

Optimization Of The Ake Gaale Regional Drinking Water Company On Sea Water Pollution And Sanitation In Clean Water Management In Ternate City

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Abstract.

Ternate has abundant groundwater/spring water reserves. The potential for groundwater reserves is not managed properly and correctly, so that in 2014 the City of Ternate experienced a very serious water shortage (crisis), this was due to a decrease in water discharge from one of the Biggest Springs on Ternate Island, namely the Ake Gaale spring, which has decreased its discharge by 25%. This condition is exacerbated by the occurrence of sea water intrusion which has resulted in almost all beaches of Ternate Island experiencing an increase in salinity (salobar) as a result of excessive groundwater extraction. optimization of local drinking water company (PDAM) Ake Gaale against sea water pollution and sanitation in clean water management. As far as this research is concerned, it is hoped that the prevalence of sea water pollution and sanitation is one of the factors that can increase morbidity and mortality compared to clean water sanitation for sea water pollution, as well as having a long-term impact on the growth and development of prevention of sea water pollution and sanitation in management clean water in Ternate City. Sustainable Development Goals targeting the fulfillment of the needs for 100% of citizens (by name by address) in 2030 with the no one left behind spark. So efforts to achieve the development target are not only by building access or facilities from each pillar of its development, but an effort is needed to maintain the sustainability of built access or standardized facilities that are owned by residents. The results of the identification of proper drinking water sources, where 65 people (42.1%) have met the category of safe and proper drinking water in accordance with health standards.

Keywords: Optimizing Regional Drinking Water Company

I. INTRODUCTION

A prosperous and prosperous Indonesia. The government in realizing a just and prosperous society based on Pancasila and the 1945 Constitution has carried out sustainable development in all fields. In the regulation on regional autonomy (Law Number 23 of 2014) the role of district governments as regions that have real and responsible autonomy is expected to be more meaningful. This principle views that the region has an obligation to improve the welfare of its people. The region or city then obtains additional authority in resource management Natural resources include water resources.[1] Consumer protection is an integral part of sound business activities. In a healthy business activity there is a balance of legal protection between consumers and producers. So that producers must be able to offer quality and sustainable products or services, because the product quality or service quality received by consumers today is not necessarily accepted tomorrow [2]. Likewise, the existing service climate is not fully in accordance with the expected service. Water is one of the basic needs for all creatures and human life to maintain their survival, so its management is the authority of the State. Data on access to sanitation from Asean and G-20 countries, namely Brunei Darussalam N/A, Cambodia 77%, Malesia 100%, Myanmar 74%, Thailand 100%, Vietnam 87%, Philippines 91%, Laos 77%, Singapore 100% and Indonesia by 75% of ten (10) Countries. According to data from the Joint Monitoring Program (JMP), according to [3]. shows that Indonesia's sanitation achievement is still in the second lowest rank among G20 countries and Asean countries.

This condition certainly needs to be improved considering that Indonesia has committed to achieving the SDGs target to provide safe access to sanitation services for all communities in 2030, with this improvement and improvement of sanitation conditions is certainly very necessary for the community, because proper sanitation conditions can not only improve sanitation conditions. public health, but can also make the environment healthier and of higher quality. According to the achievement

of decent sanitation in 2021, it shows that Sumatra: Aceh 77.5%, North Sumatra 82.0%, West Sumatra 68.6%, South Sumatra 77.2%, Riau 83.6%, Riau Islands 91.6%, Jambi 80, 3%, Lampung 83.8%, Bengkulu 79.8%, Kep. Babylon 92.2%, while in Kalimantan: West Kalimantan 78.3%, East Kalimantan 89.7%, Central Kalimantan 73.7%, South Kalimantan 81.4% Kaltara 79.8%, while Maluku: North Maluku 77.8%, Maluku 76 ,7%, while Sulawesi data: North Sulawesi 84.8%, West Sulawesi 80.1%, Central Sulawesi 76.6%, Southeast Sulawesi 85.6%, South Sulawesi 91.5%, Gorontalo 78.5%, while data for Nusa Tenggara, NTB 82.8% and NTT 73.3%, while in Java and Bali: Banten 82.8%, Jakarta 95.1%, West Java 71.6%, Central Java 83.2%, DIY 97.1% East Java 80.9 %, and Bali 95.9%, while in Papua: Babar 77.8% and Papua 40.8%. Based on [4] data, it shows an increase in national achievement to 80.29% for access to proper sanitation and 7.25% for safe sanitation. It is hoped that these achievements can continue to increase as there is increasing support from many parties to achieve the 2030 SDGs targets.

Ternate has abundant groundwater/spring water reserves. Potential groundwater reserves This is not managed properly and correctly, so that in 2014 the City of Ternate experienced a very serious water shortage (crisis), this is with a decrease in water discharge from one of the Biggest Springs on Ternate Island, namely the Ake Gaale spring, which has decreased its discharge by 25%. This condition is exacerbated by the occurrence of sea water intrusion which has resulted in almost all beaches of Ternate Island experiencing an increase in salinity (salobar) as a result of excessive groundwater extraction.(Malut Post, 218) As a result of the dynamics and results of these developments, there is considerable pressure for the community on the environmental conditions and natural resources of Ternate Island. Rapid population growth will result in the need and availability of land for settlements to increase. Meanwhile, the geographical condition of Ternate Island with a limited area, resulting in the conversion of the spring recharge area into a residential area, which in turn will disrupt the natural water cycle, resulting in a decline and crisis in the availability of water resources in the Ternate City area, both in terms of quantity and quality.The condition and crisis of water resources began to be felt since the beginning of 2000 and the water crisis reached its peak in 2013, where in that year one of the largest springs in North Ternate District, namely the Ake Gaale Spring, experienced a decline in discharge of around 25%.This condition is exacerbated by the occurrence of seawater intrusion which causes groundwater to taste salty (salobar). As a result, PDAM Ternate City can no longer provide optimal services to residents of Ternate City, both in quantity (debit) and quality[5].

The phenomenon of pollution of sea water sources and sanitation in drinking water companies (PDAM Kote Ternate will risk access to clean water sources and have an impact on clean water treatment, in line with this phenomenon, the increase in water and sanitation pollution in the city of Ternate is found in three villages, namely: Dufa village -Dufa, Sangaji and Toloko This pollution can be optimized by drinking water companies so that the community can use clean water.Based on the above problems, that there is a phenomenon of high equality of development, especially clean water and optimizing regional drinking water companies (PDAMs) which are polluted by sea water in Ternate City, thus the research question arises whether the two problems are related. And it is hoped that it can provide information and determine development interventions and policies, especially for sanitation health programs in clean water management in Ternate City. Characteristics of the optimization of the regional drinking water company (PDAM) Ake Gaale against sea water pollution and sanitation in the management of clean water in the City. So from this title, researchers are interested in exploring further about the optimization of the regional drinking water company (PDAM) Ake Gaale against sea water pollution and sanitation in clean water management. As far as this research is concerned, it is hoped that the prevalence of sea water pollution and sanitation is one of the factors that can increase morbidity and mortality compared to clean water sanitation for sea water pollution, as well as having a long-term impact on the growth and development of prevention of sea water pollution and sanitation in management clean water in Ternate City.

II. METHOD

This study uses a survey method approach that takes samples from a population with the main data collection tool using a questionnaire [6]. Unit of analysis in This research is the head of the family of the people of Ternate City, namely in three sub-districts, Dufa-Dufa, Sangaji, and Toloko with a population of 150 families. Analysis of research data with descriptive quantitative approach. Field data that has been collected and then grouped, arranged systematically and presented in bold and described to provide a comprehensive explanation of the shape of the community's role in achieving Sustainable Development targets.

III. RESULT AND DISCUSSION

3.1 Development Theory

Development (development) is generally synonymous with the planned change process, or improving conditions for the better. Development is an effort to achieve progress for mankind. The key words of development are change, growth, fulfillment of needs, increasing dignity and self-esteem [7]. Development is not limited to physical facilities only, but development includes all aspects of physical, mental, intelligence, moral life, the order of values and norms in improving the quality of life and life. There are two development approaches, namely a top-down approach and a bottom-up approach. The top-down approach is a blue print strategy, namely an approach that originates from the government, so that the community is only considered as a target/object of development. The bottom-up approach is a development approach that positions the community as the subject of development. So that the community is involved in the planning process.

Implementation, to evaluation. The bottom-up approach is an ideal approach in development that takes into account aspirations. Initiative, creativity, and accommodating local socio-cultural conditions [8]. In Indonesia, there is a paradigm shift and development policy, namely development to empowering clean water sanitation. In the 1970s integrated village development shifted to rural community development in the 1980s and early 1990s, then shifted again to community (village) empowerment from the late 1990s until now. In essence, the old paradigm (development) is more oriented towards the state and capital, while the new paradigm (empowerment) is more focused on communities, institutions and local communities that are built in a participatory manner. Community development with empowerment is seen as very important based on the following considerations: 1. A productive society is a healthy society. 2. The planning process that comes from and is desired by the community is better than the planning that comes from the authorities. 3. The process of participation in community development is the prevention of various ignorant attitudes 4. A strong empowerment process in community efforts is the basis of strength for a democratic and independent society [9]

3.2 Quantity Vulnerability Analysis

To determine the quantity susceptibility class, an approach to determining the class that is used is carried out based on the contribution of each parameter class to the potential susceptibility of the quantity. • The value of the quantity vulnerability will be low if • If the land cover factor is good (Forest), then the score is low Based on the results of the analysis of several overlapping parameters, what contribute to a decrease in the absorption of rainwater and a decrease in water reserves Ake Gaale's soil is of medium, high and very high vulnerability. Based on the results of the analysis, it was found that the area of the Ake Gaale affixed area was which has a very high and high level of vulnerability is 23 hectares or around 7.4% of the total recharge area. Meanwhile, with a moderate level of vulnerability of 184.88 Hectare or 46.8% of the total recharge area and the level of vulnerability is low to very low is 175.7 or 45.8% of the total area of recharge. So that the area of the Ake Gaale spring recharge area with a moderate level of vulnerability is very high which requires handling activities to reduce the quantity vulnerability level is 207.88 hectares or 54.2%.

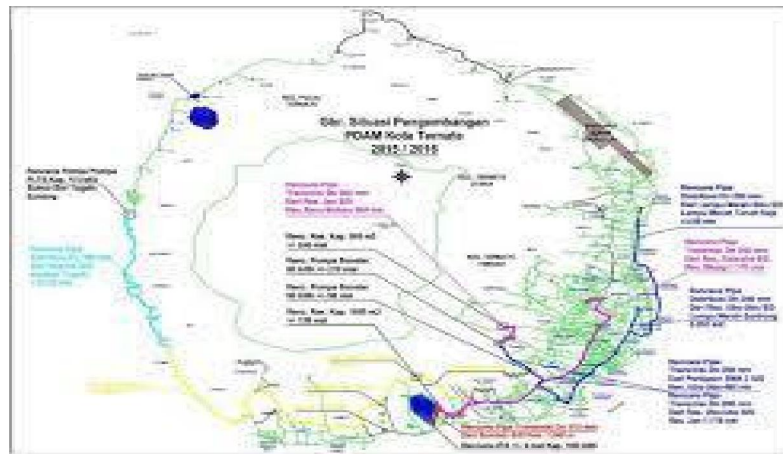


Fig 1. Ake Gaale Springs Vulnerability Assessment

3.3 Vulnerability Analysis on Quality

According to Margat, 1968, the vulnerability of groundwater quality to pollution (Groundwater Vulnerability To Contamination) is defined as the possibility of diffusion and percolation of substances pollutants from the soil surface into the groundwater table under natural conditions (Vias et al., 2006). Water Source Pollution is defined as the entry or inclusion of living things, substances, energy and or other components into water caused by human activities, which results in a decrease in the value of water quality to a certain level, and causes the water to be unable to be used in accordance with its designation; (PP NUMBER 82 YEAR 2001) Several types of sources of pollution to water quality can come from several sources, that is

a) Residential Waste (Domestic Waste)

Settlements produce various types of liquid and solid waste, such as solid waste and water waste, both dirty water from the cubicle/toilet (black water), and water from the bathroom (grey water). Wastewater from settlements (domestic) usually has a composition consisting of feces and urine secretions, water used for washing kitchens, bathrooms, detergents and so on, most of which is waste of organic materials. Medical waste originating from hospitals or health care homes as well included in the category of domestic waste, although in terms of the quality of this medical waste have a more serious level of pollution impact, especially regarding waste that is contain various diseases and very dangerous bacteria.

b) Agricultural Waste.

To achieve production or yields and maintain production quality, the agricultural industry is very intensive in using various types of fertilizers, both organic and chemical fertilizers, as well as various types of pesticides to control plant pests and diseases. other plants. The activity of using fertilizers and pesticides will leave residues in nature (soil and water) and and over time the remnants of fertilizers and pesticides These will accumulate and pollute the soil and water (surface water and ground water). Some fertilizers and pesticides contain some heavy minerals which are resistant (not easily decomposed) by nature and will also disrupt the level of human health or other creatures, even fatalistic. Given the very serious impact on human health, the presence or occurrence of pollution by agricultural waste, in the form of fertilizers and pesticides, is very strictly limited. So the chemical parameters for water quality are very strict and measurable.

c) Industrial Waste

What is meant by industrial waste is all waste (solid and liquid and gas) as a by-product of the mass production of a product. Activity dimensions This industry can be large-scale or the scale of household activities, so the waste generated produced can be a little or a lot / excessive quantity. Waste type This industry can be in the form of liquid waste, solid waste and gas waste, even noise that generated by industry can also be categorized as waste. Garbage disposal sites can be categorized as industrial waste considering that the amount or volume that is managed is quite large and contains various types of

waste that are very dangerous and can contaminate groundwater resources, especially from the leachate produced [10].

d) Livestock Waste

What is meant by livestock waste is all waste or waste materials, both liquid and non-liquid solids originating from the processes and activities of the maintenance and processing of products from the livestock processing industry, both those managed on a small scale (scale) people/individuals), as well as on a large scale or industry. This includes waste from broiler and layer chicken farms, which are getting more and more slaughtered chicken industry today increase its production in line with the increasing demand for chicken products.

3.4 Areas Affected by Ake Gaale Springs Vulnerability

Hydrologically, hydrogeologically and regionally, that the intersection between the ground water level and the earth's surface, which is called the discharge area, will be marked with the emergence of several springs (not just one spring) or the so-called belt springs or springs complex. So the Ake Gaale spring which is on Ternate Island too is an area or complex where there are several springs that appear in the the earth's surface with a distribution of about one kilometer with the midpoint in the Ake Gaale spring PDAM Ternate City. Springs that appear within the belt area or The Ake Gaale spring complex will have a variety of discharges that can be utilized, depending on the condition of the soil structure at the location of the spring, but all springs The water comes from the same ground water source so it will have the same quality same.(Malut Post, 2019) As a result of all the activities that occur in the recharge area of the Ake Gaale spring on groundwater resources, so the results of this KKMA analysis also show that the level and type of vulnerability of the Ake Gaale spring (quantity and quality) is not only felt or occurs only at the location of the eye. water used by PDAM Ternate City only. However, the impact of the quantity and quality of vulnerability will also have an impact on ground water and springs that are / appear in the Ake Gaale Community Settlement area up to the beach. Some signs of vulnerability of groundwater/spring water resources that may be felt by people living in the Ake Gaale residential area, include:

1. The occurrence of a decrease in the discharge or ground water level in people's dug wells, so that it will be increasingly difficult to carry out drawing or pumping due to groundwater deeper.
2. Decrease or loss of runoff water (over flow) that irrigates the Ake Gaale spring pool which is located in the residential area.
3. 3. Ground water will feel the higher the level of salt (salobar), especially when the dry season lasts and during groundwater/dug well pumping activities more intensive.
4. The concentration of organic elements will increase during the dry season, marked by with an increasing or pungent odor of groundwater.
5. If ground water is precipitated or allowed to stand, a precipitate or color will appear in the groundwater.
6. It is possible to find other organic and inorganic chemical elements which comes from domestic liquid waste or other pollutants with increasing concentrations increases during the dry season.

Taking into account these conditions, the results of the KKMA analysis show that the affected area as a result of various activities in the catchment area of the Ake Gaale Spring can not only be monitored and felt at the location of the Ake Gaale spring. Gaale which is in the Ternate City PDAM complex, but it will have an impact to the entire area of the spring belt or the residential area of the Ake Gaale community, as in map no. 20 (Map affected by the vulnerability of the Ake Gaale Spring). Understanding the conditions mentioned above, various efforts and activities for improvement, conservation and various other activities aimed at improving the quantity and quality of water Ake Gaale's soil/eyes that are carried out in the recharge area of Ake Gaale's springs will also have a positive impact on improving the condition of ground water/springs in the whole area the residential area of the Ake Gaale community to the position or coastal area of Ake Gaale. Recognizing the conditions of the benefits of these conservation efforts, the involvement and participation active participation of the community in the area affected by the vulnerability will be very meaningful and beneficial for the

sustainability and sustainability of the number and groundwater quality in the Ake Gaale region.



Fig 2. The Condition of Sea Water Affects the Quality of Drinking Water (PDAM) in Ternate City

3.5 Sustainable Development Goals

The Government of Indonesia to achieve the Universal target towards the “Sustainable Development Goal” in 2030, in accordance with the National Medium Term Program Plan (RPJMN) 2021-230 where basic drinking water and sanitation services can be enjoyed by all Indonesians. To realize this goal, of course, it requires the participation of all levels of society, the private sector and especially the Regional Government which has an interest in meeting minimum service standards for the community for the drinking water and sanitation sector. As its implementation, a program called "Indonesia Urban Water Sanitation and Environmental Hygiene for All" was formed, a five-year assistance program designed to support the Government of Indonesia in increasing access to drinking water, sanitation and improving hygiene behavior for the poor and vulnerable groups in urban areas.



Fig 3. Lake Lagoon Surface Water Reserve

3.6 Efforts to Support the Achievement of the SDGs Target for Ternate City with Clean Water and Sanitation

Community involvement is one of the determining factors for the success of the program development. Development without the role of the community is empty, and development only as the main role of the political elite is blind. This means that multi-stakeholder collaboration is needed, namely: government, philanthropy and society in the success of the development process sustainable. The achievement of development goals in the field of clean water and proper sanitation can be counted from household access to drinking water and sanitation which reaches 100%, the occurrence of efficient use of drinking water as well as a movement to protect and restore the system related to water resources, From these parameters it is clear, involvement and carrying capacity community in achieving the targets of the Sustainable Development Goals in the field of Clean Water and Adequate Sanitation is urgently needed.

<http://ijstm.inarah.co.id>

In this study, efforts are described and grouped the people of the city of Ternate in supporting the achievement of the SDGs goals 6 into 2 (two) part [11]. Namely, First, the efforts of community groups who do not have access to clean water and proper sanitation and Second, the efforts and actions of community groups who already have access to water drinking and proper sanitation in maintaining its sustainability.

3.7 Efforts to Maintain Drinking Water Sources (Sustainable)

Referring to the Sustainable Development Goals that target the fulfillment of needs for 100% of citizens (by name by address) in 2030 with the no one left behind spark. So efforts to achieve these development targets are not only by building access or facilities from each pillar of its development, but an effort is needed to maintain sustainability from built access or from standardized facilities already owned by residents. The results of the identification of proper drinking water sources, where 65 people (42.1%) have met the category of drinking water is proper and safe in accordance with health standards. In an effort to keep sustainability of clean water sources owned, which are used for drinking and Their MCK has taken measures to save water use, both for bathing, washing, latrine, and cooking, maintenance and maintenance of built infrastructure and protect the Batang Kuantan river area by not polluting rivers and sea water with garbage, not constructing houses and places of business on the banks of rivers and beaches and planting riverbanks and beaches with protective plants [12].

IV. CONCLUSION

The springs vulnerability assessment activity aims to determine the condition and problems and various potential risks to the quantity and quality of groundwater and Ake Gaale spring. Furthermore, various needs for work plans can be made carried out to reduce or eliminate the level of vulnerability and potential risk of the groundwater resources. Local government that has an interest in meeting minimum water service standards for the community for the drinking water and sanitation sector. As its implementation, sustainable development programs are formed to lead to a prosperous and environmentally friendly society.

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