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SANITATION, SETTLEMENTS, AND DISEASE: PUBLIC HEALTH MANAGEMENT IN THE SEMARANG GEMEENTE, 1906–1942

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ABSTRACT

This research examines the dynamics of public health, sanitation, and settlements in Gemeente Semarang during the period of 1906–1942, when rapid urbanization gave rise to various social and environmental issues. The focus of the research is directed toward how settlement conditions and sanitation systems were at the beginning of the Gemeente's formation, how disease outbreaks spread within that context, and how the colonial government responded through health management policies and kampung improvement. The primary objective of this research is to historically reconstruct the linkage between urban spatial planning, sanitation, and the emergence of disease outbreaks in Semarang. The method used is the historical research method with the stages of heuristics, source criticism, interpretation, and historiography. This research utilizes several primary sources such as Van Wonen en Bewonen (1913), De Locomotief (15 January 1908), Bataviaasch Nieuwsblad (22 July 1918), Verslag van den toestand der gemeente Semarang (1918–1930), Gedenkboek Semarang (1931), as well as archives from the Koninklijke Bibliotheek and KITLV Netherlands. The results of the study show that the urbanization process caused spatial inequality between organized European settlements and indigenous kampungs that were crowded and unhygienic. This condition triggered the spread of cholera, malaria, influenza, plague, and dysentery outbreaks, with high mortality rates among the indigenous population. As a response, the Gemeente Semarang government implemented public health policies through the construction of a rioleering (sewerage) system (1913–1923) and the kampongverbetering (kampung improvement) program (1917–1938) which were oriented toward environmental improvement and social facilities.

I. INTRODUCTION

Semarang quickly became one of the most important port cities on Java's northern coast around the turn of the twentieth century. Its role as a center of trade and colonial administration resulted in tremendous population increase, both among Europeans and indigenous (Jumaidi & Fatma Fatkhia, 2024). In 1906, the population increased, prompting the establishment of a new city administration region known as Gemeente Semarang. Since then, Semarang has begun to perform government activities with greater responsibilities. However, the foundation of the Gemeente Semarang administration was accompanied by a number of problematic issues, one of which was an increase in urban population and mobility, resulting in densely populated residential neighborhoods.

Residential areas in Semarang during the colonial period were distinguished based on ethnic groups. European residents occupied the Zeestraat area (now Jalan Kebon Laut), Poncol, Pindrikan, Bojong, and Kota Lama. The Eastern foreign community, consisting of Chinese, Arabs, and Indians, were placed in special areas such as Pecinan, Pekojan, and Kauman, although some of them also lived mingled with the indigenous population. Kampung Melayu became a settlement for immigrants from various regions such as Aceh, Banjar, Sumatra, Melayu, Bugis, Gresik, as well as foreign traders like Arabs and Indians, located near the port because most of its residents worked in the maritime and trade sectors. Meanwhile, the indigenous people occupy the outskirts of the city that remain connected to the main roads, such as Lamper, Peterongan, Sompok, Jomblang, Karangsari, Pandean, and Plampitan. The population density in Gemeente Semarang is most significant in areas that serve as major economic hubs. The density in these areas is not just limited to daily activities, but indeed becomes a place for carrying out daily livelihoods (Kasmadi et al., 1985; Tio, 2001)

The aforementioned issue of population density causes a domino effect, namely the quality of the residential environment. Houses began to be built at random, resulting in an unsystematic density. This density not only changes the city's layout, making it ugly, but it also causes unhealthy environmental difficulties. This unstructured density appears to result in the formation of an inadequate sanitation system. Poor drainage systems, mounds of domestic waste, and no guarantee of good water quality have emerged as new societal challenges. Dense settlements like the Pecinan region, Kampung Melayu, and Tambaklorok frequently fail to fulfill basic sanitary standards. These settlement areas generally have poor sanitation, limited clean water supply, minimal lighting and ventilation, and often face the threat of flooding during the rainy season. This condition is further exacerbated by the declining community culture of mutual cooperation in environmental clean-up efforts. (Amalia, 2016; Cipta, 2020).

Two initial issues apparently gave rise to a more complex problem, namely vulnerability to health issues. Throughout the early 20th century until the end of colonial rule in 1942, various diseases spread in the Dutch East Indies, including in Semarang itself. In Semarang, at the

beginning of the 20th century, specifically in 1901-1902, cholera outbreaks severely affected Semarang. The cholera outbreak even recurred in 1910, and this second period lasted one year longer than the first period, ending in 1913. This epidemic in its study Vico Saputra et al. (2024), concluded that the outbreak of Cholera was caused by suboptimal sanitation in residential areas. More specifically, the imbalanced drainage channels create stagnant water, not to mention the presence of latrines adjacent to wells, resulting in low hygiene levels. Furthermore, Semarang has repeatedly faced outbreaks of deadly tropical diseases besides cholera, such as malaria, plague, and dysentery, which have become routine threats to the city's residents, especially in densely populated residential areas. This condition raised concerns not only among the indigenous population but also within the colonial government, which began to realise the importance of public health management for the city's economic and social stability. In response to the situation, the Dutch colonial government began implementing various health management policies and sanitation reforms (Cipta, 2020; Sugiyatno & Yuliati, 2023).

So far, relevant studies on health themes in Gemeente Semarang have been extensively researched. Several studies have been conducted, such as by Vico Saputra et al. (2024), who examined the impact of environmental cleanliness and sanitation on the emergence of the Cholera outbreak in Semarang from 1910 to 1913. This historical study provides an understanding of how Cholera emerged and its relationship with environmental cleanliness and sanitation. The next study was conducted by Amalia (2016), who examined how the kampongverbetering program initiated by the Gemeente Semarang government was implemented and its impact on the community during the Gemeente Semarang administration. A similar study was also conducted by Dewi (2021), who attempted to see the progress of the drainage system development in Semarang and its impact on the community. From the various existing studies, the examination of health and health management in Gemeente Semarang has indeed been attempted, but the existing evaluations are spatial in nature, both in terms of time dimension and the context and objects being discussed. Therefore, this study aims to specifically reconstruct how the events of disease, living conditions, and sanitation in Gemeente Semarang were addressed in the discourse by the Gemeente Semarang government.

Starting with the context of the aforementioned issue, it is undoubtedly relevant and interesting to show in detail how the Gemeente Semarang government dealt with disease, living conditions, and cleanliness. The primary goals of this study will be to determine (1) how sanitation and settlement conditions were at the start of the Gemeente Semarang administration, (2) how disease outbreaks occurred during the Gemeente Semarang era, and (3) how the government implemented health management strategies over time. This study will span from the founding of the Gemeente Semarang Government in 1906 until the conclusion of that era in 1942. It is hoped that this research would help us understand the history of health in Semarang.

II. METHODS

This study used the historical research method. This procedure involves four parts. The heuristic step, or source collecting, comes first, followed by source criticism and verification, then data interpretation, which entails linking facts into a cohesive whole, and lastly historiography, or creating the entire tale (Kartodirdjo, 1992; Kuntowijoyo, 2018).

The author conducts this research using a variety of primary materials, including the periodicals Van Wonen en Bewonen, Van Bouwen, Huis en Erf from 1913, the newspaper De Locomotief from January 15, 1908, and the Dagblad van Noord-Brabant from August 16, 1924. The author also consulted the Bataviaasch Nieuwsblad newspaper edition of July 22, 1918, the report Gedenkboek Semarang (1931), Verslag van den toestand der gemeente Semarang over tahun 1918-1930, and other comparable materials. The sources for this study were found in the archives of the Koninklijke Bibliotheek Belanda, Monumen Pers Nasional, Tropen Museum, and the Koninklijk Instituut voor Taal-, Land-, en Volkenkunde. The documents have also undergone internal and external source critique in order to be considered valid for usage in this research procedure. External scrutiny was carried out to guarantee the legitimacy of the documents. For example, in the January 15, 1908 edition of De Locomotief, the researcher checked the publisher's information, publication year, the condition of the digital reproduction at the Koninklijke Bibliotheek, and the edition number's correspondence with the archive catalogue to ensure that the document was authentic and contextually relevant. Internal critique involves analyzing the text's content and reliability. In the case of De Locomotief, the researcher investigates the content of news articles about the state of Semarang, colonial policies, and mentions of public facility construction. The news content was compared to the official report Verslag van den toestand der gemeente Semarang to assess data consistency, potential bias of colonial journalists, and the extent to which the information may be used for an accurate historical reconstruction.

To understand the sociopolitical context, the researcher links the report from De Locomotief about the development of the city of Semarang with findings from other sources, such as Gedenkboek Semarang or city government archives. This stage enables researchers to see temporal links, such as how city dynamics and colonial government policies influenced the demand for healthcare services and highlighted patterns of continuity and change. it is called interpre interpretation. Meanwhile, at the final stage, which is historiography, it is an effort to compile a historical narrative based on the interpreted findings. At this stage, factual information from De Locomotief is combined with other sources to compile a chronological account of the health management process in Gementee Semarang. The narrative is constructed systematically, analytically, and coherently to provide a comprehensive picture of the development of health management in Gementee Semarang.

III. RESULT AND DISCUSSION

Pemukiman dan Sanitasi pada Periode Awal *Gemente* Semarang

By 1906, when Semarang was established as a Gemeente (municipality), the city had already undergone a somewhat quick urbanization process. This prosperity was mostly driven by port and commerce activity, establishing Semarang as a major economic hub on Java's northern shore. The increased movement of people and commodities through the port area resulted in an increase in population, particularly along the riverbanks and around the port, causing residential districts to grow fast and extensively. The city's physical layout contrasts between parts that are built in an orderly manner, typically occupied by middle to upper-class groups or European populations, and residential neighborhoods that expand organically without apparent spatial planning (Kasmadi et al., 1985).

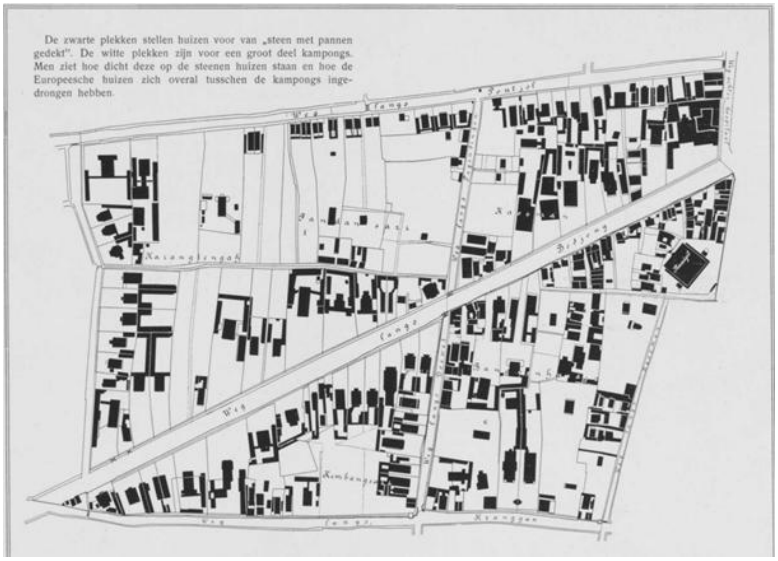
The rapid advancement of the trade and industry sectors also made Semarang one of the main urbanisation destinations in the Dutch East Indies. Many migrants from various regions and ethnic backgrounds came to seek economic opportunities, causing the city to develop into a dynamic multi-ethnic social space. The population consists of various groups, such as Javanese, Chinese, Arabs, Malays, Indians, and Europeans. Of the entire population, the indigenous people dominated with a number reaching 126,628 in 1920 and increasing to 175,457 in 1930. After that, the Chinese ethnic group occupied the second largest position, followed by Europeans and other Eastern foreign groups who also contributed to shaping the socio-cultural character of the city of Semarang in the early 20th century (Amalia et al., 2016).

Actually, the process of urbanisation driven by trade and industry has set aside new social dilemmas. As an early consequence of this urbanisation, the indigenous population was gradually displaced from the main areas of the city. Many of them who previously lived along the main roads were forced to move because their residential land was bought by foreigners (Tjokrosujoso, 1956). The Bojong area became an early example of indigenous land purchased by Europeans and then transformed into an elite residential complex consisting of villas and luxurious houses with large yards. The subsequent shift of the indigenous population created new pockets of settlement in the areas of Bulu, Pandean, Ambengan, and Karangsari, which developed into dense villages due to the influx of migrants from outside Semarang in the late 19th century (Brommer et al., 1995).

The population density in the people's settlements is increasing as the number of residents displaced from the city center continues to rise. As a result, the quality of the living environment has drastically declined, especially in terms of sanitation and public health (Tjokrosujoso, 1956). Indigenous settlements generally stand without thorough planning, with narrow streets, bamboo-walled houses, and very limited public facilities. This condition is in stark contrast to the neatly arranged European areas, which have spacious yards and are equipped with modern

facilities such as electricity and gas (Yuliati, 2009). Tillema (1913) even described and symbolised the condition of the indigenous village as resembling an "Augiasstal," 'a stable that had never been cleaned for decades.' The location of the latrines near the wells caused the villagers to often consume water that had been contaminated with waste, worsening their health conditions.

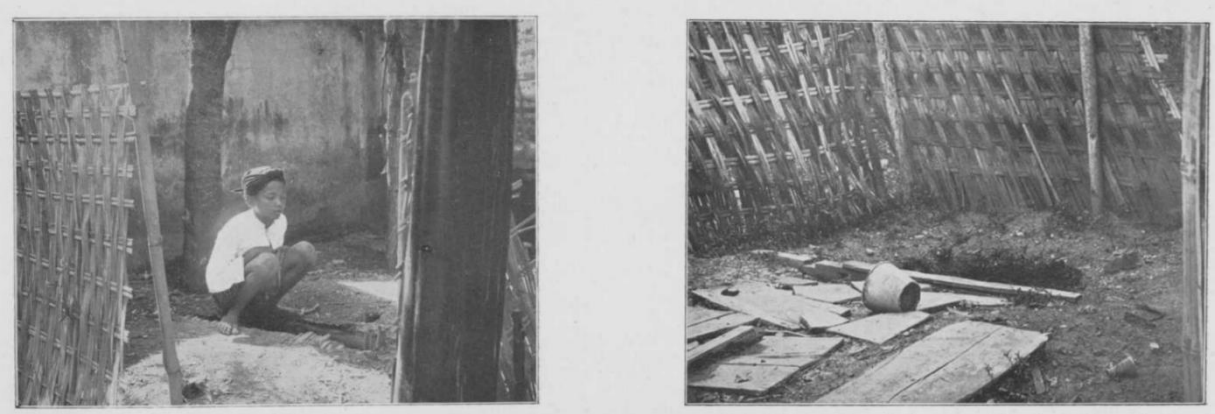
The settlement at that time was dominated by small, closely-packed houses, with narrow or almost non-existent yard space. The space between houses is limited; ventilation and natural light entering the house are often obstructed by neighbouring houses or closely standing walls. Many roofs and walls of houses use simple materials, and the building construction is still weak against weather changes (Kasmadi et al., 1985).



Picture 1. Indigenous settlements (white) and European-owned buildings with roofs and bricks (black) in 1913 (Source: Tillema (1913)

In addition to the terrible living conditions caused by this huge development trend, Gemeente Semarang is dealing with sanitation challenges. During the early years, environmental sanitation was extremely poor. Household wastewater lines were largely open, and much of the wastewater from kitchens, bathrooms, and solid waste was disposed of untreated in ditches or neighboring rivers. Wells, as drinking water sources, are typically located near densely populated areas, making them susceptible to contamination by surrounding garbage, particularly after heavy rain (Vico Saputra et al., 2024). The provision of clean water officially still has very limited coverage. Only a small portion of settlements have access to managed water supply systems, while the majority still rely on shallow wells or surface water sources whose quality heavily depends on the season and surrounding environmental conditions. As a result, during the rainy season, the situation worsens: contamination increases, access to clean water decreases, and the risk of disease spreading becomes greater (Kasmadi et al., 1985).

The reason is that the city's drainage infrastructure has yet to be organized systematically. Many spontaneous residential neighborhoods lack adequate rainwater drainage infrastructure, resulting in puddles in alleys, village roads, and yards. Furthermore, the elevation and land contours in some low-lying places, particularly those near rivers or beaches, make it difficult for rainwater to drain. These conditions frequently last for several days after the rain, worsening the environmental humidity and the quality of the underlying tile or dirt surface, resulting in a moist feeling and an unpleasant odor (Amalia et al., 2016; Vico Saputra et al., 2024).



Picture 2. The condition of the latrine (left) and well (right) belonging to the Bumiputera in Gementee Semarang in 1913 (Source: Tillema (1913)

Overall, the physical design of settlements and sanitation facilities in early Gemeente shows a close relationship between the environmental conditions of its development and health risks. Spontaneously developed settlements, minimal household sanitation, inadequate water access, and poor drainage all became part of the reality of the rapidly growing city of Semarang in the early 20th century. These conditions provide an important backdrop for observing how the city government would subsequently respond to the sanitation and housing needs to better protect public health (Amalia et al., 2016).

Various Disease Outbreaks Attack Gementee Semarang

The environmental welfare conditions in the people's settlements show a direct impact on public health. In 1901, there were 2,480 cases of cholera in Semarang, and the number decreased in 1902 to 1,020 cases. The cholera outbreak cases increased again in 1910 to 3,163 cases, then gradually decreased in 1911 to 1,169 cases, in 1912 there were 583 cases, and in 1913 it became 92 cases (Tillema, 1913). Meanwhile, Saputra et al. (2024) in their study findings stated that the cholera outbreak, particularly during the period of 1910-1913, was closely related to poor sanitation conditions, contaminated well water, and high population density. At least, as a result of this cholera outbreak, it was recorded that nearly 3,500 people died, and

that the conditions of densely populated villages, water pollution, and irregular sanitation were the main contributing factors (Saputra et al., 2024).

The cholera outbreak issue was not yet completely resolved, and simultaneously in 1911, Semarang was also shocked by the phenomenon of mass fever. Initially, this disease was identified as malaria, but in reality, the fever that struck was a reaction to an influenza infection occurring simultaneously with malaria. The influenza infection was first recorded as an outbreak in the Semarang port area, transmitted by foreign travellers from Hong Kong and Singapore who were active in the port. The influenza outbreak that struck Semarang lasted quite a long time, from 1911 until it was declared safe in 1928 (Sugiyatno & Yuliati, 2023). As an illustration to understand the magnitude of this influenza epidemic, an interesting report in the Bataviaasch Nieuwsblad newspaper edition of July 22, 1918, was published. In its report, it was mentioned that 30 percent of the total patients in a hospital in Semarang were filled by workers from two railway companies who were exposed to the influenza virus (Bataviaasch Nieuwsblad, 22 juli 1918).

Based on the analysis by Sugiyatno & Yuliati (2023), they stated that the phenomenon of the influenza outbreak in Semarang brought by foreigners was actually exacerbated by the social conditions of the community itself. Significant supporting factors for its spread include unhealthy environmental conditions and exacerbated by the economic pressure on the impoverished community. Other records, such as Gedenkboek Semarang (1931:192), mention that every day around 40 to 60 people died from the disease. This condition peaked during the week between November 19 and 25, 1918, when 309 people were recorded to have died due to the influenza virus attack (Ravando, 2020). The high death toll not only reflects the rapid spread of the disease but also the weakness of the public health system at that time. The impact of this epidemic was even felt for some time after 1918.

Another deadly epidemic is the plague. This epidemic also spread to various residential areas. Until the year 1917, a total of 76 people were recorded to have died from this disease, with details of 35 victims in Semarang Tengah, 24 in Semarang Kulon, 12 in Semarang Wetan, and 5 in Semarang Kidul. Several villages that were most severely affected include Karangturi, Lemahgempal, Bugangan, Gambiran, Bojongpejambon, Kembangsari, Randusari, Widoharjo, Lamper Kidul, Genuk, Bandarharjo, Rejosari, Barusari, Bulustalan, Pederesan, Bulu Lor, Pendrian Kidul, and Kentangan (*Verslag van Den Toestand Der Gemeente Semarang over 1928*, 1929). The report also noted 50 cases of dysentery with 8 fatalities, 118 cases of typhus with 16 deaths, and 4 cases of diphtheria that resulted in 2 deaths. These diseases primarily affected the indigenous population living in densely populated areas with minimal sanitation facilities, highlighting the poor health conditions of the urban community at that time. The condition illustrates the weakness of the healthcare system and medical handling in urban

areas. Not stopping there, chickenpox also began to appear, initially in the Chinese settlement before eventually spreading to various other areas of the city.

The series of epidemics that struck Semarang had a significant impact on the increase in the death rate of the population. In several areas, the mortality rate reached around 10 percent of the total population, even increasing to 11 percent in the following years. The mortality rate among indigenous communities is recorded to be much higher compared to other ethnic groups, reflecting social inequality and poor living conditions (Cipta, 2020; *Verslag van Den Toestand Der Gemeente Semarang over 1928*, 1929). Abeyasekere (1989) noted that the infant mortality rate in several areas of Java reached 300 per 1,000 live births, much higher than the rates recorded among the European population in the same locations. The available healthcare infrastructure is limited in scope and unevenly distributed, reflecting colonial priorities. The Military Medical Service (Militair Geneeskundige Dienst) dominates the healthcare system and is almost entirely focused on soldiers and European employees. Meanwhile, the civilian sector managed under the Burgerlijk Geneeskundige Dienst (Civil Medical Service) is underfunded and unable to serve the much larger indigenous population. Access to quality healthcare services and decent living conditions is also racially stratified, with European groups enjoying separate residential areas that have better healthcare facilities and public services (Hartatik et al., 2025). Thus, the spread of various epidemics in Semarang not only highlights the weaknesses of the colonial health system but also demonstrates the direct impact of the city's suboptimal spatial planning, especially on the indigenous population.

Implementation of Health Management and Its Development

The discourse on large-scale health management by the Gemeente Semarang government through settlement and sanitation management stems from the experience of the cholera outbreak in 1910–1913. The high mortality rate due to this disease outbreak accelerated discussions and sanitation actions in Gemeente Semarang. This situation forced the government to take more concrete steps, starting from monitoring water and markets, hygiene campaigns, to planning a more structured waste disposal system. The government is not only addressing individual cases but also restructuring the urban environment (Saputra et al., 2024).

The initial concrete step taken by the government at that time was to launch a program for the construction of a drainage network (rioleering) that began and was refined during the period of 1913–1923. Furthermore, theoretically, the construction of this drainage system is also based on an analysis of the environmental vulnerabilities in Semarang itself. With the growth of the city and the increasing environmental pressure in the lower part of Semarang, the Gemeente government realised that the existing city drainage and wastewater disposal system was inadequate. The city area, mostly consisting of low-lying alluvial plains with elevations between 0.75 to 3.5 meters, often floods after rain due to the irregular drainage

system. The construction project of this drainage network is designed to follow the city's master plan and is placed to channel waste from densely populated areas to the main drainage, thereby reducing local flooding and contact between waste and residents' drinking water sources. The implementation of the sewerage system is gradual and closely related to the selection of repair locations as well as the budget capacity of the city government, but this project is one of the most important interventions in reducing waterborne disease transmission in Semarang (Dewi, 2021).

In the early stages, the municipal administration prioritizes flood-prone and submerged neighborhoods, particularly in the Lower municipal zone near the riverbanks and canals. This network of channels is intended to connect flood-prone communities to rivers, canals, or the sea as final disposal sites. The development of drainage channels is complemented by upgrades to supporting infrastructure, such as communal washing channels, public restrooms, and clean water hydrants in villages, with a focus on indigenous populations who previously lacked access to contemporary sanitation facilities (Dewi, 2021). In the planning process, Tillema (1913) stated that the development of the sewerage system must proceed simultaneously with the provision of clean water and efforts to maintain environmental cleanliness to prevent contamination from household waste into groundwater. He emphasised that human and animal waste, including faeces, urine, organic waste, and liquid waste, must be diverted through special channels to prevent them from being absorbed into the soil and contaminating drinking water.

However, the implementation of the sewerage system faces logistical and technical challenges. In several densely populated villages, narrow roads and closely packed buildings make it difficult to install the piping. Costs and transportation issues also hinder access between areas, such as between the Upper City and the Lower City. Nevertheless, this effort became one of the significant milestones in the colonial government's attempt to regulate the city's sanitation system, reduce waterlogging, and curb the spread of infectious diseases. With these gradual steps, Semarang attempted to build the foundation of a modern urban sanitation system by connecting household wastewater, rainwater, and industrial liquid waste to a planned drainage network (Dewi, 2021).

Picture 3. The process of demolishing indigenous houses in the implementation of the kampongverbetering program in 1930 (Source: (Flieringa, 1930)

The commitment of the Gemeente Semarang government to health management based on social advancement facilitation is also more clearly seen in the kampongverbetering or village improvement program. The program, which is part of the colonial strategy to improve the social and health conditions of the city's population by enhancing the layout of the people's settlements to prevent them from becoming sources of infectious diseases, was officially implemented in 1917. In the early stages of its implementation, the kampongverbetering activities in Semarang were still limited to woningverbetering efforts or the improvement of residents' houses, due to the limited funds from the city government. The main focus is directed towards improving building structures and land arrangement to make them more habitable. Although on a small scale, the implementation of this program not only touched private houses but also included public buildings such as warehouses, shops, workshops, and schools. Based on the Gemeente Verslag report of 1917, with a budget of around f90,000, the colonial government successfully repaired 78 houses and buildings scattered across various areas of the city of Semarang (*Verslag van Den Toestand Der Gemeente Semarang over 1918*, 1919). This effort marks the initial steps of the colonial government in linking urban planning with public health aspects.

The implementation efforts of the kampongverbetering program began to be seen on a massive scale in 1928. If previously focused on building repairs, this time the implementation includes the provision of environmental support facilities such as drainage, lighting, road construction, as well as land filling and levelling (*Verslag van Den Toestand Der Gemeente Semarang over 1928*, 1929). The central government of the Dutch East Indies also provided financial subsidies to expedite the implementation of the program, with the amount of assistance varying each year according to the number of villages targeted for improvement. In Kampung Poengkoeran, for example, the gemeente government allocated funds amounting to f8,000 for the village improvement, which took 2 years to complete. These improvements include the main roads and small alleys, the construction of new roads, the excavation and arrangement of drainage ditches, as well as the filling of low-lying areas. To open wider road access, the colonial government even bought several houses of the Bumiputera residents that were considered to obstruct the irrigation circulation route, and then demolished them (Flieringa, 1930).

After that, in 1930, the village improvement initiative was carried out more vigorously by renovating six locations simultaneously, namely Kampung Karangasem, Kampung Kebonsari, Desa Pederesan, Desa Kebonagoeng, Desa Tamanhardjo, and Kampung Petelan-Redjosari. The allocation of funds for this six-village project was f26,835. The following year, 1931, an additional f21,515 was allocated to continue the work in Kampung Petelan-Redjosari (Rückert, 1932). However, towards the end of the 1930s, the program was transferred to the Kampongverbeteringscommissie, a Dutch East Indies government agency that regulated and

distributed village improvement aid in Java. The establishment of this agency was outlined in Gouvernements besluit No. 30 dated May 25, 1938, where the government formed a special agency named Kampongverbeteringscommissie tasked with distributing and overseeing the use of village improvement fund subsidies in various cities in Java (Kampongverbeteringscommissie, 1939). Through the establishment of this commission, the kampongverbetering program in Semarang is no longer the sole direct responsibility of the city government, but is instead regulated within a broader regional policy framework.

In addition, handling through medical means was also carried out. For example, in dealing with the influenza outbreak, the Dutch colonial government implemented three main forms of intervention. First, the government distributed medical supplies such as Dover's Powder and quinine through the Stadsverband, which were distributed in a coordinated manner to prevent the spread of the disease (Ravando, 2020). Secondly, the government also encourages the use of alternative treatments based on herbal remedies to alleviate various influenza symptoms, such as the use of castor oil, lemon water, fruit juice, eucalyptus oil, as well as the recommendation to consume coffee and tea to strengthen the immune system (Versteegh, 1934). Third, to improve treatment effectiveness, the government established a food supply committee tasked with monitoring the health of influenza patients and delivering food aid directly to the homes of affected Bumiputera residents, as poor nutrition caused by hunger has been shown to increase mortality rates during the outbreak (Ravando, 2020; *Verslag van Den Toestand Der Gemeente Semarang over 1918*, 1919).

However, in reality, the handling efforts were more focused on improving settlement patterns in the following years, which continued to be carried out extensively until the end of the Gementee Semarang Government era. In 1939, the colonial government allocated funds amounting to f60,000 to the Semarang Gementee Government for village improvement projects. In 1940, the improvement of settlements was focused on the areas of Peterongan Wetan, Peterongan Perbalan, Boestaman, Kireman, Pedalangan, and Sedajoe. This program includes village land elevation work, house elevation, drainage construction, and concrete road installation, with a budget allocation of f50,000 (de Locomotief, January 8, 1940). Two years later, in the Soerabaijasch Handelsblad newspaper edition of February 9, 1942, it was mentioned that the kampongverbetering program continued in 1942. The colonial government allocated funds amounting to f75,000 to improve the living conditions, especially the roads that often flooded and were poorly maintained.

Through a series of mitigation steps implemented by the colonial government, ranging from the provision of medicine and food aid, the implementation of the kampongverbetering program, to the construction of housing for the people, various epidemics that once shook the lives of the people of Semarang City were finally brought under control. Thus, the outbreak of various epidemics in Semarang not only highlighted the weaknesses of the colonial health

system but also revealed the direct impact of the city's inadequate spatial planning, especially on the indigenous population.

IV. CONCLUSION

The initial condition of Gemeente Semarang in the early 20th century showed a sharp contrast between the modern urban layout in the European area and the densely populated, unorganised, and poorly sanitised living conditions of the local people. Rapid urbanisation due to port activities and trade spurred the growth of indigenous villages that were overcrowded with closely packed houses, narrow streets, and unsanitary water sources and sewage systems. This situation led to a decline in environmental health quality and became a major factor in the spread of various epidemics such as cholera, plague, and influenza between 1910 and 1928. These epidemics highlighted the weaknesses of the colonial health system while also demonstrating the direct relationship between environmental conditions and the high mortality rates among the indigenous population. Recognizing the complexities of the situation, the government of Gemeente Semarang established a series of more systematic health and sanitation measures. These measures included the construction of a drainage network (rioleering) to address drainage and flooding issues, the implementation of the kampongverbetering program, which focused on improving houses and village infrastructure, and medical interventions such as the distribution of medicines, herbal remedies, and food aid to affected residents. The colonial government used a combination of technical, social, and medical measures to create a more structured urban health system and stop the catastrophic epidemic in Semarang, laying the groundwork for urban health governance in the Dutch East Indies.

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