JURNAL GEOGRAFI
Geografi dan Pengajarannya
ISSN : 1412 - 6982
e-ISSN : 2443-3977
Volume 21, Number 2, December 2023

CONSUMER INTEREST IN THE PROBOLAJANG PIPELINED DRINKING WATER SUPPLY SYSTEM

Santoso IB[*1)], Muzayanah[2]
[1)] Environmental Engineering, Institut Teknologi Sepuluh Nopember Surabaya, Indonesia
[2)] Geography Education, Universitas Negeri Surabaya, Indonesia

Abstrak: Pengadaan sistem penyediaan air minum perpipaan regional Kabupaten Probolinggo, Kota Probolinggo dan Kabupaten Lumajang (Probolajang) merupakan upaya Provinsi Jawa Timur dalam meningkatkan pelayanan sistem penyediaan air minum. Keberhasilan program ditentukan oleh besarnya minat masyarakat menjadi konsumen sistem penyediaan air minum. Penelitian ini bertujuan untuk menganalisis minat masyarakat untuk menjadi konsumen sistem penyediaan air minum perpipaan Probolajang. Wilayah penelitian adalah 6 distrik di Kabupaten Probolinggo, 3 distrik di Kabupaten Lumajang dan 3 distrik di Kota Probolinggo. Responden adalah keluarga yang bukan konsumen sistem penyediaan air minum perpipaan eksisting. Variabel terikat adalah minat responden untuk melanggan sistem penyediaan air minum. Variabel bebas adalah tingkat pendidikan, penghasilan, kualitas, kuantitas dan kontinuitas air baku. Analisis menggunakan regresi logistik polynomial. Analisis membuktikan bahwa variabel tingkat pendidikan, penghasilan dan kuantitas air baku memiliki hubungan positif terhadap minat responden untuk menjadi konsumen. Variabel kualitas dan kontinyuitas air baku memiliki hubungan negatif terhadap minat responden menjadi konsumen.
Kata kunci: Minat, konsumen, air

Abstract: Procurement of regional piped drinking water supply system for Probolinggo and Lumajang Regency (Probolajang) is an effort by Government to improve drinking water supply system services. This research aims to analyze the public's interest in becoming consumers of the Probolajang piped drinking water supply system. The research area consist of 6 districts in Probolinggo Regency, 3 districts in Lumajang Regency and 3 districts in Probolinggo City. Respondents are families who are not subsribing to existing water system. The dependent variable is the respondent's interest in subscribing to the drinking water supply system. The independent variables are education, income, quality, quantity and continuity of raw water. Analysis method that used for this study is polynomial logistic regression. The result proves that the variables of education level, income and quantity of raw water have positive relationship with respondents' interest in becoming consumers. Meanwhile, quality and continuity of raw water have negative relationship.
Keywords: Interest, consumers, water

A. INTRODUCTION

Criteria for Piped Drinking Water Supply Systems according to Government Regulation of the Republic of Indonesia No. 122 of 2015 concerning Drinking Water Supply Systems in Indonesia, including: quality, quantity and continuity. Quality criteria ensure that the quality of water received by consumers meets the drinking water quality standards according to the

*) Correspondence address :
e-mail : bagyo@enviro.its.ac.id

Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2023 concerning the Implementation of Government Regulation No. 66 of 2014 concerning environmental health.

Quantity criteria ensure that the quantity of water provided can meet the daily needs of consumers. Continuity criteria guarantee that water is available at all times or 24 hours, both during the dry season and the rainy season (Aronggear, T. E., etc., 2019).

The East Java Provincial Government seeks provide improved piped drinking water supply system services for all communities in East Java Province. In an effort to make this happen, the East Java Provincial Government is building a regional piped drinking water supply system, in areas that have not been reached by a drinking water supply system. Regional in the sense of crossing districts or cities in East Java Province. The Probolajang Regional Piped Drinking Water Supply System is planned to serve Probolinggo Regency, Lumajang Regency and Probolinggo City. The Probolajang Regional Piped Drinking Water Supply System Plan is listed in Presidential Regulation of the Republic of Indonesia no. 80 of 2019 concerning the Acceleration of Economic Development in the Gresik-Bangkalan - Mojokerto - Surabaya - Sidoarjo - Lamongan, Bromo Region – Tengger - Semeru Region, as well as the Selingkar Wilis and South Cross Region. The success of this program is determined by the level of public interest in subscribing to the Probolajang drinking water supply system.

This study aims to analyze respondents' interest in becoming consumers of the Probolajang regional piped drinking water supply system which will be built by the East Java Provincial Government. It is hoped that this study will provide information for the East Java Provincial Government and Regional Drinking Water Companies to improve services in the clean water sector.

B. METHOD

The study area is the service plan area of the Probolajang regional piped drinking water supply system, namely: 6 districts of Probolinggo Regency, 3 districts of Lumajang Regency and 3 districts of Probolinggo City. Respondents were heads of households who still use drilled wells, dug wells and other water sources with shared pipes. There were 115 respondents, representing all residential areas. The respondents were spread across the research area. The service area of the Probolajang Regional piped drinking water supply system and the position of the respondents are presented in Figure 1. Data collection was conducted in February 2023. The sampling was done

by systematic random sampling method. The data collection technique is by interviews. The dependent variable of this research is the respondent's interest in subscribing to the drinking water supply system. The independent variables consist of social variables and existing raw water condition variables. Social variables with parameters of education level and income. Existing raw water condition variables with quantity, quality and continuity condition.

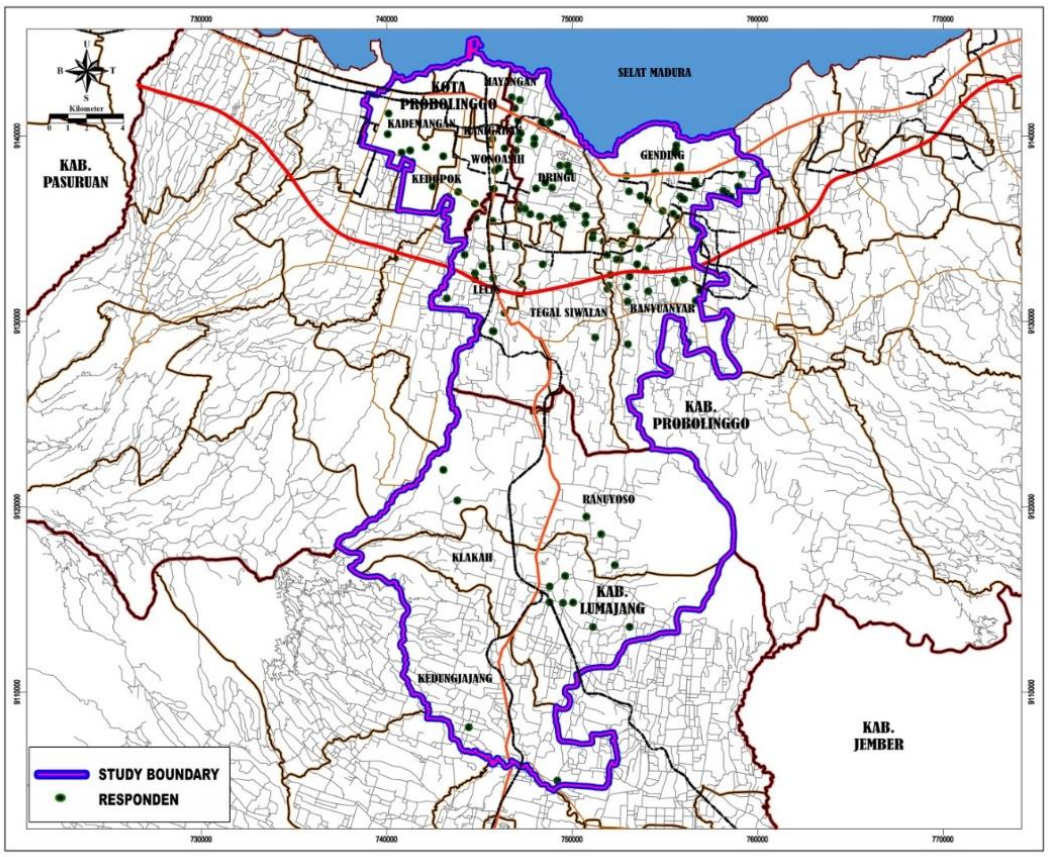

Figure 1. Map of respondent distribution. Source : personal analysis

The data and data symbols are as follows:

a. Respondents' interest in subscribing to the drinking water supply system with the symbol: 0 = not interested in subscribing; 1 = willing to subscribe,

b. The education level of the head of the family with the symbol 0 = no school; 1 = elementary school graduate; 2 = junior high school graduate; 3 = high school graduate; 4 = bachelor/vocational graduate,

c. Average family income with symbols: 0 = income below IDR 3,000.00; score 1 = income IDR 3,000,000 to IDR

4,500,000; score 2 = income above IDR 4,500,000,-.

d. Existing clean water quality: with symbol 0 = poor water quality; 1 = water quality is quite good; 2 = good water quality (clear, odorless and tasteless),

e. Existing clean water quantity: with symbol 0 = insufficient water for daily needs; 1 = the amount of water is sufficient for daily needs,

f. Continuity: with symbol: 0 = water in the water source is not always available; 1 = water in the water source is always available,

The data is analyzed using polynomial logistic regression with SPSS 24 software.

C. RESULT AND DISCUSSION

C.1. RESULT

The results obtained from logistic regression are presented in the Table 1

Table 1. Parameter estimates

Variable	Regression coefficient b(i)	Odds ratio Exp(b(i))
Education	1,39242	4,02457
Average income	1,43715	4,20867
Quality water source	-0,75157	0,47163
Quantity water source	2,60979	13,59621
Continuity water source	-2,45952	0,47163

Source: personal analysis

The coefficient of determination R^2 was obtained at 0.115. This means that the independent variables (education, average income, quality, quantity and continuity of existing raw water) are able to explain the variable interest in subscribing to the drinking water supply system by 11.5%. The remainder (89.5%) is explained or influenced by other variables not studied.

C.2. DISCUSSION

The Probolajang Regional Piped Drinking Water Supply System is one of the East Java Provincial Government's efforts to expand the clean water service network of Probolinggo Regency, Lumajang Regency and Probolinggo City. The Probolajang Regional Piped Drinking Water Supply System service area plan is stated in Presidential Regulation of the Republic of Indonesia no. 80 of 2019 concerning the Acceleration of Economic Development in the Gresik - Bangkalan - Mojokerto - Surabaya - Sidoarjo - Lamongan, Bromo Region - Tengger - Semeru Region, as well as the Selingkar Wilis and South Cross Region. The Pipeline Area Plan consist of: 5 sub-districts in Probolinggo City, 5 sub-districts in Probolinggo Regency and 3 sub-districts in Lumajang Regency.

The majority (65%) of the population in these 3 districts still rely on water sources from HiPPam (Association of Drinking Water Users) and springs. The interest of residents in the research area in subscribing to this clean water pipe system is the key to the success of expansion of the pipe network. Subscriber interest in this research is related to the level of education, average income of respondents, quality, quantity and continuity of clean water.

From the analysis results it was found that the education variable had a regression coefficient (b(i)) of 1.39242 and an Odds Ratio [Exp(b(i))] of 4.02457. This means that respondents with higher education have a positive relationship (1.39242) with interest in subscribing to the clean water supply system. Respondents with higher education have a tendency to subscribe to piped drinking water systems that is 4.02457x greater than respondents with lower education. This is in accordance with research by Amwila, A., & Listari, S. (2019), which states that higher education has a positive effect on the willingness to subscribe to PDAM (regional drinking water company). This is because respondents with higher education are more concerned with the easy availability of clean water (Khan, I., etc., 2010).

The average income variable has a regression coefficient (b(i)) of 1.43715 and an Odds Ratio [Exp(b(i))] of 4.20867. This means that respondents with a higher average income have a positive influence on their interest in subscribing to the clean water supply system. Respondents with higher incomes tend to have an interest in subscribing to clean water supply systems that is 4.20867x greater than respondents with lower average incomes. The results of this analysis are in accordance with research by Bandara, B., Chandrakumara, DPS. (2015) which states that respondents who have middle to upper income tend to choose the convenience of providing clean water.

These results are also in accordance with the research of I Nyoman Sutama and Muhammad Ikbal (2017), which states that the factors that have a significant influence on the demand for clean water at PDAM Sumbawa City are income, number of family members and water rates.

The existing clean water sources that respondents have been using comes from drilled wells as much as 80%, 17.9% from dug wells, and the rest from other water sources and pipes from water sources installed together. From the results of interviews with respondents, the quality of the respondents' raw water sources were inconsistent. In the rainy season, the

quality of the water sources tends to be clean, while in the dry season, the water quality is sometimes slightly colored but odorless and tasteless.

The results of the quality variable analysis using logistic regression showed that the regression coefficient (b (i)) was -0.75157 and the Odds Ratio [Exp(b(i))] was 0.47163. This means that the quality of the water source used by respondents has a negative effect on their interest in subscribing to the clean water supply system. Respondents with good water quality are 0.47163x more likely to have no interest in subscribing to a clean water supply system than respondents who have water sources with poor quality. This is in accordance with research on Pahlawan, etc. (2019) which states that product quality has a positive and significant effect on customer loyalty at PDAM Makasar City. Respondents hope that by subscribing to the Probolajang clean water supply system, the quality of the water obtained will be maintained and in accordance with clean water standards, namely colorless, odorless and tasteless.

The clean water quantity variable has a regression coefficient (b(i)) of 2.60979 and an Odds Ratio [Exp(b(i))] of 13.59621. This means that the quantity of water sources used by respondents has a positive effect on their interest in subscribing to the clean water supply system. Respondents with good water quantity tend to have an interest in subscribing to a clean water supply system that is 13.59621x greater than respondents who have water sources with insufficient quantity. This is in accordance with interviews with respondents who stated that respondents expected the availability of clean water in sufficient quantities for daily needs and ease in utilizing water sources. So far, respondents have used traditional water pumps and buckets to fill water reservoirs such as bathtubs or buckets.

By subscribing to a clean water supply system, respondents hope to save electricity and energy costs in providing water for daily needs. This is in accordance with research by Ninin, G, 2016 which states that people can reduce their water expenditure by an average of IDR 100,000 per month by substituting gallons of water and electricity costs for using water pumps with piped water provided by the private sector. By subscribing to a clean water supply system, respondents hope to get water in sufficient quantity and at an affordable cost.

Continuity can be interpreted as meaning that the available water must be able to meet needs continuously 24 hours per day, both during the rainy season and the dry season. Amwila, A., & Listari, S. (2019). The majority of respondents (97.9%) stated that their water source continuously provides

water at all times. From the results of the logistic regression analysis, it was found that the clean water continuity variable had a regression coefficient (b (i)) of -2.45952 and an Odds Ratio [Exp(b(i))] of 0.47163. This means that the continuity of the water source used by respondents has a negative effect on respondents' interest in subscribing to the clean water supply system. Respondents with continuous water sources tend not to be interested in subscribing to a clean water pipe system.

The continuity that has been obtained from existing water sources influences respondents' interest in subscribing to the drinking water supply system. Respondents have obtained the continuity aspect of existing water sources. A small number of respondents (2.1%) stated that existing water sources were not continuous, but this problem could be overcome by providing storage tanks to store water. The majority of respondents (97.9%) stated that existing raw water is continuous, available at all times, both during the dry season and the rainy season.

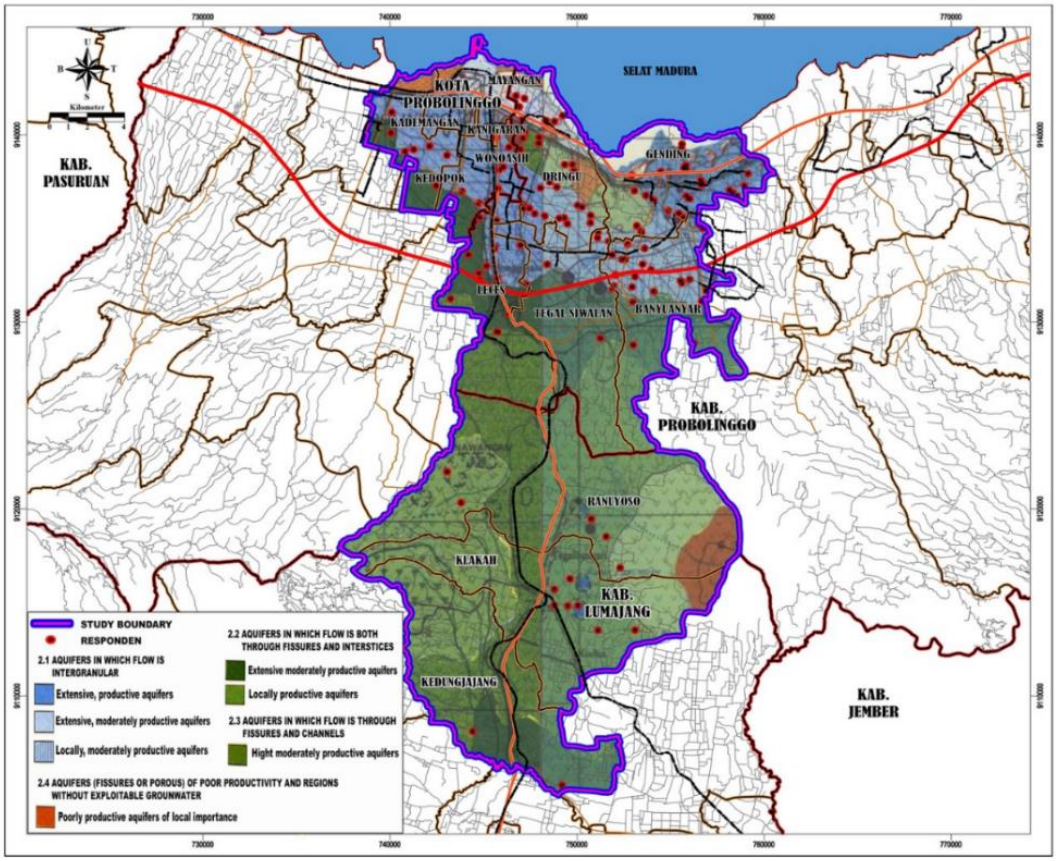

Figure 2. The resulting map overlays the respondent's location with the Geohydrological map. Source: personal analysis

The continuity of existing raw water is proven by overlaying the position of the respondent's residence with the Geohydrological map of the research area, Figure 2. The research area is a medium and high productive aquifer area, as evidenced by the large number of uses of water sources such as springs, artesian wells and drilled wells downstream and the large distribution of wells in the research area. Various types of wells are found, including shallow wells and deep wells (drilled wells). Shallow wells in the form of dug wells that are made and used by residents, usually have a depth of less than 40m Rengganis, H., & Seizarwati, W. (2015).

Figure 2 shows that the respondents' residential locations are spread across moderate to highly productive aquifer areas. This causes existing raw water to be available at all times. Although in terms of quantity it is not stable throughout the year. In the rainy season, quantity and quality meet respondents' needs. Meanwhile, during the dry season, the quantity decreases, but it can still be overcome by using other nearby springs. This is in line with the research results of Musfira, M., & Purcahyono, J, (2019) which states that interest in subscribing to a clean water supply system is influenced by the availability of raw water which is still abundant and of good quality.

This is different if the respondent is in a low productive aquifer area. Respondents who are in low-productive aquifer areas or areas that often lack water will only be able to rely on water sources with non-continuous water flow. Respondents in this area tend to be interested in subscribing to the clean water supply system because they hope for sufficient water during the dry season (Masruroh, N. A., & Rahman, H. Z., 2023)

D. CONCLUSION

The conclusion of this research is that social variables with the parameters of education level and income have a positive relationship with respondents' interest in becoming consumers. The variable condition of the existing drinking water supply system with the quantity condition parameter has a positive relationship with respondents' interest in subscribing to the clean water supply system. The quality and continuity variables have a negative effect on respondents' interest in subscribing to the clean water supply system. This research is expected to be a basis for selecting clean water pipelines based on the interests and clean water needs of the people of Probolinggo and Lumajang based on local topographic conditions.

BIBLIOGRAPHY

Government Regulation of the Republic of Indonesia No. 122 of 2015 concerning Drinking Water Supply Systems in Indonesia, including: quality, quantity and continuity

Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2023 concerning the Implementation of Government Regulation No. 66 of 2014 concerning environmental health.

Aronggear, T. E., Supit, C. J., & Mamoto, J. D. (2019). Analisis kualitas dan kuantitas penggunaan air bersih PT. Air Manado Kecamatan Wenang. *Jurnal Sipil Statik*, *7*(12).

Presidential Regulation of the Republic of Indonesia No. 80 of 2019 concerning the Acceleration of Economic Development in the Gresik - Bangkalan - Mojokerto - Surabaya - Sidoarjo - Lamongan, Bromo Region - Tengger - Semeru Region, as well as the Selingkar Wilis and South Cross Region

Khan, H., Iqbal, F., Saeed, I., Khan, I. (2010) Estimating willingness to pay for improvements in drinking water quality: evidence from Peshawar, Northern Pakistan. *Environmental Economics*. Vol. 1(2)

Bandara, B., Chandrakumara, DPS. (2015) A binary logistic regression analysis on the demand for bottled water in the city of Colombo. *International Journal of Multidisciplinary Research and Development* Online ISSN: 2349-4182 Print ISSN: 2349-5979 www.allsubjectjournal.com Vol. 2(11) pp 428-433

Nyoman Sutama, Muhammad Ikbal (2017). Faktor-Faktor Yang Mempengaruhi Permintaan Air Bersih Pada PDAM Kota Sumbawa Tahun 2017. Fakultas Ekonomi & Manajemen Universitas Samawa Program Studi Ekonomi Pembangunan. Jurnal Ekonomi dan Bisnis Vol 14 No 1, April 2017

Amwila, A., & Listari, S. (2019). Pengaruh pendapatan, jaringan pipa, sumber air terhadap minat rumah tangga berlangganan PDAM Kota Bogor. *Ikraith-Ekonomika*, *2*(3), 130-139.

Pahlawan, M., Nurlia, N., Laba, A., Pakki, E., & Hardiyono, H. (2019). Pengaruh kualitas produk dan kualitas pelayanan terhadap peningkatan kepuasan dan loyalitas pelanggan Perusahaan Daerah Air Minum (PDAM) Kota Makassar. *Journal of Applied Business Administration*, 3(2), 228-244. https://doi.org/10.30871/jaba.v3i2.1560

Ninin Gusdini, N., M Yanuar J Purwanto, Y., Kukuh Murtilaksnono, K., & Kholil, K. (2016). Kelangkaan air bersih: Telaah sistem pelayanan penyediaan air bersih di Kabupaten Bekasi. Jurnal Sumber Daya Air, 12(2), 175-186.

Musfira, M., & Purcahyono, J. (2019). Identifikasi faktor penghambat peningkatan infrastruktur dasar di Kabupaten Kaimana. *Jurnal MEDIAN Arsitektur dan Planologi*, *9*(01), 10-17.

Masruroh, N. A., & Rahman, H. Z. (2023). Analisis ability to pay (ATP) dan willingness to pay (WTP) pada rencana pengembangan sistem penyediaan air minum (SPAM Sumber Air Wendit. *Jurnal ARTESIS*, *3*(1), 75-80.

Rengganis, H., & Seizarwati, W. (2015). Strategi dan upaya pemanfaatan sumber air umbulan untuk penyediaan air bersih di Provinsi Jawa Timur. *Jurnal Teknik Hidraulik*, 6(1), 63-76.