International Journal of Application on Economics and Business (IJAEB)
Volume 1, Issue 2, 2023. ISSN: 2987-1972

ANALYSIS AND STRATEGY FOR PROVIDING CLEAN WATER TO THE SURROUNDING COMMUNITY IN THE MUARA ANGKE AREA

Septihani Michella Wijaya[1], Angely Olivia Putri[1], Andi Wijaya[1*]

[1]Faculty of Economics and Business, Universitas Tarumanagara, West Jakarta, Indonesia
[*]*Email: andiw@fe.untar.ac.id*

Submitted: 20-12-2022, Revised: 07-02-2023, Accepted: 10-03-2023

ABSTRACT

The environment provides a number for humans, one of which is providing clean water that can meet human needs. Earth as a place for human life provides 97.5 percent of water and the rest is land for living. Of the 97.5 percent figure, only 2.5 percent of the water has quality for human consumption. This means that the availability of clean water consumed by humans is very limited. In addition to this, there are many other factors that cause the availability of clean water to dwindle. For this reason, efforts are needed to reduce the clean water crisis. Researchers have formulated several strategies to address clean water in the Muara Angke area. Suggested strategic programs: Educate to increase awareness about clean water aims to provide the community with the importance of keeping the environment clean to help reduce and prevent the scarcity of clean water in the community, Ultrafiltration Technology which creates and provides water suitable for use for various daily household activities -days, Reverse Osmosis System to improve water quality with a reverse osmosis system, namely water filtration processing to neutralize tastes, odors and harmful substances, Pipeline systems related to the distribution of clean water to be distributed to every community settlement, Collaboration with Air Si Biru to obtain facilities and access to drinking water from Si Biru more easily and at a more affordable price, Integrated Marketing Communication which educates the message that the importance of clean water and the condition of clean water is limited in its availability in several areas of Indonesia waste, and CSR which will improve water quality which will later be processed into water that will be used by the community.

Keywords: *water, crisis, strategy, analysis*

1. INTRODUCTION

Water is a substantial resource for the life of living things, ranging from plants, animals, and humans. This is why clean water is fundamental for life (Habib, 2020) [1]. Indonesia itself is known for its tropical climate, affecting the seasons in this area, namely the dry and rainy seasons. The rainy season usually occurs from October to April and meets the water needs. Because it always rains every year. Water sources not only comes from rainwater but also from river water (Pratiwi et al., 2020) [2]. However, even if Indonesia has reserves of water sources in the form of river water, based on data, in December 2018, as many as 550 rivers located in Indonesia, 82% of them are in damaged or polluted states (Pratiwi et al., 2020) [2].

Water can be obtained from groundwater and surface water. However, clean water will be tough to obtain if an event occurs, the number decreases, and various other factors. As a result, humans will find it difficult to get clean water, so it is difficult to do daily activities, such as drinking, cooking, and washing (Cahyadi et al., 2020) [3]. Data World Resources Institute (WRI) in the matter of the freshwater resources owned by each country in the world, Indonesia is ranked 51st with a high level of crisis risk (High 40-80% chance) (Jaan et al., 2020) [4]. In addition, the phenomenon of water scarcity in Indonesia, every day it happens more and more. Based on the report of the Water Environment Partnership in Asia (WEPA), Indonesia is a country that has 6% of the world's water potential. However, the need of Indonesia's population has not had enough water. But, in reality, the scarcity of water still occurs in Indonesia. An example is the city of Jakarta. Quoting from Indonesia.go.id, In 2018

the coverage of clean water in Jakarta only reached 60%. So, there is still 40% Jakarta residents who do not have access to clean water (Purnamasari, 2019) [5]. One area that has not yet had access to clean water is North Jakarta. The water problem in North Jakarta is endless. Some time ago, several regions experienced a water crisis because of the disrupted water network. This time other territories demand clean water services because they haven't got it for decades (Damari, 2021) [20].

The absence of clean water services for the piping system and the master meter has caused a clean water crisis in Muara Karang. Not only that, there is only one clean water service kiosk available in Muara Karang, causing the residents of the area to have to drink drinking water by buying refilled water and gallons. Besides that, to take a bath and wash the residents have to wait for the rain to fall (Noviansah, 2021) [6]. There is a crisis for clean water, considering that clean water is one of the primary needs resulting in high demand for water where residents are willing to spend Rp. 1,000,000 even more merely to buy water (Noviansah, 2021) [6]. The difficulty of obtaining clean water causes high expenditures that must be incurred by the residents, which is an additional problem considering that during the pandemic, people find it intricate to work. In addition, the health of residents is disturbed because they have to drink groundwater and river water

2. ANALYSIS

Based on the background and existing problems, several analyze were conducted to support the solutions provided.

Strength, Weakness, Opportunity, and Threat Analysis

SWOT analysis helps companies to determine effective strategies that maybe take advantage of the opportunity based on the strength possessed the company, overcoming threats that come from outside and overcoming existing weaknesses (Goli et al., 2021) [7]. Water is a basic human need and is difficult to replace because the use of water itself can meet the necessity for bathing and drinking and water is exceedingly crucial to support daily activities (Rideng et al., 2021) [8]. Without water, humans cannot survive. Likewise, the environment becomes unkempt and uncomfortable to live in. This shows that water is vital to ensure that nature is in good condition because water is also fundamental for helping plants and animals to grow and develop (Liu et al., 2021) [9]. However, water is susceptible to pollution since it is very easily polluted. Therefore, water needs to be managed with specific standards to have a good and decent quality to drink. Not only that, if the water quality is no longer divine, we cannot reuse it because it will cause dysentery, typhoid, and hepatitis

Indonesia has abundant water resources that are supervised by multi-level water management. The existence of AIWW (Asia International Water Week) will encourage opportunities for Indonesia to solve clean water problems because the Government Participates in Designing and Implement Actions to Solve Water Problems in Asia (Rakyat, 2022) [10] . In addition, the 2021 KSAN (Water and Sanitation Conference) will collaborate with stakeholders through policies for the provision of safe drinking water and sanitation that will support the 2020-2024 National Medium-Term Development Plan (RPJMN) related to 100 percent access to safe drinking water, including 15 percent access to drinking water safe, and 30 percent access to piped drinking water (Data Reportal, 2022) [11]. However, the seizure of using clean water for various uses causes the loss of proper access to clean water for some people. Many factories produce cesspits induce water to be easily polluted because it contains

chemicals. Wasteful behavior of clean water causes more and more people to lose access to clean water. This is a concern because the limited amount and the increasing number of people are the reasons for the clean water crisis (Bulukazari et al., 2022)[12].

PESTLE Analysis

PESTLE analysis is a tool or instrument used to analyze several factors in a country or market and examine the predispose of these factors on the success of the market competition. This analysis can reduce the effect of potential threats while increasing strategic thinking skills, identifying new opportunities, and seeking difficulties from a new market (Sari et al., 2022) [13]. The following describes the PESTLE analysis related to the case of the water crisis in Muara Karang:

Politic: The DKI Provincial Government is preparing to build water kiosks in 100 locations this year. The construction of the water kiosk was already planned by PAM Jaya, a business entity owned by the DKI Jakarta Provincial Government (Purnamasari, 2019) [5].

Economy: Residents have to spend above 1 million per month which is worrying for the economic condition of the citizens because expenditure of 1 million is a big expense (Noviansah, 2021) [6].

Social: During the pandemic, many residents experienced layoffs (Termination of Relationships) work) so that residents use river water, groundwater, and rain to save water that affects daily activities and health conditions of locals (Sari et al., 2022) [13].

Technology: In 2030 it is predicted that there will be a clean water crisis in several parts of the world. Because, that's what various countries in the world, including Indonesia, are recommended to apply Smart Water technology (WEF, 2022) [14].

Legal: The provisions in Article 33 section (3) of the 1945 Constitution of The Republic of Indonesia is emphasized in Law Number 23 of 2014 concerning Regional Government that the fulfillment of clean water for the community is one of the responsibilities of the government and regional governments as part of public services that must be done. (Astriani et al., 2022) [15].

Environment: One of the causes of the clean water crisis is population growth, changes in demographics, urbanization, and climate change causing water deficit reach 40 percent (Sari et al., 2022) [13].

Porter's Five Forces Model

The following is further forecasting of the market situation using analysis Porter's Five Forces Model which according to David & David (2017) [16] can be used for develop strategies in various industries (David & David, 2017) [16]. The need for water is one of the challenges considering that most of the world's population needs water because it is something that can't be replaced. Consumers have few choices to choose a water provider because there is already a market leader under government auspices. Several companies have to lead the market and in under the jurisdiction government and it is difficult for a new company to enter. The government can cooperate with various water service industries and drinking water companies to solve the water crisis problem

Consumer Analysis

Based on segmenting, targeting, and positioning analysis, the clean water users include overall age group, gender, occupation, and region. Where is the community also prioritizes the ease and speed of obtaining clean water. Besides, the main target is people who have a habit of saving and not being wasteful in using water considering that water is the main need of every human being (Habib, 2020) [1].

3. STRATEGY

Education and Awareness

Currently, public awareness and responsibility for clean water still very low. According to data published by UNICEF and WHO. Indonesia is one of the ten countries whose population do not yet fully have access to clean water. As much as two-thirds the population of Indonesia along with nine other countries, namely the People's Republic of Indonesia China, India, United Kingdom, Nigeria, Democratic Republic of Congo, Bangladesh, Republic of Tanzania, Kenya, and Pakistan have no access to clean water. However, this is not accompanied by awareness and public knowledge of clean water (Kamila et al., 2022) [17]. Low public awareness makes the availability of clean water in a society experiencing a crisis due to bad habits of society. Indonesia prefers practical ways of disposing of waste, namely by throwing it into a ditch or a lake or river (Kamila et al., 2022) [17]. Rivers and lakes are providers of clean water. To overcome this, the government and the community must work together to cooperation in disseminating education to increase knowledge and awareness about the availability of clean water (Kamila et al., 2022) [17]. Education about clean water aims to provide the community with the importance of keeping the environment clean for sustainable life. To help reduce and prevent water scarcity in the community.

Ultrafiltration Technology

The increasing population continues to grow new settlements in various parts of Indonesia. Make the natural process of water filtration and groundwater quality decreases and is polluted, resulting in water problems such as dirty water, oily water, smelly water, water containing iron, and calcareous water. A clean water treatment process is needed to maintain the quality of water that will be used daily. With a clean water treatment system, the quality of the water will be better so you can feel the pleasure of clean water, clear water, and fresh drinking water. Water treatment with Ultrafiltration Technology is one of the findings which became a breakthrough in the clean water treatment system. Filter with absolute values in very small pores can filter microorganisms and bacteria from treated raw water. The use of chlorine materials is also added to clean water treatment plants in very small amounts to kill bacteria. Ultra Filtration can get rid of organisms that are resistant to chlorine, but it can also remove concentrates and particles contained in wastewater. Another advantage of the ultrafiltration system is the low installation, cheap, easy maintenance, and also safe (Uragami, 2017) [18].

Reverse Osmosis System

Water is prominent and even a necessity for all living things, ranging from humans, animals, and plants. Unfortunately, not all places have the amount of clean water and fit for consumption. Therefore, the existence of the Reverse Osmosis system is useful for those who

do not have water availability in terms of both quality and quantity. One of the residents of Muara Angke said that there had never been a drinking water service from the provincial government. Even the water content in the estuary area can be said to be far from clean due to the unfavorable climate and soil conditions. Coupled with a statement from the research team from the National Research and Innovation Agency (BRIN) and the University of Brighton UK release the results of a preliminary study on water quality in some sites dominated by waste disposal. The results of the study are published in the journal Marine Pollution Bulletin entitled "High concentrations of paracetamol in effluent dominated waters of Jakarta Bay, Indonesia". The result shows that some nutritional parameters such as Ammonia, Nitrates, and total phosphates, exceed the limits of the Indonesian Seawater Quality Standards. Meanwhile, Paracetamol was detected at two sites, namely the Angke River estuary (610 ng/L) and the mouth of the Ciliwung Ancol river (420 ng/L), both in Jakarta Bay. Paracetamol concentration is quite high, raising concerns about the environmental risks associated with long-term exposure to marine organisms in Jakarta Bay (Utami, 2021) [19]. Therefore, a technology that can eliminate a lot of types of dissolved and suspended chemical species as well as biological ones (mainly bacteria) from water, and is used in industrial processes and the production of drinking water. Reverse osmosis is best known for its use in water purification drinking from seawater, removing salt and other waste materials from water molecule.

Piping System

The clean water crisis is still an unsolved problem in Muara Angke. The quick solution is to buy refill water and gallons but it's only a temporary solution. In addition, there are limitations in the clean water distribution system that will be used by the Public. To overcome this problem, we propose the solution is to do the pipeline. To provide solutions related to the distribution of clean water to be distributed for each community settlement. Provide convenience for the community in accessing and using clean water.

Collaboration with Clean Water Providers

Residents say there has never been a drinking water service from the Provincial Government. Only one water kiosk was built in 2020 in Blok Eceng Village, Muara Angke, North Jakarta (Noviansah, 2021) [6]. They deliver 17 areas of the Waste Block, Eceng Block, and Empang Block villages that have not received water service since the 1980s. Block Residents, Eceng Block, and Empang Block, Muara Angke, asked The DKI Provincial Government provides drinking water supply services. According to them, the village was never provided with clean water facilities. So that the citizens have to keep buying water refills with jerry cans. So far, residents have consumed drinking water by buying from filled water refill gallons and bottled water. One family can spend IDR 13 thousand for daily drinking water needs which causes local settlements to have to spend more money every month only to obtain potable water [7,8]. Therefore we proposed a solution, namely in collaboration with SiBiru. Drinking Water Depot Fill Rework is an industrial business that uses a raw water treatment process into drinking water that is sold directly to consumers. Processing water in drinking water depots is essentially filtration (filtering) and disinfection. It is hoped that this collaborative activity can be profitable and be a win-win solution for all parties.

Integrated Marketing Communication

This advertising transformation is driven by the increasingly massive digital penetration of society as consumers. Through digital marketing, various campaigns support emerging products. The growth of social media users in Indonesia continues to increase every year. Data from We Are Social states the number of active media users on social services in Indonesia was as many as 191 million people in January 2022 (Data Reportal, 2022) [11]. Not a few consumers use social media to search for environmental-related content. So, marketers need to be active in using social media by creating regular content to promote a product or purpose. And can work together with online media platforms to disseminate information related to clean water.

Corporate Social Responsibility

One of the consequences of limited clean water is because of the quality of the water in the country's low area of Muara Angke due to particulate contamination and harmful substances such as microorganisms, nitrates, and arsenic. Green scallops or Green Mussel is one of the marine biotas that lives naturally in Jakarta bay. Like a kidney in the body, a cluster of green shells in the ocean has the function to filter seawater naturally. This green scallop is a deposit feeder that eats all the particles that settle in the seabed and is also a filter feeder where green mussels also absorb all the particles in the water that passes through its body. The experiment was carried out by placing five kilograms of green mussels the in the aquarium backwash filter results as much as 50 liters. After silence for an hour, the water conditions became clear. From the nature of the green mussels, we propose to utilize green mussels as one of the efforts to improve water quality in Muara Angke.

4. IMPLEMENTATION

The implementation of strategy is implemented as follows: 1) *Educate* in the form of providing counseling regarding the scarcity and importance of clean water to the community in the Muara Angke area, Creating an interesting content that informs and educates the community regarding the condition of the availability of clean water which is scarce in Indonesia, conducting educational activities and disseminating information through the media social networks such as Instagram, Tiktok and Facebook, as well as being active and regularly uploading content about clean water. 2) *Ultrafiltration Technology* by determining the territory for the ultrafiltration technology machine which will be the central point of the source of clean water that will be distributed to the community. Create a planning and development team to design the ultrafiltration system, establish Ultrafiltration technology according to a predetermined procedure by the team, and put the ultrafiltration system machine in the prepared captivity. 3) *Reverse Osmosis System* by creating a planning team to build a reverse osmosis system. Establishing a reverse osmosis system according to established procedures designed by the team. Placing the Reverse Osmosis device on a large scale with the capacity operating 11.35 million liters (3 million US gal) per day in the yard of Muara Angke. So that it can treat and filter dirty water through the desalination water process. The reverse osmosis system includes the initial storage to the stage processing with specifications, namely: The initial storage capacity is 550 liters, 378 liters/day, the dimensions of the reverse osmosis system are 40 cm x 25 cm x 45 cm, the number of stages of filtration is six pieces. Directing the clean water distribution pipe resulting from Reverse filtering Osmosis to every resident's house so that it is easily accessible and consumed. 4) A *Piping system*, where the first step in implementing this system is to determine the area that will be the target of clean water, then identify sources of suitable water for use. After the area and water sources have been found, water will be channeled to settlements using a piping

system. Determine the type and material of the pipe used in the design according to the working pressure on the pipe. Designing a plan/pipeline that will lead to each community's settlements. Creating a pump pressurized drainage system that will drain water clean for settlements. 5) *Collaboration with Clean Water Providers*, by creating a team that will plan and design the laying refill water depot. Build water refilling depots scattered in Muara Angke area. 6) Integrated Marketing Communication, by designing a campaign concept that educates about the importance and limited availability of clean water in some areas in Indonesia. Holding campaigns on various social media, especially Instagram and TikTok. Create interesting content such as fun facts about the water conditions in Indonesia. 7) Corporate Social Responsibility, by placing a solid substrate as a form of attaching green mussel larvae and being a medium for the growth of green mussels to maturity. Prepare an iron ram measuring 50cm X 30cm X 10cm that is capable of collecting green mussels and placing them on the bottom of the water in Muara Angke.

5. CONCLUSION

Based on a comprehensive series of analyses related to the situation and condition of the water in Muara Angke, as well as the suggested strategy as a solution to the problems of a clean water crisis. It is hoped that the strategy and its implementation have succeeded in providing convenience for the community in accessing clean water and be an example of success in other areas. Strategies can utilize technology optimally, to change threats that there are opportunities according to the existing problems. Our strategy can serve as an example that contributes to protecting the environment and directing consumer behavior in a more positive direction. We firmly believe that the existing problem is not a threat, because on the other hand can create an opportunity. Based on this reason, there is confidence in achieving targeted goals, to be successful by implementing strategies and recommended programs effectively and efficiently.

REFERENCES

[1] Habib, A., Bouchaib, B., & Housni, S, A critical analysis of water economics in public water and sanitation services in Morocco, Arab Gulf Journal of Scientific Research, Vol. 40 No. 3, pp. 280-301. DOI: https://doi.org/10.1108/AGJSR-04-2022-0034

[2] Pratiwi, D., Sinia, R. O., & Fitri, A, Peningkatan Pengetahuan Masyarakat Terhadap Drainase Berporus yang Difungsikan Sebagai Tempat Peresapan Air Hujan, Journal of Social Sciences and Technology for Community Service, Vol. 1, No. 2, pp. 17-23. P-ISSN: 2723-2026. E-ISSN: 2723-455x

[3] Cahyadi, R., Kusumaningrum, D., & Prasetyoputra, P, Self-supplied water in Indonesia: recent spatial and socio-demographic conditions and its future development, in IOP Conference Series: Earth and Environmental Science, Vol. 1062, No. 1, p. 012038. DOI: 10.1088/1755-1315/1062/1/012038

[4] Jaan S. Islam, M.R. Islam, Meltem Islam, M.A.H. Mughal, Comprehensive Analysis of Energy Sustainability, DOI: https://doi.org/10.1002/9781119525936.ch5

[5] Purnamasari, D. M, Tak Pernah Dapat Pasokan sejak 1980, Warga Muara Angke Minta Layanan Air Bersih, Kompas, https://megapolitan.kompas.com/read/2022/02/23/

10015491/tak-pernah-dapat-pasokan-sejak-1980-warga-muara-angke-minta-layanan-air?page=all, 28.09.22

[6] Noviansah, W, 40 Tahun Krisis Air Bersih, Warga Muara Angke Tagih Janji Anies! Detik, https://news.detik.com/berita/d-5955536/40-tahun-krisis-air-bersih-warga-muara-angke-tagih-janji-anies, 28.09.22

[7] Goli, I., Azadi, H., Nooripoor, M., Baig, M. B., Viira, A. H., Ajtai, I., & Özgüven, A. I, Evaluating the Productivity of Paddy Water Resources through SWOT Analysis: The Case of Northern Iran, Vol. 13, No. 21. DOI:10.3390/w13212964

[8] Rideng, I. W., Wijaya, I. K. K. A., & Saripan, H, Dimensions of Water Resources Regulation in Philosophy of Justice and Human Rights Perspective, Journal of Indonesian Legal Studies, Vol.7, No.1, p. 31-56. DOI:10.15294/jils.v7i1.53820

[9] Liu, J., Qin, K., Xie, G., & Xiao, Y, Is the 'water tower' reassuring? Viewing water security of Qinghai-Tibet Plateau from the perspective of ecosystem services 'supply-flow-demand', Environmental Research Letters, Vol. 7. DOI:10.1088/1748-9326/ac8c57

[10] Kementrian Pekerjaan Umum dan Perumahan Rakyat, Forum Pre Asia International Water Week Ke-2 di Labuan Bajo, Kementerian PUPR Perkuat Manajemen Pengelolaan Air Selama Pandemi Covid-19 dan Fenomena La-Nina, PUPR, SP.BIRKOM/XII/2021/ 648. https://eppid.pu.go.id/page/kilas_berita/2765/Forum-Pre-Asia-International-Water-Week-Ke-2-di-Labuan-Bajo-Kementerian-PUPR-Perkuat-Manajemen-Pengelolaan-Air-Selama-Pandemi-Covid-19-dan-Fenomena-La-Nina, 13.12.21

[11] Data Reportal, Indonesia, Digital:2022 Indonsia, https://datareportal.com/reports/digital-2022-indonesia, Data Reportal. 15.02.22

[12] Bulukazari, S., Babazadeh, H., Ebrahimipak, N., Mousavi-Jahromi, S. H., & Ramezani Etedali, H, ptimization of water and land allocation in salinity and deficit-irrigation conditions at farm level in Qazvin plain, PloS one, Vol.17, No.7. DOI: 10.1371/journal. pone.0269663

[13] Sari, P. N., Gusti, A., Suci, I., & Pratama, M, Sustainability of the climate village program to prevent the impact of climate change on water supply and sanitation: a perspective from the PESTLE analysis, In IOP Conference Series: Earth and Environmental Science, Vol. 708, No. 1, p. 012086. DOI: 10.1088/1755-1315/708/1/ 012086

[14] World Economic Forum, Ensuring sustainable water management for all by 2030, WEF, https://www.weforum.org/impact/sustainable-water-management/, 16.09.22

[15] Astriani, N., Rubiati, B., Adharani, Y., Afifah, S. S., Salsabila, R., & Diffa, R, The Responsibility of the Indonesian Government to Fulfill the Rights to Water During the COVID-19 Pandemic: Some Legal Issues, Environmental Policy and Law, Vol. 51, No. 5, pp. 327-341. DOI: 10.3233/EPL-201044

[16] David, Fred R. dan David, Forest R, Strategic Management concepts and cases A Competitive Advantage Approach, Sixtennth Edition, England, Pearson Education. 2017

[17] Kamila, Putri S; Salami, Indah R S, Study of Clean Water and Sanitation Access and Its Relationship to Waterborne and Stunting Prevalence in Bandung Regency, Vol.1065, No.1. DOI: 10.1088/1755-1315/1065/1/012039

[18] Tadashi Uragami, Ultrafiltration, https://doi.org/10.1002/9781118932551.ch11. 2017

[19] Utami, S, Pentingnya Air bagi Kehidupan Manusia, Media Indonesia, https:// mediaindonesia.com/humaniora/429866/pentingnya-air-bagi-kehidupan-manusia. 02.09.21

[20] Damari, A, Teknologi Pompa Air Listrik untuk Menanggulangi Krisis Air di Desa Ciaruteun Ilir Binaan Komunitas Pendidik Nusa Bogor, Jurnal Pusat Inovasi Masyarakat (PIM), Vol. 4 No.1, pp 42-49. ISSN 2721-897X