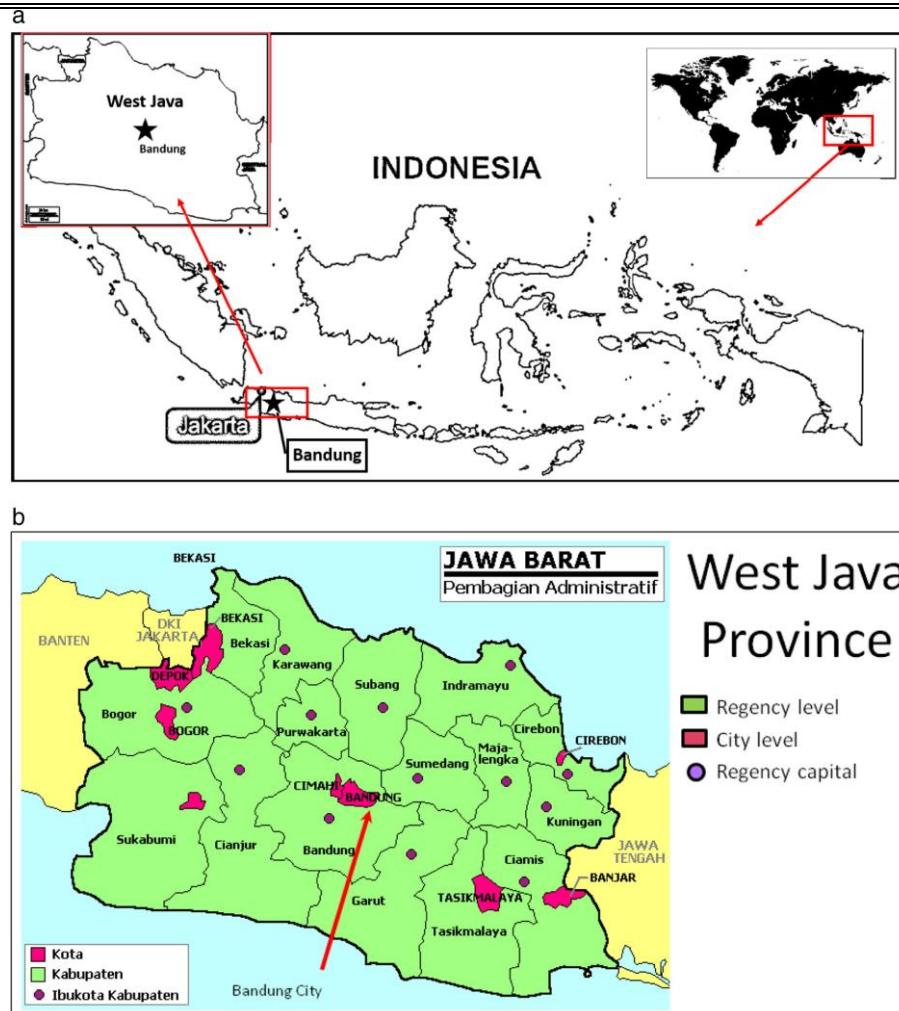


## **WWCH 2018 PROBLEM DESCRIPTION**

<b>Problem Title</b>	
<i>Septage management in the urban areas of Indonesia</i>	
<b>Contact Information</b>	
Name	PHAM NGOC BAO
Country	JAPAN
<b>1. Basic information</b>	
<p>With a total of 2.5 million registered residents living in an area of 167.27 km<sup>2</sup>, Bandung City is the third most populous city in Indonesia after Jakarta and Surabaya. The city is also an important urban centre of Indonesia, having a higher economic growth rate than the national average. It has experienced many challenges resulting from rapid urbanisation, large slums areas, increasing demand for basic infrastructures, especially related to water and sanitation, and flooding. The city serves as the capital of the West Java Province and is located about 140 km from the country capital, Jakarta, and the city is part of the Bandung metropolitan area (BMA), which consists of Bandung, Cimahi City, Bandung and West Bandung Regency with an area of 3392 km<sup>2</sup> in 2005 and a total population of 8.2 million in 2014 (Tarigan et al., 2016).</p> <p>Wastewater pipeline network or sewerage system have been planned and constructed since 1916 by the Dutch Government. According the latest data, by the end of 2017, there was 245,838 of households or approximately 40.13% of inhabitants still discharge their untreated wastewater (practicing open defecation) directly into surrounding environment without any treatment. This becomes one of the main causes of groundwater and surface water pollution in this city. Moreover, untreated domestic wastewater and septage disposal become the biggest contributors in term of pollutant loads (e.g. organic pollutants, nutrients) to most of the rivers and lakes in Indonesia.</p> <p>Consequently, annual monitoring carried out by the Government of Indonesia has revealed that river water quality steadily deteriorated until 2016. The percentage of heavily polluted rivers, as defined by the Class II Water Quality Criteria in Government Regulation on 82/2001, was already over 60% in 2008 and exceeded 70% in 2016. The result of monitoring 44 large rivers across Indonesia showed that only four met Class II standards throughout the year (MOE, 2018).</p>	



*Figure 1. Administrative map of Bandung city (Source: Tarigan et al., 2016)*

### 3. Problem description

Aware of the negative impacts of poor wastewater and septage treatment, the Government of Indonesia, similar to other countries in Asia, continuously improves the regulations on wastewater treatment before discharging into rivers or other water bodies. Unfortunately, issues related to septage management have not been given appropriate attention from either central or local governments. In 2015, the Government of Indonesia launched a domestic water and sanitation program through Presidential Decree No. 2/2015 on the National Medium-Term Development Plan (RPJMN) 2015-2019. This Plan aims for 100% population access to water and sanitation, commonly known as “universal access”, by 2019. The policy also aims to eliminate the number of slum areas. For wastewater, the target is to ensure a proper sanitation system for 85% of people and basic sanitation for the remaining 15%. Out of the 85% of the population with proper sanitation, 95% would be served by a proper on-site system and 5% by a centralized or off-site system. Thus, improving the performance of on-site sanitation systems plays a vital role in achieving this target.

A large number of government agencies are responsible for this sector, but lack of coordination among these relevant agencies have been observed.

In term of septage, Indonesia has septage management systems in every region. Generally, all of these regions apply similar institutional arrangements for their septage management systems. The government manages this system through a special unit that specializes in handling wastewater management, including septage. There are also several regions, which have local companies owned by the government, to manage their septage treatment plants, such as in Bandung. Meanwhile, septage emptying and collection are often done by private companies due to limited capacity of the state companies. For example, in Bandung, the private companies have more trucks than the responsible state company (PDAM). Based on data from PDAM, the private companies has 61 trucks to serve the households from Bandung and its surrounding area, while PDAM has only four trucks. Each truck has capacity of 3 to 4 m<sup>3</sup>.



(a)



(b)



(c)



(d)

*Figure 2. Desludging services carried out by PDAM (a) Desludging process (b) Transporting septage to dumping point (c) Dumping septage into designated dumping point (d) Dumping point connected to Bojongsoang wastewater treatment plant (WWTP).*

Currently, all urban domestic wastewater from Bandung is being treated in Bojongsoang WWTP. The WWTP has been operated since 1992 with an area of 85 ha. The first treatment unit is natural purification process using 3km open channel to Bojongsoang WWTP. After that, the process is continued using physical and biological treatment process through a series of waste stabilization ponds, including 6 anaerobic ponds, 4 facultative ponds and 4 maturation ponds. Treated wastewater is diverted directly to Citarum River. The plant has capacity of 80,885 m<sup>3</sup>/day, serving 400,000 inhabitants or 15% of the total population of Bandung city. Currently, there is no septage treatment facility in Bandung city. A number of challenges and causes have been identified across the sanitation service chain for septage management, including:

**1. Lack of understanding on the needs of proper maintenance of septic tank and proper septage management**

In Indonesia, most people, including government officials, have insufficient information and

knowledge on sanitation issues. While people generally understand that most of the houses are equipped with septic tanks, and they do not know what the septic tank does, how it functions, how to properly operate and why we need to maintain and desludge (emptying) regularly, or even where it was located within their houses, and what are the possible negative impacts on their health if the septic tanks are improperly constructed, etc.

## **2. Lack of coordination among relevant stakeholder groups**

The key of a successful long-term sustainable septage management system is a synergy between different stakeholder groups such as local government, private sector, and local communities. In Bandung, the septage management involves some key stakeholder groups, including (a) PDAM as the main operator; (b) local agencies as the support system and regulation makers; (c) private sector as co-operator in septage desludging and transport operator; and (d) local communities as the main service users. If these stakeholders can work closely together, a sustainable septage management system can be established in the city.

## **3. Poor performance of on-site sanitation systems**

Results from our household surveys showed that 70% of households in Bandung had inappropriate on-site system. The type of on-site system commonly observed in the field survey was septic tanks with overflow to drain. Although the majority of septic tanks in Bandung are known as “improper septic tanks”, they are actually leaked pit latrines. Some septic tanks (49.4% of respondent in Bandung) met the national standards but most of them are inappropriate. Leaked septic tanks are commonly found in the community, showing a large potential of groundwater pollution. Some households in Bandung admitted that they built a permeable septic tank so it would not get filled up too fast. Furthermore, the households have incorrect understanding that wastewater would be treated in the septic tank so it could be disposed into the ground directly. This wrong information needs to be corrected by the local government or related institutions through technical information dissemination. This situation should also be considered by governments and operators when developing septage regulation and management.

According to the Indonesian standard SNI-03-2398-2002, a septic tank has to be emptied once every 2-5 years. This standard was also adopted by the Regulation of Public Works and Housing Minister No 4/2017. It is suggested that a septic tank in a standard condition should be emptied once every two years (Sudarmadji & Hamdi, 2013). However, the majority of people emptied their septic tank after more than five years after it has filled up or caused trouble with the toilets. According to our survey result, 66.81% of septic tanks in Bandung had not been emptied within five years. The average interval time for septage emptying in Bandung were 7.14 years. Many people think that the huge size of septic tank combined with intentional leaking will prevent the septic tank from being filled up. This phenomena is also observed in several big cities in Asia such as, Dhaka (Bangladesh), Phnom Penh (Cambodia), New Delhi (India), and Hanoi (Vietnam). This low emptying rate could impact on septage business activities or impeded septage supply for septage treatment plants (STP). From a business point of view, the low rate of emptying will also reduce potential income for the septage emptying operators and other related business. Compared with other cities in developing countries in Asia, septic tank conditions in Bandung was considered left behind. According to the results from the survey, the percentage of emptied septic tanks within the last 2 years only around 26.67% in Bandung. Similar situations have been observed in Vietnam and Cambodia. Meanwhile, in some other countries such as Bangladesh, India, and Malaysia, the percentage already reached 50%.

Another issue found in field observation was the absence of access holes. In Bandung, only about 46% of septic tanks were equipped with an access hole. The lack of access holes becomes a problem during the emptying process, whereby people have to break the septic tank to empty septage and then repair it. The process becomes worse when owners do not know exact location of their septic tank within their houses, impeding the work of operators and delaying the emptying process further. Moreover, there is a misconception that access holes and ventilation pipes will cause bad smells in the house. Some people also think an access hole is not needed because it is not necessary to empty septic tanks.

#### **4. Ineffective septage emptying and collection system and lack of consumers' demands**

Currently, the septage management system in Indonesia is considered not effective enough that leads to improper STP operation. This situation also occurs in Bandung City. One of the contributing factors is desludging mechanism based solely on consumer demand. Desludging operators will be emptying and transporting septage if the operators get a direct call from the customers. It gives an uncertainty about the wastewater volume that will enter the plant. This uncertainty will directly impact to the fluctuation of the collected amount of septage, thus affecting the process inside the treatment facilities.

The processes to empty septic tanks and transport septage from on-site systems to septage treatment plants in Indonesia in general face many challenges. Services are often impeded due to bad access, such as narrow roads or overcrowded settlements, and also due to the condition of the septic tanks themselves, such as tanks without inspection hole. These difficulties often result in a higher service fee.

#### **5. Lack of septage treatment facilities**

Septage treatment plants are not available in Bandung. Therefore, there are three options for septage treatment partially, including (i) draining into designated dumping points along the city's wastewater collection network (sewerage system), (ii) draining to wastewater treatment plant's inlet, or (iii) disposing on land, which functions as a sludge drying bed in Bojongsoang Wastewater Treatment Plant (WWTP).