

Clean Water Crisis at Tourism Attraction of Tanjung Batu, Pemangkat District: A Qualitative Swot Analysis

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Abstract

Tanjung Batu is a tourist attraction in Pemangkat District that potential to be developed into a tourist destination. The tourism sector has contributed income for local and regional communities. However, there is a crucial problem encountered by the local community, which is clean water availability. This study aims to determine the factors causing the clean water crisis, the efforts made, and also seek and formulate coping strategies. This research used qualitative methods for obtaining data or information and SWOT matrix analysis to get the strengths, weaknesses, opportunities, and threats. The informant selection was done by using the purposive sampling technique to choose those whose knowledge of Tanjung Batu Tourism Destinations. The selected informants were the government, such as the Sambas Regency Tourism, Youth and Sports Office, the Pemangkat Sub-district Office, Pemangkat City Head Village, Pemangkat District, private parties involved in managing local tourism, and the community who can explain the tourism conditions in Tanjung Batu, Pemangkat. The analysis shows that Tanjung Batu tourism attraction has a shortage of clean water every year due to climate and weather changes, wasting water, seawater intrusion, population growth, and PDAM water distribution. Alternative strategies for tackling the clean water crisis Tanjung Batu attraction in Pemangkat sub-district include: a) utilization of well water effectively and efficiently; b) utilizing PDAM services appropriately; c) savings on clean water use; d) optimal clean water storage use, e) drilling wells, f) processing of seawater into clean water for consumption, g) sharing of well water use to all communities fairly and equitably, and h) clean water recycling.

Keywords: - clean water, tourism, SWOT, water crisis

1. Introduction

The clean water crisis can occur in any country. If it is not managed properly, Indonesia will also experience a clean water crisis in the future. This can be caused by poor water management, such as inefficient use of water and the increasing need for clean water, while its availability in nature is so low. Thus, the water crisis cannot be avoided. The quantity of water is getting less and the quality is also decreasing. Nur et al. (2016) stated that the human need for water is indispensable, therefore clean water to meet human needs is an essential need. As the population increases, the need for water also increases. A total of 33.4 million people lack clean water and 99.7 million people lack access to good sanitation facilities. Data from the Central Statistics Agency (BPS) states that the current achievement of access to clean water in Indonesia has reached 72.55 percent. This figure is still below the target of the Sustainable Development Goals (SDGs), which is 100 percent. Running a business in the tourism sector requires the availability of quality clean water. In this case, the world tourism agency UN-WTO, when commemorating the world tourism day on 27 September carries the theme 'Tourism and Water' with the hope that tourism can play a role in

overcoming the water crisis.

Sambas Regency can be categorized as relatively sparsely populated because its population density is only 78 people/km². Domestic water demand in Sambas Regency and its surroundings is calculated based on the population and growth rate. Sambas Regency will also experience a clean water crisis, it is concluded of based on data from RPIJM Sambas Regency in 2015, the availability of clean water in Sambas Regency in 2015 was still very low of 30.41% with the number of population of 27,155 people in 5,431 house connections, with a clean water production capacity of only 87 liters/second. In line with this condition, Sulistyarso et al. (2015) conducted an analysis of the availability of two alternative raw water sources found in Riam Cagat and Riam Pencarek in Sajingan Besar District to meet the raw water needs in Sambas Regency. Based on this research, the results of the availability of Riam Pencarek water in the form of reliable discharge (Q_{90}) are 189.91 liters/second, and Riam Cagat water sources in the form of reliable discharge (Q_{90}) are 148.87 liters/second. Through this, a water transmission network system for Sambas Regency can be carried out by the method of gravity, diameter, and type of pipe required, namely Galvanized Iron pipe with a

diameter of 400 mm, HDPE pipe PN12,5 with a diameter of 400. HDPE PN10 pipe 400 mm diameter, HDPE PN8 pipe diameter. 400 mm.

The problem of clean water is becoming more urgent in tourism development since it is an inseparable important capital in tourism development. Data on tourist visits have also increased from year to year data from BPS Sambas, 2019 the number of tourists in 2014 was 50,375 tourists while in 2019 was 115,000 tourists. Amenities and clean water are needed. Likewise, Tanjung Batu tourism, Pemangkat District, which is one of the 95 destinations in Sambas Regency (BPS Sambas, 2019) has difficulty in getting clean water, especially in the dry season. Water conditions can be reduced for various reasons, including an increase in population, such as in some areas, an increase despite no big increase, but accompanied by an increase in the number of tourists, both domestic and foreign tourists. In addition to the population, the development of infrastructure in the tourism sector, such as hotels, restaurants, and places of worship also requires a large amount of clean water (Trisnawati, 2012).

The water problem that occurs in Pemangkat District includes all levels of society. Many of the clean water provided by PDAM does not flow during the dry season, plus not all areas have access to PDAM distribution. Clean water services have not shown good results. The problem is that the service coverage is still low due to the lack of water discharge produced and the clean water standard that is distributed has not been fulfilled due to the lack of a treatment system. Thus, the majority of people still use water from rivers, wells, springs, and rainwater. This situation raises the problem of water insecurity, especially for people in coastal areas whose areas are at risk of saltwater intrusion. In addition, changes in weather or climate also affect on water conditions. Groundwater conditions are influenced by water availability, precipitation, and evapotranspiration. Hence, rainfall data are needed as a supporting factor. According to Robo et al. (2019) excessive use of groundwater by the community can reduce groundwater on the coast, resulting in less groundwater compared to the increased amount of seawater, resulting in ground space or small holes on the rocks make it easier for seawater to enter because there is no barrier between sea water and clean water.

Meanwhile, according to Hidayat (2008), groundwater potential in Pemangkat District is classified as medium. The Q_{opt} of unstressed groundwater extraction varies from 1.4 l/s with a well depth of 10-20 m bmt. Q_{opt} of groundwater extraction is depressed 3.5 - 7.7 l/s with a good depth of about 90 m. However, most of these wells

are mixed with salt water which is located close to the beach. Thus, the practice of buying and selling water becomes common practice in this area. One day, it is possible that the price of water will become more expensive. The water problem that occurs in Tanjung Batu tourism, Pemangkat District shows that water is not a cheap item that can be taken just from nature. In the case of Tanjung Batu tourism, Pemangkat District, water is a valuable item of economic value. Moreover, water is a source for all industries related to tourism.

Based on these problems, research on overcoming the clean water crisis that occurs in Tanjung Batu tourism, Pemangkat District is increasingly interesting to be explored. The strategies that need to be done to overcome this is also essential to Tanjung Batu tourism in Pemangkat District to be developed as one of the leading tourism destinations in Sambas Regency.

1.1 Purpose

The purpose of this study is to find out the factors that cause the clean water crisis in tourism destination of Tanjung Batu Pemangkat District, to find out what efforts have been made by stakeholders in overcoming the clean water crisis in tourism destination Tanjung Batu Pemangkat district, to find and formulate strategies to tackling the clean water crisis in tourism destination of Tanjung Batu, Pemangkat district.

1.2 Research Question

- a. What is the factors that cause the clean water crisis in tourism destination of Tanjung Batu Pemangkat district?
- b. What efforts have been made by stakeholders in overcoming the clean water crisis in tourism destination Tanjung Batu Pemangkat district?
- c. How to formulate strategies to tackling the clean water crisis in tourism destination of Tanjung Batu Pemangkat district?

2. Method

2.1 Research Type

This research used qualitative methods for obtaining data or information. This research used descriptive research to make a description of a clean water crisis overcoming phenomenon at the Tourism Attraction of Tanjung Batu, Pemangkat District (Wardiyanta, 2010). Tanjung Batu is a natural formation in the form of rocky hills jutting into the sea or headland located in Pemangkat City or about 47 Km from Sambas. According to Lofland and Lofland (1984) in (Maleong, 2010),

the data sources of qualitative research are in the form of sentences, words, expressions, and actions. As well as additional data such as documents and others. In this study, the primary data source is the data information collected using a list of interview guidelines. Secondary data sources were data sources collected by other parties, in the form of written data such as reports, tables and graphs, photographs, and statistics.

Qualitative data analysis was carried out after completing data collection within a certain period. During the interview, the researcher collected and analyzed the answers of the interviewees. Miles and Huberman (1984) in (Sugiono, 2016) suggest that qualitative analysis activities are obtained from various sources using (triangulation) and carried out continuously until the data is saturated. These activities consist of three activities that occur simultaneously, namely data reduction, data presentation, and drawing conclusions.

Furthermore, in order to formulate alternative strategies to overcome the clean water crisis, a SWOT analysis was carried out. SWOT analysis is based on the logic that maximizes strengths and opportunities, but at the same time minimizes weaknesses and threats (Freddy, 2011).

2.2 Participants

The informant selection was done by using the purposive sampling technique to choose those whose knowledge of Tanjung Batu Tourism Destinations. The selected informants were the government, such as the Sambas Regency Tourism, Youth and Sports Office, the Pemangkat Sub-district Office, Pemangkat City Head Village, Pemangkat District, private parties involved in managing local tourism, and the community who can explain the tourism conditions in Tanjung Batu, Pemangkat District (Sugiyono, 2016).

3. Instruments

The instruments in this study are camera, laptop, stationary, recorder that used to collect the information from the informan.

3.1 Data Collection

Data collection in this study were through observation, documentation, and interviews to obtain data and information directly from sources deemed relevant to this research, including government officials in agencies in charge of Tanjung Batu tourism issues, community tourism business actors, the general public, the scheduled and unscheduled visitors. The interviews were carried out by asking questions, listening, expressing interest, taking notes, and recording the

information conveyed by the informants. Interviews were conducted with questions that led to the depth of information, and further question development was carried out by researchers in the field when dealing with informants, adjusted to the conditions of the interview that took place (Bagus and Eka, 2012).

4. Data Analysis

a. Strengths

From the results of research, it was found that internal factors in the form of strength in overcoming the clean water crisis in Tanjung Batu Pemangkat tourism included:

1. The availability of wells or ponds that still produce water.
2. Unlimited availability of seawater.

b. Weaknesses

From internal factors, in addition to strengths, some weaknesses can hinder in overcoming the clean water crisis in Tanjung Batu Pemangkat tourism. The researchers identified several weaknesses, such as:

1. The wasteful attitude of water from the Tanjung Batu tourism manager and the surrounding community in using clean water.
2. Low public awareness to minimize the clean water crisis.

c. Opportunities

From external factors, researchers identified opportunities, including:

1. The high interest of visitors to visit the Tanjung Batu Pemangkat tourism destinations.
2. The PDAM pipeline has reached the Tanjung Batu Pemangkat tourism destinations.

d. Threats

From external factors, in addition to opportunities, there are also threats that can be identified as follows:

1. Displacement and increasingly crowded population growth in Tanjung Batu Pemangkat.
2. A prolonged drought. Based on the identification results of various internal and external factors in overcoming the clean water crisis in Tanjung Batu Pemangkat tourism, the SWOT matrix is as in Table 1.

Table 1: The SWOT matrix in overcoming clean water crisis in Tanjung Batu Pemangkat tourism destinations.

Internal Factors	STRENGTHS a. Availability of wells or ponds that still produce water. b. Lots of seawater availability	WEAKNESSES a. The wasteful attitude of water from the Tanjung Batu tourism manager and the surrounding community in the use of clean water. b. Low public awareness to minimize the problem of a clean water crisis that occurs.
External Factors	S-O STRATEGIES a. Using well water effectively and efficiently. b. Using PDAM services wisely.	W-O STRATEGIES a. Use clean water efficiently b. Make clean water storage.
OPPORTUNITIES a. The high interest of visitors to visit the Tanjung Batu Pemangkat tourism destinations. b. The PDAM pipeline has reached the Tanjung Batu Pemangkat tourism destinations.	S-T STRATEGIES a. Making an artesian well. b. Processing seawater into clean water ready for consumption.	W-T STRATEGIES a. To share the well water to all communities fairly and evenly. b. Doing clean water recycling.
THREATS a. Migration and growing growth in Tanjung Batu Pemangkat. b. The prolonged drought.		

5. Findings and Discussion

5.1 General Geographical and Historical Condition of Clean Water in Tanjung Batu Pemangkat

Pemangkat district is located on the seashore. The geographic location of Pemangkat District, according to latitude and longitude is at 1 0 05 ' 01" - 1 0 12 ' 14" Latitude and 108 0 54 ' 01" - 109 0 04' 49" 4 Longitude. Pemangkat has a very beautiful view, which is a combination of mountain, sea, river, and city views. The distinctive feature of this city is the existence of a mountain that resembles a sitting elephant as a tourist icon of Pemangkat city. There are two ports in Pemangkat, namely Sintete port and Seteher port, making Pemangkat City crowded with people from various regions. The ethnic diversity in this city is very visible. The boundaries of Pemangkat District, to the north, are bordered by Jawai District, south with Salatiga District, east by Semparuk District, and west by the Natuna Sea. The area of the Pemangkat sub-district was originally 111.00 Km². The total population is approximately 44,783 people, with a population density of 403 people/km². The issuance of the Sambas Regency Regional Regulation Number 3 of 2003 concerning the Establishment of the Semparuk District, the area of the Pemangkat District was reduced to 193.75 km² (BPS, Sambas 2019).

This tourist attraction is also unique in the form of the colonial heritage sites such as the fascist

monument, evidence of Japanese atrocities, cannons from the Dutch, the Tomb of General Van Den Bosch (Netherlands 10/10 year 1850, as well as several graves of Dutch soldiers including F. Jsorg. Luit Kol Inf 1850 and V Winsheim.

All living things need water as one of their main needs because water plays a very important role in life. However, this decade, the availability of water began to decrease and was very limited. While population growth is growing faster. For this reason, the hydrological cycle must be maintained to improve water quality for water availability.

Talking about clean water in Pemangkat, we have to look back to the past so that we can find out how the development of water source utilization has been. Based on field observations, currently, the quantity of clean water discharge has decreased.

The results of the interview showed that the Pemangkat community, especially Tanjung Batu, had been using clean water for their daily needs for a long time. Previously, the community used well water found on the Tanjung Batu hill, where the water sources were so many it seemed like it was endless. In fact, there was found a spring well, which was named by the local community as "Telaga Bui". According to local people, the Telaga Bui well was made at the time of the arrival of the Dutch. This well has a deep depth into the ground and is a source of water for meeting the needs of toilets and drinking. However, lately, the Telaga Bui well is unable to meet the need for

clean water, especially when the dry season hits. This is because the amount of water in the Telaga Bui well begins to decrease. Since the community's need for clean water has increased, the supply of clean water has also decreased. This condition even leads to the fighting over water between members of the community. In addition, changes in weather and nature such as a lack of rainfall have exacerbated this condition. Natural conditions like this make the soil absorbs water in the lowlands unable to be used for vital purposes such as drinking and cooking because the salt content in the water causes the water to taste salty.

Then, the local community in this case is also less responsive in overcoming the lack of water supply. This can be seen from their lack of efforts on how to overcome this water shortage. They do not prepare a lot of water reservoirs, only relying on the supply and storage areas that are makeshift. As a result, the water used for bathing, drinking, and toileting is limited and difficult to obtain.

5.2 Factors Causing Clean Water Crisis in Tanjung Batu Tourism Destinations

According to Putra (2017), the tourism industry is often blamed for the increasing need for clean water due to the development of tourism facilities such as hotels, villas, and restaurants. This does not just happen, many factors cause this situation to occur. Based on the results of the survey and interviews with several informants, it was revealed that there were several factors causing the water crisis in the Tanjung Batu Pemangkat.

a. Climate Change and Weather

Climate change is a major factor in the lack of clean water. Erratic climate cycles and changing weather result in reduced rainfall. This natural phenomenon causes the supply of rainwater to be limited and decreasing. Water storage such as lakes is getting drier and no longer able to provide water supply for the community. Furthermore, when viewed from the geological conditions, Tanjung Batu is an area surrounded by sea and beaches. Tanjung Batu Beach is a beach in the form of a Cape, a natural form consisting of rocky hills jutting into the sea with a height of approximately 80 meters. Tanjung Batu Beach is located 47 kilometers from the city center of Sambas Regency. At the foot of this hill, there are many rocks that stretch out into the sea, which can be seen when the water is receding. This Beach is equipped with a mountain that functions as a natural fortress. This causes the soil absorbs water in the lowlands to be unable to be used for vital purposes such as drinking and cooking because the salt content in the water causes the water to taste salty. Salt water and fresh water mixed in theory considered that

there is a clear boundary between salt water and fresh water called the "interface". To know the position of the interface and detect intrusion it is use the GHYZBEN-HERZBERG method. To determine the depth of the interface in this way required data on seawater density, fresh water density and groundwater level elevation. Using this data the interface depth can be calculated by the formula:

$$hs = \frac{\rho_f}{\rho_s - \rho_f} \times hf \quad (1)$$

hs = depth of interface from sea level

hf = ground water level above sea level

f = density of fresh groundwater = 1000 gr/cm³

s = density of sea water = 1025 gr/cm³

Determination of salt content in groundwater can be determined by measuring the value of Electrical Conductivity. Determination of the value of electrical conductivity can be used as a determinant of the amount of salt and other dissolved substances in groundwater. Electrical conductivity can be used as an indicator of sea water intrusion. Based on the data from the measurement of electrical conductivity and the depth of the well, it can also be described the position of the contact area between fresh water and salt water. So that it can be seen how far the salt water infiltrates landward. Salinity that exceeds the threshold can increase the sodium content in the body which can trigger adverse effects on health. Such as hypertension, cardiovascular disorders, stroke, left ventricular hypertrophy and heart swelling, increased body fluids, digestive system disorders, and others.

b. The Waste Water Habits in the Use of Clean Water

The local community has extravagant habits in the use of clean water, this is told by a resident of Tanjung Batu. In general, people use clean water for all household activities, from cooking, washing, bathing, and so on, but they are rather wasteful in its use. This has an impact on the lack of clean water supplies when the dry season arrives. On the other hand, the community is also less responsive in overcoming the lack of water by not preparing large water reservoirs. The impact is difficult to shower, difficult to drink, and toilets. Based on the data of RISPAM Sambas 2015, there are indicators of water use in Sambas regency, Pemangkat District.

i. Drinking Water Needs

Projected drinking water needs in Sambas regency Pemangkat district from 2015 to 2035 with an average water demand are 26 to 94 liters/second,

maximum daily water requirement are 31 to 113 liters/second, and peak hour water needs are 39 to 142 liters/second.

- ii. Household Water Needs (Domestic Water Needs)
Projected domestic water needs in Sambas regency Pemangkat district from 2015 to 2035 are 37 to 137 liters/second,
- iii. City Support Activities (Non-Domestic Water Needs)
Non-domestic activities are city support activities consisting of commercial activities in the form of industry, offices, commerce and social activities such as schools, hospitals and places of worship. Projected non-domestic water needs in Sambas regency Pemangkat district from 2015 to 2035 are 43 to 157 liters/second.

c. Seawater Intrusion

The existence of Tanjung Batu Pemangkat, which is located on the seashore, has several wells, which originally had fresh water, gradually turned brackish and salty in taste. This is called seawater intrusion. The seawater intrusion is one of the factors in the clean water crisis in Tanjung Batu Pemangkat. Based on information obtained in 1991-2003, some of the well water in Tanjung Batu is still tasteless. But after that until now there are wells whose water is salty and abandoned by the community. At least, currently, five public wells are still being used by the people of Tanjung Batu which still have tasteless water.

d. Population Growth

It cannot be denied that with the increasing population, the use of clean water will also increase. This also happens in Tanjung Batu emangkat where until now the population continues to increase because Tanjung Batu tourism has started to rise again and is crowded with tourists.

e. The Uneven Distribution of PDAM Water

The PDAM pipeline has served the community. However, not all houses get this service. Some even decided to stop using the PDAM water. This is due to the uneven distribution of water, sometimes the water runs, sometimes it does not. The water is also sometimes less clear and smelly.

5.3 Efforts to Overcome the Clean Water Crisis

Water is a vital resource for life. Basically, water is used for daily activities such as drinking, bathing, cooking, or washing. Therefore, the availability of sufficient water is prioritized. According to Wafi and Subhani (2017), the efforts made by the government in overcoming the clean water crisis include providing facilities in the form

of clean water reservoirs, providing piping between distant hamlets, facilitating clean water for consumers of PDAM. The results of data collected show that efforts to overcome water scarcity problems. Water management that has been carried out by the community is by conserving water, such as storing water in a basin to wash dishes so that it can be used repeatedly. Then to wash clothes by rinsing it once, besides that, usually use the water used for ablution to water the plants. In fulfilling the need for clean water for eating and drinking, the Pemangkat community generally purchases water by using a car for 80,000-120,000/1000 liters. In addition, several residents also make water reservoirs, either permanently made of cement, or prepare several large jars and large holes to meet the clean water supply.

5.4 Strategies for Overcoming the Clean Water Crisis in Tanjung Batu Pemangkat Tourism Destination

Formulating alternative strategies are steps taken in order to achieve the desired goals, the researcher uses the SWOT analysis method (Strength, Opportunities, Weakness, Threats) (Rangkuti, 2006). This method is expected to provide strategies in overcoming the clean water crisis in Tanjung Batu Pemangkat tourism, internally of strengths and weaknesses and externally of opportunities and threats to generate ideas and goals that help identify problem conditions.

6. Conclusion and Recommendation

Based on the identification of internal and external factors eight strategies to overcome the occurrence of a clean water crisis in Tanjung Batu Pemangkat tourism were formulated. They are a) use well water effectively and efficiently, b) use PDAM services wisely, c) make savings in the use of clean water, d) make clean water storage, e) make an artesian well, f) process seawater into clean water ready for consumption, g) to share the well water to all communities fairly and evenly, h) cleans water recycling.

Observing the need for clean water in Tanjung Batu Pemangkat tourism destination, there was a shortage of clean water availability from year to year due to various factors such as climate change and weather, water wasteful habits, seawater intrusion, population growth, and distribution of PDAM water. The strategies include external and internal factors. Its strength is in the form of the availability of wells or ponds that still produce water and the abundance of sea water availability.

The weaknesses are the wasteful attitude of water from the Tanjung Batu tourism manager and the surrounding community in the use of clean water, and the low level of public awareness. The opportunities are high interest of visitors to visit the Tanjung Batu Pemangkat Tourism destinations and the PDAM pipeline have reached Tanjung Batu Pemangkat Tourism destinations. Then the threats are the population growth and the prolonged drought.

The results indicate several strategies for solving the problem, including a) making use of well water effectively and efficiently, b) using PDAM services wisely, c) use of clean water efficiently, d) make clean water storage, e) make artesian well, f) seawater processing into clean water ready for consumption, g) share the well water to all community fairly and equitably, and h) recycling clean water.

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