UTILIZATION OF MADE AQUIFERS TO IMPROVE THE QUALITY OF CLEAN WATER TO DRINKING WATER

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ABSTRACT

The need for clean water quality has increased every year, especially in big cities in Indonesia. This is triggered by the high population growth which causes the need for clean water to be urgently needed. Lack of water catchment areas and green land exacerbates the amount of clean water. In addition, the cause of the decline in clean water quality is also influenced by the many negative activities carried out by humans, one of which is the activity of disposing of garbage in the river, reservoir / setu and drainage areas. The use of chemicals, namely Poly Aluminum Cholrid (PACPOWDER) in the processing of river water or river water requires high operational costs, which results in high costs for people who subscribe to PDAM. The filtering pattern of water can be done by referring to the soil layer in the form of an aquifer, so that the water that is not good can be filtered in the presence of an aquifer and can purify the water into drinking water. The use of artificial aquifers that have currently been carried out by the Ministry of Public Works is through rain, where through the filtration of rainwater containing acidic levels it can be neutralized through artificial aquifers into clean water and can be applied to areas of high drought levels.

Keywords: *Water Quality, Aquifer, Filteration Pattern*

1. PRELIMINARY

The need for clean water quality has increased every year, especially in big cities in Indonesia. This is triggered by the high population growth which causes the need for clean water to be urgently needed. Lack of water catchment areas and green land exacerbates the amount of clean water. In addition, the cause of the decline in the quality of clean water is also influenced by the number of negative activities carried out by humans, one of which is the activity of disposing of garbage in the river, reservoir / setu and undrainage areas. The government in this case through legislation no. 17 of 2019 concerning Water Resources, it is explained that meeting water needs is a priority over the others. In this statutory regulation, it is necessary to make efficient use of water resources, both from surface water and groundwater. The current utilization process is not optimal in managing these resources, for example the presence of sedimentation or garbage in the

surface water area causes a decrease in the quality of drinking water.

Referring to Law no. 17 of 2019, the management of the utilization of water resources is handed over from the central government to a service agency under the Ministry of BUMN. Currently water management at the district or city level is located in the Regional Drinking Water Company.

One of the Regional Drinking Water Companies that exploits the potential of surface water is PDAM Kota Bekasi, where the Tirta Patriot Regional Drinking Water Company (PDAM) is located at Jl. Struggle No. 99, Marga Mulya, North Bekasi District, Bekasi City, West Java has a vision of "Bekasi Healthy, Smart and Ihsan". In charge of serving clean water to communities in the North Bekasi and East Bekasi areas. The water source from PDAM Tirta Patriot is obtained from Kali Bekasi and Kali Malang. With this source, PDAM Tirta Patriot is able to produce clean water with a maximum capacity of 750 liters per second. In the production of clean water, PDAM Tirta Patriot uses a chemical mixing, namely Poly Aluminum Cholrid (PACPOWDER), into raw water which will later turn the raw water into clean water, where the chemical mixing occurs at the rapid stirring stage.

Identification of problem

The problem formulations in this case study are:

1. Can artificial aquifer filtration method improve river water quality so that it can reduce PDAM IPA management costs?

2. What parameters can be fixed by artificial aquifer methods?

2. LITERATURE REVIEW

Water can be a solid (ice), a liquid (water) and a gas (water vapor). Water is the only substance that occurs naturally on the earth's surface in all of its three forms. Water is a chemical substance with the chemical formula H2O: one water molecule is composed of two hydrogen atoms covalently bonded to one oxygen atom. Water is colorless, tasteless and odorless in standard conditions (Tarigan Diarto, 2017).

Water sources are one of the components in a clean water supply system, because without a water source, a clean water supply system will not function (Sutrisno, 2000). Types of water sources that can be used as clean water sources are as follows:

1. Sea water

    Sea water has a salty taste because it contains a lot of pure salt (NaCl) which is high. The salt content of pure seawater is about 3%. In order to be used for daily use, seawater must undergo a desalination process, which is the removal of the salt content from the water. However, the desalination process is rarely used because it is very expensive and requires high technology.

2. Rainwater

    Rainwater is water that is obtained from space, due to the occurrence of a precipitation process (the event that water falls to the earth). Rain water is the sublimation of water vapor into pure water which when it descends to earth through the air dissolves substances and particles in the air such as oxygen, carbon dioxide, bacteria, dust and others so that the quality is low.

3. Surface water

    Surface water can be in the form of stagnant water or flowing water such as lakes, rivers, seas, swamps and others (Azwar, 1996). Surface water must be treated first before use because generally it has been polluted.

Groundwater is water obtained from collecting water in the deep soil layers. This water is generally very clean because it has been filtered by soil or rocks. It's just that it may contain high levels of minerals. Examples of ground water, well water and spring water.
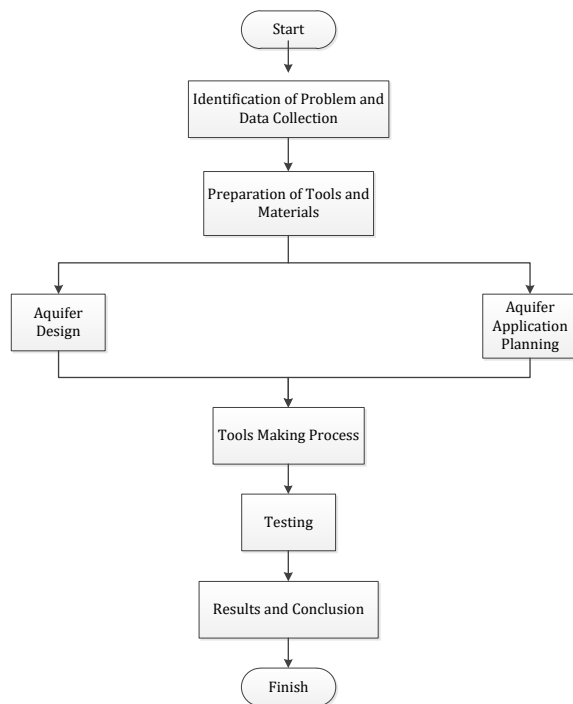
3. FLOWCHART

Figure 1. Flowchart

4. RESULTS AND ANALYSIS

In the progress of this research to get a good result in research, we are in the preparation stage and what we have carried out in this research. We get secondary data as supporting data in the research conducted. In this study, secondary data is the daily report of the PDAM reservoir water quality testing from March to April 2021. Then the filtration design is carried out for the following research process:

Figure 2. Filtration Design

For the design to be used, the tool is arranged vertically according to the predetermined arrangement with the bottom bucket perforated as a place for the faucet and is the result of filtered water. The following is the design of the filtration device:
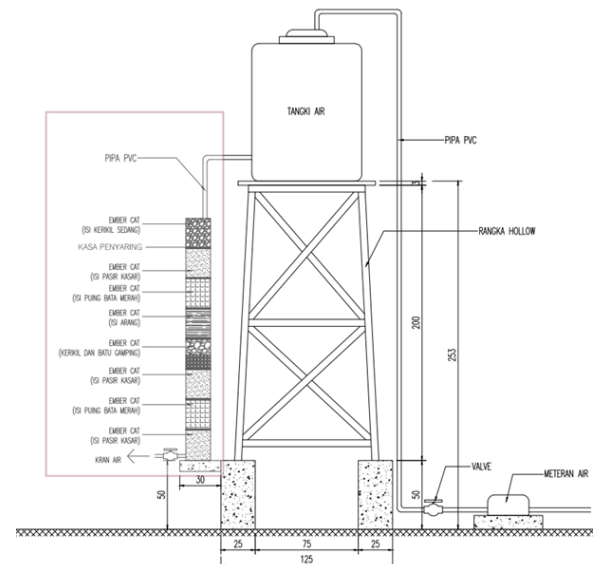

Figure 3. Design of Filtration Device

5. CONCLUSION

Based on the results of the provisional research which is still in the progress stage, the conclusions of the initial stages are made, namely:

1. The aquifer that has been installed prior to the PDAM IPA can actually reduce the operational costs of chemicals in the PDAM IPA and improve the quality of water in the river according to the standard Permenkes No. 492 / MENKES / PER / IV / 2010 and clean water standard No. 416 / MENKES / PER / IX / 1990.

2. The use of charcoal can reduce bacteria in the river before the IPA process is carried out in the PDAM

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