Inclusive Development Approach to Urban Water Services in Jakarta

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Abstract. The lack of a reliable piped water network in Jakarta causes the ongoing exploitation of groundwater. Thus, the government should provide inclusive clean water for all residents. This study aims to review the literature on the inclusive development approach on water services across urban contexts to provide recommendations for the local government. Since the inclusive development approach to water and sanitation is relatively new, the study employs a narrative review method to learn best practices from several cities across the globe. Studies showed that other cities faced a similar problem in providing piped water systems, leading to the reliance on groundwater sources. Some recommendations can be drawn from the study. First, the local government should increase water supply by piped water networks to low-income families in poor neighbourhoods. Second, subsidizing the poor should also be included in the system. Third, strict rules and regulations on groundwater use should also be applied to all to save water and the environment. Fourth, the collaboration between citizens and the government by encouraging community participation in decision making can empower citizens, especially women, to increase their knowledge on water use and their right to have clean water.

1. Introduction

Providing inclusive clean water in Jakarta is still a big challenge for the government today. As a megacity that undergoes rapid population growth and urbanization, Jakarta encounters various complex issues in preserving sustainable water use [1]. Water demands in Jakarta have been rising exponentially, leading to groundwater overexploitation [1][2]. If this continues to happen, Jakarta’s coastal areas are predicted to submerge by 2050 [3]. These issues bring forth the importance of promoting inclusive clean water in Jakarta. Inclusive clean water is characterized by equal access to high quality, quantity, and affordability in acquiring clean water services among all residents [4]. In short, inclusive clean water plays a pivotal role in improving the social, political, environmental, and economic aspects of the urban area.

Like many other cities in the global south, residents of Jakarta rely on water sources outside of the formal piped water network, such as groundwater [5], rainwater [6], and informal service providers [7]. The main reason behind the reliance on informal piped water networks is the limitation in providing clean water services through a well-established piped water system. The saline intrusion and the contaminated groundwater led to the reliance on bottled water for drinking. According to Badan Pusat Statistik [8], bottled water is Jakarta’s the most preferred drinking water followed by shallow subsurface and deep confined aquifer groundwater. As statistics reported, most homes in Jakarta still struggle to
provide clean water for drinking, with roughly 77.73 percent paying more for bottled water, 12 percent relying on groundwater, and only 9.7 percent relying on piped water [8]. Low-income residents buy refilled bottled water or use other informal providers because they cannot afford to have piped water at their homes. It is evidenced by residents of Western Jakarta such as those in Kamal, Tegal Alur, and Pegadungan wards and those in neighbourhoods of Rawad Badak, Kamal Muara, Muara Angke, and Muara Baru in Northern Jakarta [9].

Similarly, in Kebon Bawang of Northern Jakarta, where a piped system has been established, the water flow rate is limited due to the narrow diameter, which is only 3 inches. The situation compelled them to purchase extra bottled water and pay for piped water [10]. In the long run, they spend much more money in water supply than residents with access to piped water or deep groundwater sources. In addition, most Jakarta residents with piped water still rely on groundwater. Eventually, overutilization of groundwater will bring grave damage to the environment’s stabilization [11], such as salinization, land subsidence, and flooding.

The provision of piped water supply for low-income and high-income residents is essential in achieving SDGs for increasing access to water in urban areas. For this reason, it is imperative to design an inclusive development approach in the water supply to ensure water availability for all residents in Jakarta. Inclusive development is defined as "development that includes a wide range of actors, particularly marginalized and vulnerable, in social, political, environmental, and economic decision making, that takes local contexts into account" [12]. This literature review focuses on the review of practices of inclusive development approach in water supply and sanitation in urban contexts across cities in several countries, to provide recommendations for local government in Jakarta.

2. Method
A narrative approach is selected to summarize best the newness of the inclusiveness and the diversity of its nature in different contexts. A narrative review will provide an integrated overview of inclusive development [13]. The search for journal articles with keywords ‘inclusive development’, ‘water supply’, and ‘piped water network’ was conducted through databases subscribed by Universitas Indonesia. The scope of the review was limited to urban settings.

3. Results and discussion

3.1. Water supply and sanitation in Jakarta
Water supply in Jakarta employs a centralized piped system with a reservoir as the primary source of water located 70 km away from Jakarta. The piped water system can only fulfil 40% of the current water demand by Jakarta residents [4]. As a result, residents of Jakarta rely on groundwater as one of the sources of clean water. Groundwater is “a resource hidden in the rocks of the earth’s crust” [14]. It is an “accumulative” infiltrated water in the cracks and spaces in soil, sand, and rock. Groundwater accounts for 30 percent of the world’s fresh water supply and is used by more than 2 billion people worldwide [15][16]. In comparison to surface water, groundwater is more likely to have better water quality due to its indirect exposure to pollutants. There are two kinds of groundwater, namely shallow sub-surface and deep confined aquifer groundwater.

Deep confined aquifer groundwater is located deeper under the ground than shallow subsurface groundwater. Deep confined aquifer groundwater is renewed by rain or stream water infiltration located far from the ground above it, whereas shallow subsurface groundwater regenerates through direct rain or stream water infiltration that passes through the upper, closer to the surface soil [17]. Deep confined aquifer groundwater has better water quality and a more reliable supply than shallow subsurface groundwater, thus making it more favoured by the general population [4]. Besides Jakarta residents, industrial and agricultural sectors are the most frequent consumers of deep confined aquifer groundwater [18]. The reliance on groundwater in Jakarta is caused by the habit of its residents over hundreds of years and the insufficient service of piped water supply, in coverage, and in water quality.
Furthermore, the water quality of groundwater across Jakarta is diverse. Northern Jakarta, for example, is closer to the Java Sea, which may negatively impact water quality in residential areas nearby the sea. Wastewater treatment in Jakarta mainly applied on-site sanitation, in which residents collected their wastewater using individual septic tanks [1]. Residents living by the river still throw feces in inappropriate places (e.g., sewers, drainage, river) [1]. Soon, the ground will absorb the dirty water and will lead to the contamination of groundwater. In most Jakarta household cases, leakage and propagation are also caused by a lack of septic tank maintenance [18]. Around 45-90% of Jakarta’s shallow groundwater is already contaminated by the Escherichia coli (E-coli) bacteria, caused by the untreated residential waste from detergent and wasting water from bathing, home industry, cooking, indoor cleaning, and outdoor use [18][19].

Research showed that water companies tried to expand the piped water connections to middle and upper-income households, but the habit of using groundwater over piped water remained the same as before [4]. The resistance to using piped water supply is because of the variance in the quality of water supply across the city. Moreover, the impact of private sector partnership on access by low-income households also added to the water supply problems in Jakarta.

3.2. Inclusive development approach in water supply and sanitation

Inclusive development (ID) is a relatively new approach [4][20], which emphasizes fairness, social justice, and social participation. Inclusive development is defined as "development that includes marginalized people, sectors, and countries in social, political, and economic processes for increased human well-being, social and environmental sustainability, and empowerment" [20]. Included in the definition is the practice of sustainable development along with inclusion and equity, with no exception to the marginalized people, sectors, and countries. The previous empirical evidence of the MDGs revealed that the achievement of one of the goals, namely improved drinking water source and sanitation facility, has overlooked equity of access to water service between the poorest and the wealthiest households within cities. SDGs improve the limitations in MDG indicators by including equity of drinking water access.

Inclusive development calls for equality in allocating rights, responsibilities, and risks [12][20]. There are three components of ID, namely social, relational, and ecological. Social inclusiveness (SI) means delivering an equal, non-discriminatory, and fair right to the same level of service for all people [12][21]. It also explains how inequality should be reduced in all sectors, and every level of society should be equitable in terms of socio-economic resources, potential, responsibilities, and liabilities [12]. SI has principles of equity in opportunities, including knowledge of the marginalized, a higher level of protection for the most vulnerable, capacity building for the poor, and engaging marginalized people in policy-making.

Relational inclusiveness (RI) emphasizes the significance of cutting poverty, having equitable access to systems for the marginalized, and ensuring an adequate structural power in resolving issues of sustainability livelihoods [12]. It relies on how pro-poor development by all parties guarantees a fair service and affordable access to clean drinking water and sanitation where social exclusion and discrimination are fought. Equality in access to fundamental needs, like drinking water, will create more opportunities for the urban poor to lead a better life (Narayan-Parker, 2002; Shah et al., 2015). There are two leading indicators of RI, namely participation and subsidies. Participation means giving everyone a chance to voice their opinion and involve them in every decision-making process, mainly representatives from the low-income communities. On the other hand, subsidies need to be distributed justly for the low-income residents through cross-subsidies policy if needed [22].

Meanwhile, ecological inclusiveness (EI) refers to the relationship between environmental issues and the marginalized, which involves ensuring resource use and dewatering process go hand-in-hand with a well-managed and environmentally sustainable wastewater management system [21]. The right to clean water provision is one of the focal points in the case of ecological inclusiveness. The following points must be considered in the inclusiveness: a) preserving biodiversity by minimizing large-scale air exploitation and reducing exposure to harmful chemicals in groundwater, b) ecological and health issues...
must be considered in studies and practical of management business and infrastructure system which intersect in environmental resource exploitation. c) dealing with water availability requires a multi-governance approach (there needs to be a sustainable collaborative effort with a top-down and bottom-up approach), d) efforts are mobilized to protect environmental rights and principles, such as developing instruments for assessing environmental impact, provides renewable energy subsidies and carbon tax, promote public education and public awareness, monitoring corporate social responsibility thoroughly, and provide integrated water resource management, e) EI instruments designed to have the least amount of impact on persons or society, offers continuity and resource allocation for the poorest, who are regularly deprived of water and face a threat to their living balance, and g) EI initiatives and activities should not worsen impoverished vulnerability of the poorest [12].

3.3. Recommendations for local government
A study by Kooy and Furlong found a connection between the over-abstraction of groundwater in wealthy neighbourhoods and the salinization of shallow groundwater in poor neighbourhoods [2]. Powerful pumps in wealthy neighbourhoods draw vast amounts of water, risking flooding and inadequate water quality in poor neighbourhoods. While the rich can opt-out of a centralized water supply, the poor often do not have the access or resources. Hence, the strategy will include government policy that strictly regulates the use of groundwater. Developing a strict law and policy for groundwater use is also significant for establishing standards and protecting rights. These can be imposed directly through laws affecting land use, or indirectly through legislation addressing related concerns, including regulatory authority distribution and water quality. Lawbreaker should be penalized with fair punishments to prevent further lawbreaking and compel people to adhere to the governing policy. The government regulations and policies that explain the rights and obligations of urban dwellers and the government, and other parties involved in water supply and sanitation, must be open to the public. Government must ensure to regularly communicate and give voice to all citizens regarding decision-making processes on water supply and sanitation.

Collaboration between citizens and the government to enhance clean water management is a powerful way. Community participation plays a critical role in attaining inclusive development for urban water services. First and foremost, the government needs to encourage urban dwellers to use piped water as opposed to groundwater by socializing the benefits of using piped water, and the negative consequences of using groundwater. There should be an engagement platform that is convenient to use, effective communication between government, stakeholders, and citizens, providing incentives for people who participated, and enhancement of connection with citizens through community networking. Following social learning principles, the government needs to approach community leaders as role models and encourage them to provide examples of correct behaviour in clean water using piped water. In addition, the role of community leaders is to translate government policies to their citizens. One of the essential community components in the use of clean water is women. Women are the key beneficiaries, as women are the largest multi-water user in urban areas due to their traditional duties. Thus, women can be targeted for intervention by the government to be educated on the use of piped water and abandon groundwater.

These strategies will entice the previously non-users of piped water to use the service, which will accelerate the water conservation process in Jakarta. If the low-income residents could not afford to pay for the piped water service, the government needs to aid the urban poor by subsidizing the cost charged for the service. The governance decision-making process should include the urban low-income families as well.

4. Conclusion
To achieve the ultimate goal of implementing inclusive development for urban water services in Jakarta, the government needs to reassess the current situation. The gap and unequal access to piped water among high-income and low-income residents is a severe concern for maintaining sustainable water use in Jakarta. For that matter, the government must provide an inclusive piped water network for all residents,
including low-income residents who dwell in “unreachable” areas. It is also essential to provide a cost-effective piped water service for all people.

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