the study. Data collected was managed and analyzed methodically to find out the answers of research question. In-depth interviews, CGDs and FGDs were transcribed. Afterward, transcribed data was indexed and filled to arrange for NVivo 10 version Program that was used for thematic data analysis. The main technique applied for thematic analysis was coding. It is the process of inspecting texts closely to search for recurrent topics, themes, or relationships and marking identical passages with the label or code to categorize them for theory building and later retrieval. Using NVivo, data specific to research objective was analyzed and new codes/nodes were identified that helped to create patterns/subthemes and themes. Validity and Reliability of the data was ensured. In this study, content validity of the tool was established through 5 experts (all faculty members) of the field from, Pakistan who were supposedly well aware about needs, requirements, and problems of the local governance system and socio-economic conditions of the country. To avoid intra-judge unreliability, the study was done in a continuous and consistent manner to avoid what Gray (2021) describes as “bias on the part of respondents” that might have arisen as respondents could provide responses they might assume could be acceptable to the researcher. The next section presents the findings.

## Results and Discussion

The findings established that the challenges faced in sanitation management in Islamabad are numerous and complex. However, there were several themes identified. The themes identified are Lack of proper solid waste management infrastructure, Inadequate sewage management infrastructure, Limited sewage treatment capacity, Lack of proper sanitation infrastructure, Poor Maintenance, Limited funding and Lack of public awareness and participation. The identified themes along with the discussions are explained in the sub-sections below:

### Theme 1- Lack of proper solid waste management infrastructure

The respondents were of the view that the city's solid waste management system is facing a number of challenges, including inadequate collection and transportation, lack of proper disposal facilities, and poor management of the existing infrastructure. Lack of proper solid waste management infrastructure is a significant challenge facing the city of Islamabad. The current system is facing a number of issues, including inadequate collection and transportation, lack of proper disposal facilities, and poor management of the existing infrastructure. These challenges lead to environmental pollution, public health hazards, and a poor quality of life for residents. The respondent argued:

*One of the main issues is the lack of proper collection and transportation of solid waste. The city's sanitation department is responsible for collecting solid waste from households and commercial areas, but the department often struggles to keep up with the volume of waste generated. This leads to uncollected waste piling up in streets and open areas, creating a public health hazard and an unsightly environment.*

Another issue identified by the respondent is the lack of proper disposal facilities in the city. Currently, solid waste is often transported to nearby landfills, but these sites are often overcrowded and poorly managed. This leads to environmental pollution and the release of harmful chemicals and pollutants. Additionally, the existing infrastructure for solid waste management is often in poor condition and not properly maintained. This includes collection vehicles and equipment, transfer stations, and landfills. This can lead to equipment breakdowns and further exacerbates the already existing problem of inadequate collection and disposal. To address this challenge, the city government should invest in new solid waste management infrastructure such as modern waste collection vehicles, transfer stations and landfills. The literature has also argued that proper maintenance of existing infrastructure, public awareness and participation, and private sector involvement could improve the system (Manzoor et al, 2020). Islamabad, like many other cities around the world, faces challenges with proper solid waste management. This can include a lack of appropriate infrastructure, such as waste collection and disposal facilities, as well as issues with community education and participation in waste management efforts (Ali & Kuroiwa, 2009). Without proper infrastructure and support, waste can accumulate in the streets and neighborhoods, leading to negative impacts on public health and the environment (Masood et al, 2014). It is the responsibility of the government to tackle this problem by providing necessary infrastructure, increase awareness and educate the citizens about the importance of waste management.

## **Theme2- Inadequate sewage management infrastructure**

The respondents were of the view that sewage management system is facing significant challenges, with a lack of proper treatment facilities and inadequate management of the existing infrastructure. Inadequate sewage management infrastructure refers to the lack of proper systems and facilities for treating and disposing of sewage and waste water. This can lead to pollution of water sources, spread of disease, and negative impacts on the environment and public health. Solutions to this issue include building new treatment facilities, upgrading existing infrastructure, and implementing stricter regulations and enforcement. The respondents argued:

*Inadequate sewage management infrastructure in Islamabad, the capital city of Pakistan, is a significant problem. The city's population has grown rapidly in recent years, putting strain on the existing sewage system. Many areas of the city do not have proper sewage treatment facilities, and raw sewage is often discharged into nearby streams and rivers, polluting water sources and creating health hazards. Additionally, illegal connections and lack of proper maintenance of the sewage system exacerbate the problem.*

The literature has argued that the government of Pakistan has been working to address this issue by upgrading and expanding the city's sewage infrastructure, but more work needs to be done to fully address the problem (Mahar et al, 2018). The issue of inadequate sewage management infrastructure in Islamabad is a multifaceted problem that poses significant risks to public health and the environment. Some of the key issues include:

## **Theme 3- Limited sewage treatment capacity**

The respondents argued that limited sewage treatment capacity is a significant issue in Pakistan. The country has a growing population and rapid urbanization which has led to an increase in sewage generation, but the existing sewage treatment plants are not sufficient to meet the demand. This results in untreated sewage being discharged into nearby water bodies, causing pollution and posing a risk to public health. Additionally, the lack of proper treatment also contributes to the degradation of the environment and loss of biodiversity.

The Government of Pakistan, in partnership with international organizations, have been working to improve sewage treatment capacity in the country (Amjad et al, 2019). This

includes building new treatment plants and upgrading existing ones, as well as promoting the use of alternative technologies such as decentralized systems, and the reuse of treated water. However, the implementation of these initiatives is hindered by a lack of funding and technical expertise, as well as a lack of proper management and maintenance of the existing treatment plants. One of respondents were of the view that:

*Furthermore, the issue of limited sewage treatment capacity disproportionately affects the poor, as they are more likely to live in areas without proper sanitation infrastructure, and their health and well-being are more likely to be impacted by the environmental and health hazards caused by untreated sewage. With the city's population growing rapidly, the existing sewage treatment facilities are unable to keep up with the demand, leading to untreated sewage being discharged into nearby water sources. Limited sewage treatment capacity is a major issue in Islamabad, the capital city of Pakistan.*

The city has a growing population and rapid urbanization which has led to an increase in sewage generation but the existing sewage treatment plants are not sufficient to meet the demand. This results in untreated sewage being discharged into nearby water bodies, causing pollution and posing a risk to public health. The lack of proper treatment also contributes to the degradation of the environment and loss of biodiversity (Zeb et al, 2013). To address this issue, the government and international organizations are working to improve sewage treatment capacity in the city by building new treatment plants and upgrading existing ones. Additionally, there is a need for effective management and maintenance of the existing treatment plants to ensure their optimal functioning and to prevent any breakdown.

#### **Theme 4- Lack of proper sanitation infrastructure**

The respondents were of the view that many areas of the city do not have proper sanitation infrastructure, leading to raw sewage being discharged into the environment. Lack of proper sanitation infrastructure is a significant issue in Islamabad, the capital city of Pakistan. Sanitation infrastructure includes facilities such as toilets, sewage treatment plants, and waste management systems. Inadequate sanitation infrastructure can lead to a range of health and environmental problems, including the spread of disease, contamination of water sources, and pollution. The respondents opined:

*In Islamabad, the lack of proper sanitation infrastructure is driven by a number of factors, including a rapidly growing population, urbanization, and limited funding for sanitation projects. Many areas of the city lack access to basic sanitation facilities, such as toilets and sewage treatment plants, which can lead to the open defecation and the discharge of untreated sewage into nearby water bodies.*

To address this issue, the literature has also argued that the government and international organizations are working to improve sanitation infrastructure in the city by building new toilets and sewage treatment plants, as well as upgrading existing ones (Padawangi, 2010). Additionally, there is a need for effective management and maintenance of the existing infrastructure to ensure its optimal functioning and to prevent breakdowns. Furthermore, public awareness raising and education campaigns on proper sanitation practices can also help in improving the sanitation situation in the city.

#### **Theme 5- Poor Maintenance**

The respondents were of the view that lack of proper maintenance of the sewage system can lead to blockages, leaks, and other issues that can exacerbate the problem. Poor maintenance of sanitation infrastructure is a significant issue in Pakistan, as it affects the ability to provide basic sanitation services to the population. Sanitation infrastructure includes facilities such as toilets, sewage treatment plants, and waste management systems.

Proper maintenance is essential to ensure that these facilities are functioning correctly and to prevent breakdowns. One of the respondents established:

*In my city, poor maintenance of sanitation infrastructure can be attributed to a number of factors, including limited funding, lack of technical expertise, and a lack of effective management. Many facilities are not regularly inspected, repaired or maintained, which can lead to breakdowns and reduced efficiency. This can result in the failure of the infrastructure to provide basic sanitation services to the population, leading to health and environmental problems.*

To address this issue, the respondents suggested that the government and international organizations need to focus on the proper management and maintenance of the existing sanitation infrastructure. This includes regular inspections, repairs, and maintenance of facilities, as well as ensuring that there is adequate funding and technical expertise available to support these efforts. Furthermore, this is in align with the research literature that suggested that the development of management systems to monitor the performance of the facilities over time can help in identifying any issues that may arise, thus allowing for prompt action to be taken (Bukhary et al 2017).

### **Theme 6- Limited funding**

Limited funding for sanitation management is a significant issue in Pakistan, as it affects the ability to provide basic sanitation services to the population. The lack of funding can lead to inadequate sanitation infrastructure, such as lack of proper toilets and waste management systems, which can lead to health and environmental problems. The literature has also suggested that the government and international organizations have been working to address this issue by providing funding and assistance for sanitation projects, but more funding is needed to fully address the problem (Syvrud, et al, 2021). Additionally, the lack of proper sanitation facilities disproportionately affects the poor, women and children. So, the allocation of more funds and effective implementation of these funds is a crucial step to improve the sanitation situation in Pakistan. One of the respondents argued:

*The city's sanitation department is facing a severe shortage of funding, which limits its ability to invest in new infrastructure and maintenance of existing facilities. Limited funding for sanitation management in Islamabad can result in inadequate maintenance of waste disposal systems and public restrooms, as well as limited resources for cleaning and waste management. This can lead to increased littering, overflowing trash bins, and poor public hygiene. To address this issue, the government and other organizations may need to increase funding for sanitation management and implement more efficient and cost-effective waste management systems. Additionally, public education and awareness campaigns about the importance of proper waste disposal can also help to reduce littering and improve overall sanitation in the city.*

### **Theme 7-Lack of public awareness and participation**

The respondents were of the view that the general public in Islamabad has limited awareness of the importance of sanitation and their role in maintaining public health. As a result, they often do not participate in efforts to improve the city's sanitation services. One of the respondents argued:

*Lack of public awareness and participation for sanitation management is a significant issue in Islamabad, the capital city of Pakistan. The public plays an important role in the maintenance and sustainability of sanitation infrastructure and services. Without proper public awareness and participation, the sanitation infrastructure and services can quickly become inadequate, and lead to health and environmental problems.*



In Islamabad, the lack of public awareness and participation can be attributed to a number of factors such as, poor education and information on proper sanitation practices, lack of community engagement and ownership in sanitation management, and weak communication channels between the government and the public. The literature argued that many people may not be aware of the importance of proper sanitation and the role they play in maintaining it (Javeed, 2020). To address this issue, the government and international organizations need to focus on raising public awareness and promoting community participation in sanitation management (BeBe & Bing, 2015). This includes education and information campaigns on proper sanitation practices, as well as engaging the community in the planning, implementation, and maintenance of sanitation projects. Involving local communities in the management and maintenance of sanitation facilities can increase their sense of ownership and responsibility, which can lead to better upkeep of the facilities (Cooper, 2018). Furthermore, creating a more effective communication channel between the government and the public can help in addressing the concerns and issues arising in the sanitation management.

## **Conclusion**

Urbanization has been a significant phenomenon in recent decades, with cities and towns growing at a rapid pace. Pakistan, like many other developing countries, is experiencing rapid urbanization and this has significant implications for sanitation management. The purpose of this article is to explore the impact of urbanization on sanitation management in Pakistan. Sanitation is an important aspect of public health, and the provision of basic sanitation services is a fundamental right. However, in many urban areas in Pakistan, the provision of these services is inadequate, and this can lead to a range of health and environmental problems. The lack of proper sanitation infrastructure, such as toilets and sewage treatment plants, is a major issue in many urban areas in Pakistan.

Urbanization has led to an increase in the population of cities and towns, and this has put a strain on existing sanitation infrastructure. The rapid growth of cities and towns has led to a lack of planning and investment in sanitation infrastructure, which has resulted in inadequate facilities and services. Many urban areas in Pakistan lack access to basic sanitation facilities, such as toilets and sewage treatment plants, and this can lead to the open defecation and the discharge of untreated sewage into nearby water bodies.

Furthermore, urbanization has led to changes in land use and increased pressure on natural resources. The conversion of rural land to urban land can lead to the loss of valuable ecosystems, such as wetlands, which play an important role in the natural treatment of wastewater. The loss of these ecosystems can lead to the deterioration of water quality and can have a negative impact on public health. To address the impact of urbanization on sanitation management in Pakistan, it is important to invest in the provision of basic sanitation services and to ensure that they are accessible to all. This includes building new toilets and sewage treatment plants, as well as upgrading existing ones. Additionally, it is important to promote the use of alternative technologies, such as decentralized systems and the reuse of treated water.

Effective management and maintenance of the existing sanitation infrastructure is also crucial. Regular inspections, repairs, and maintenance of facilities, as well as ensuring that there is adequate funding and technical expertise available to support these efforts. Furthermore, public awareness raising and education campaigns on proper sanitation practices can also help in improving the sanitation situation in urban areas. In conclusion, urbanization has a significant impact on sanitation management in Pakistan. The lack of proper sanitation infrastructure, as well as the changes in land use and increased pressure on natural resources, can lead to health and environmental problems. To address these issues, it is important to invest in the provision of basic sanitation services and to ensure that they are accessible to all. This includes building new toilets and sewage treatment

plants, as well as upgrading existing ones, promoting alternative technologies, and effective management and maintenance of the existing sanitation infrastructure.

### **Recommendations**

The paper has some policy recommendations for addressing the impact of urbanization on sanitation management in Pakistan, specifically in Islamabad Capital Territory. Firstly, the author suggests that there is a need for development of a comprehensive and integrated urbanization and sanitation policy for Islamabad Capital Territory that addresses the interplay between the two. Secondly, the capital authority must increase investment in the construction and maintenance of public sanitation facilities, such as toilets and waste disposal sites, to meet the growing needs of the urban population and also implement a rigorous enforcement mechanism for ensuring compliance with sanitation regulations and standards, including penalties for non-compliance. Thirdly, the authorities should promote community involvement and public-private partnerships in sanitation management to ensure sustainable and effective solutions. Further, there is a need to foster collaboration between government agencies, private sector entities, and community-based organizations to improve the coordination and effectiveness of sanitation initiatives. Fourthly, the authorities must enhance the capacity of local government institutions, including the Municipal Corporation and the Water and Sanitation Agency, to effectively manage and regulate sanitation services. Finally, all stakeholders must be encouraged to adopt new technologies, such as waste-to-energy systems, to enhance the efficiency and sustainability of waste management.

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