Introduction and Outline: Analysis of Urban Wastewater Treatment Problems

**Introduction**

The management of urban wastewater has become a menace in most nations, pegged on the fact that the infrastructure development and regulations have not kept abreast of the growth in population and urbanization. Generally, wastewater from developed nations is usually pumped into seas or rivers directly without treatment resulting in pollutions and becoming a risk to the ecosystem's health and the people. The Nature Conservancy undertook research that established that among the nations evaluated, the cost of implementing activities of source water protection, including utilizing cover crops, forest protection, and reforestation, could be recoupled via savings in costs related to annual water treatments (Porto, Khatri & Vairavamoorthy, 2018). Most notably, wastewater treatment is a significant part of safeguarding water resources. For this reason, the project analyzes the lack of proper solutions for disposal of sludges, cities relying heavily on centralized sewage systems, lack of integrated management of urban water, and lack of clear wastewater ownership as being the culprits behind urban wastewater treatment challenges.

**Scope of the study**

The research project will delve into the analysis of urban wastewater treatment challenges. Various issues will be discussed as they lead to difficulties in treating urban wastewater. They include lack of proper solutions for disposal of sludge’s, lack of clear wastewater ownership, lack of integrated urban water management, overreliance of centralized sewage systems, lack of adequate space and increasing urban wastewaters with heavy metal. In this case, the different aspects highlighted as pertaining to treating urban wastewater will be elaborated on to establish their unique impact on urban centers. The study will also highlight solutions to the various issues identified.

**Sources of information**

Based on the study's scope, the project will utilize various secondary sources empirical scholarly works such as peer-reviewed journal articles related to urban wastewater treatment challenges published in the last five years. The report will also use books, websites such as the UN, UNDP, and the UNEP that highlight urban wastewater challenges. On the other hand, the study will use primary sources such as speeches, eyewitness accounts, speeches, and interviews from relevant stakeholders in managing urban wastewater. For this reason, the project will utilize online libraries, newspapers, and databases to highlight the challenges of treating urban wastewater.

**Background information**

The sources of available water across the globe are becoming depleted. Besides, the challenge is culminated by the rate at which populations are surging, particularly in developing nations. According to a study by INSIGHTS (2018), over 29 nations are regarded as water stressed. Among them, 20 are considered absolute water scarce. Estimations indicate that by 2025, approximately a third of the population in developing nations will suffer from severe water shortages.



*Figure 1 above shows the total non- irrigation water consumption* (Porto, Khatri & Vairavamoorthy, 2018)

It is worth noting that wastewater treated and released from chemistry, biological and physics contaminants could be one source of water that is readily available, particularly in semi-arid and arid regions. According to Iacob (2013), the effluent and the sludge treated from wastewater treatment plants could be safely reused for recreation, industrial processing, potable reuse, urban planning, and cooling. On the other hand, poor wastewater management in developing nations results in the contamination of freshwater resources. Notably, it is a significant contributor to diseases and deaths affecting the health of ecosystems.

**Urban wastewater treatment problems are as a result of:**

***Lack of proper solutions for sludge management***

The lack of managing waste products results in waterborne illnesses and water pollution. Notably, the lack of proper sanitation technologies is hampering the efforts of dealing with urban wastewater (INSIGHTS, 2018).

***Lack of integrated urban water management***

The management of sludge is undertaken by municipal agencies or the private sector that offers the de-sludging service. The recent mini-sewage treatment plants' proliferation in urban housing complexes carries significant challenges. There have been reports of numerous deaths resulting from pit empties that are poorly equipped due to unskilled plant operator's actions (ESCAP, 2015). A similar danger is linked to fecal sludge treatment plants.

***Overreliance of centralized sewage systems***

Centralized sewage systems usually require large as well as sewer trunks that are capital intensive. They also have a higher water requirement for transportation of waste (ESCAP, 2015). Besides, they have a higher risk of system failure in contrast to decentralized wastewater management systems.

***Lack of clear wastewater ownership***

It is vital to establish the owners of wastewater, either the city or the locals. Policymakers need to determine this factor before developing treatment as well as use options. In nations such as Bangladesh, the residents in rural areas are the owners of the wastewater (Porto, Khatri & Vairavamoorthy, 2018). But, in urban areas, the situation is different.

***Lack of adequate space***

It has been a challenge finding space to install water treatment plants or even upgrade the existing ones. Moreover, there has been public opposition to developing the treatment plants near residential settlements due to odor and noise issues.

***Increasing urban wastewaters with Heavy metal***

Increasing industrial activities have led to wastewaters with heavy metals such as steel, iron, among others. Most of the industrial technologies lead to both organic and organic impurities (Czikkely & Fogarassy, 2018). To remove the heavy metals, improved and advanced technology are required. Other inorganic impurities can lead to irreversible environmental degradation and pollution.

**Conclusion**

The lack of proper solutions for sludge management, lack of integrated urban wastewater management, overreliance of centralized sewage systems, lack of clear wastewater ownership， lack of adequate space and increasing urban wastewaters with heavy metal is responsible for treatment challenges related to urban wastewater. Therefore, it is critical to plan holistically for rural and urban centers, looking at the sources of water that they use.

**References**

Czikkely, M., & Fogarassy, C. (2018). Urban Wastewater Management in Focus of Heavy Metal Contamination. *YBL Journal of Built Environment*, *6*(1), 103-113.

ESCAP, et al., (2015). Policy Guidance Manual on Wastewater Management with a Special Emphasis on Decentralized Wastewater Treatment Systems. Bangkok. Thailand. *United Nations and Asian Institute of Technology,* 1-144. <https://www.unescap.org/sites/default/files/Policy%20Guidance%20Manual%20on%20Wastewater%20Management.pdf>

Iacob, V. (2013). The Wastewater – A Problem of Integrated Urban Water Management. *Procedia Economics And Finance, 6,* 436-443. doi: 10.1016/S2212-5671(13)00160-3

INSIGHTS, (2018). Synthesis Document: Wastewater Challenges and Solutions. *INSIGHT SERIES 10 – MUMBAI,* 1-3. <https://www.ircwash.org/sites/default/files/insights_10_wastewater_challenges_solutions_ver_fin.pdf>

Porto, M., Khatri, K., & Vairavamoorthy, K. (2018). Challenges for urban water supply and sanitation in developing countries. *Water For A Changing World - Developing Local Knowledge And Capacity*. doi: 10.1201/9780203878057.ch7