OPEN ACCESS
Saudi Journal of Civil Engineering
Abbreviated Key Title: Saudi J Civ Eng
ISSN 2523-2657 (Print) |ISSN 2523-2231 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com/journal/sjce/home

Original Research Article

Identification of Access to Clean Water in Slum Management and Prevention Area, Bandar Lampung City, Indonesia

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DOI: 10.36348/sjce.2022.v06i06.003 | **Received:** 18.05.2022 | **Accepted:** 21.06.2022 | **Published:** 30.06.2022

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Abstract

The increase in the population in a city and the development of development in all fields will result in increased water demand. Therefore, efforts are needed to increase the availability of clean water which will be useful for improving people's welfare. This research was conducted to examine more deeply related to access to clean water in slum communities by examining the problems 1) how much access to clean water and how to get clean water; 2) how much clean water is available; and 3) how much clean water is needed. The study was conducted in four villages in Bandar Lampung City, Indonesia, namely Sawah Lama Village, Sukamenanti Baru Village, Kota Sepang Village, and Rajabasa Pemuka Village. Data were collected through a process of observation, interviews, and analysis of secondary data, such as village data, population numbers, and others. The data were then analyzed using triangulation techniques to obtain a comprehensive and valid picture. The results of this study indicate that the greatest need for clean water is found in the Sawah Lama village at 27,021.40 liters/day. Information was also obtained that the highest use of access to clean water was drilled wells with a user percentage of 84.37% in Sukamenanti Baru Village, 69.40% in Sawah Lama Village, 74% in Kota Sepang Village, and 100% in Rajabasa Pemuka Village. The availability of water based on calculations is still sufficient, but for Kota Sepang Village there is a shortage during the dry season.

Keywords: Access to clean water, Handling of slums, Prevention of slums.

INTRODUCTION

Water is an important environmental component of life and is the main requirement for life processes on earth. However, water can be a disaster if it is not available in the right conditions, both in quality and quantity (Warlina, 2004). Water as a component of the environment will affect and influenced by other components. Poor quality water will result in a bad environment that will affect the health and safety of humans and other living creatures (Haseena *et al*., 2017; Ibrahim & Sjarmidi, 2017). A decrease in water quality will reduce the usability, usability, productivity, carrying capacity and capacity of water resources. In fact, it will eventually reduce the wealth of natural resources.

Currently, in certain places, water has become an expensive item; because water has been polluted by various kinds of waste from various human activities so in terms of quality, water resources have decreased. Likewise, in terms of quantity, it is no longer able to meet the ever-increasing needs. This is due to the increasing population and development, especially in urban areas. Of course, apart from these factors, the availability of clean water in an area is caused by several other factors, namely 1) political factors, where clean water and sanitation are not a priority; 2) financial (poverty), institutional (lack of proper institutions, non-functioning of existing institutions); 3) technical, namely the distribution of settlements; and 4) climate, namely floods and droughts (Hosain *et al*., 1999; UN Millennium Development Project -New York, 2004; Zulkarnaini *et al*., 2019). Of course, these four factors need to be considered as a solution because the availability of water is related to the needs of daily life. In fact, the dense population in big cities that is not comparable to residential land causes many slums to appear in urban areas (Khomarudin, 1997; Surtiani, 2006; Turok & Borel-Saladin, 2016).

Based on Law Number 1 of 2011 concerning housing and settlement areas: 1) slum housing is housing that has decreased the quality of its function as a place of residence; 2) slum settlements are settlements that are unfit for habitation due to irregularity of buildings, high levels of building density, and quality of buildings and facilities and infrastructure that do not meet the requirements. The slum indicators according to the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 02/PRT/M/2016 concerning improving the quality of shabby housing and slum settlements in determining the location consist of several aspects, namely 1) the condition of the building; 2) environmental road conditions; 3) condition of drinking water supply; 4) environmental drainage conditions; 5) wastewater management conditions; 6) waste management conditions; and 7) fire protection conditions. Based on this understanding, the characteristics of slum housing and slum settlements can be formulated, namely 1) are housing and settlement entities that experience quality degradation; 2) the condition of the building has a high density, irregular and does not meet the requirements; 3) the condition of facilities and infrastructure does not meet the requirements (limits for facilities and infrastructure are set within the scope of creativity).

The problem of slum settlements and clean water is certainly a challenge for the Indonesian government and the community to achieve the targets of the Millennium Development Goals (MDGs), namely the achievement of people's welfare and community development. Even the Medium Term Development Plan (RPJM) III 2015-2019, is related to the handling of slum settlements in cities without slums by improving the quality of the environment. In addition, the Indonesian government also wants to realize sustainable development, as recommended at the Earth Summit in Johannesburg in 2000, namely targeting the provision of drinking water and sanitation. This means that the government already has a direction in improving the quality of life of the community, especially in slum areas, one of which is by facilitating access to clean water (Masduqi *et al*., 2008).

It is not without reason why the government is targeting the provision of clean water in slum areas. This is because the provision of clean water has a very important role in improving the quality of life and reducing the number of people with diseases, especially those related to water (Fitria & Setiawan, 2014). Environmental health problems often occur due to the lack of clean water sources and proper sanitation (Enralin & Lubis, 2003). Even though the government wishes to have good intentions, the fact is that the program is not going well. The unsustainability of the clean water service program is caused by the lack of community participation and the lack of public acceptance of new technologies (Marganingrum *et al*., 2010; Zulkarnaini *et al*., 2019). The provision of clean water can only be sustainable if there is a statement of needs from the community.

Several studies have been conducted regarding access to clean water. As was done by (Uar, 2016) who studied access to clean water in slum areas in Ambon City, Indonesia. The research shows that not all slum areas in Ambon City have access to clean water due to the large area and geographical conditions. There are around 21 villages that fall into the medium-risk category related to access to clean water. Research conducted by Hakim (2010) also shows that several areas in Serang Regency, Indonesia, do not have clean water facilities according to standards. This water problem also in fact occurs in various cities in Indonesia, one of which is Bandar Lampung City, which is located in Lampung Province. The city of Bandar Lampung has problems with the use of clean water as a result of development so there are some areas that experience a shortage of clean water. From the results of the literature review and data acquisition in the field, the factors that affect the lack of clean water in Bandar Lampung are, 1) the physical condition of the water has decreased such as the colour of the water is cloudy, 2) there is no source of clean water in people's homes, 3) lack of adequacy of clean water in one family, 4) the absence of clean water facilities or PDAM, and 4) the influence of climate where in certain seasons the adequacy of the community in one family is fulfilled but in other seasons it is not fulfilled. Based on the implementation of the slum settlement survey which refers to Law Number 1 of 2011 and the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 02/PRT/M/2016, the Government of Bandar Lampung City determines the areas that fall into the category of slum settlements. The results are stated in the Mayor's Decree No. 974/IV.32/HK/2014 which contains several areas that fall into the category of slum settlements.

Based on the description above, this research was conducted with the aim of obtaining an overview of access to clean water in slum areas in Bandar Lampung City today as a result of the program launched by the Bandar Lampung City Government.

METHOD

This research is a qualitative descriptive study with a cross-sectional approach, namely a research design that involves more than one variable at a time so that the relationship and description can be seen clearly (Notoatmodjo, 2012).

Participants and research sites

The study was conducted in four villages that fall into the category of slum areas in Bandar Lampung City, Indonesia. The areas are Kota Sepang Village, Rajabasa Pemuka Village, Sawah Lama Village, and Sukamenanti Baru Village. The four villages represent

four sub-districts that fall into the category of slums in Bandar Lampung City, Indonesia.

Data Collection

Data was collected in the form of primary data and secondary data. Primary data was obtained by filling out questionnaires when conducting direct observations at the research site. Questionnaires were distributed to residents at random with the assistance of regional leaders. In addition, to obtain more in-depth information, interviews were also conducted with participants. Secondary data was obtained through literature and document studies, namely documents on wastewater management and drinking water supply for 2018-2022, village maps, and regional spatial planning maps.

Data Analysis

The data obtained from the results of this study were analyzed descriptively with the data triangulation technique, which is a data analysis technique by comparing one data with other data so that it can provide an overview of the validity of the data (Sugiyono, 2016). The use of this triangulation technique aims to test research material or data so that it can increase the level of coherence and research success (Zamili, 2015). In this case, data triangulation was carried out based on data from filling out questionnaires, interviews, and literature studies. The results of the analysis are then presented in the form of narrative and descriptive data.

RESULTS AND DISCUSS

Analysis of Social Status Characteristics

The analysis of the characteristics of social status in the four regions begins by examining the household characteristics of the respondents. This is related to information related to the number of heads of households in one house which is then related to the number of clean water needed. The results of the analysis are presented in Figure 1.

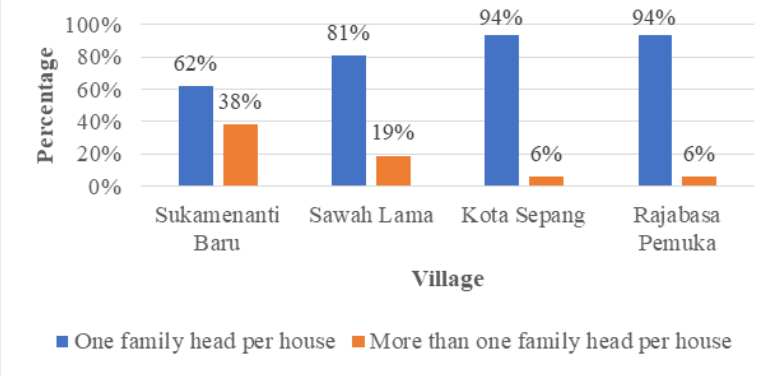

Figure 1: Percentage of household heads in each house

The data in Figure 1 shows that the occupants of the house are dominated by one family head. However, if you look at it, Sukamenanti Baru Village seems to have the highest percentage, where as many as 38% of the residents live in houses with more than one family head. Of course, this will be the basis of information related to daily water needs. The denser the number of residents, the more water needs are needed.

Next, the authors collect data and analyze data related to the amount of clean water needed in the four villages; the data is presented in Table 1. From the data in Table 1, it can be seen that the largest amount of water needed is in Sawah Lama Village, which is 195.81 litres per person per day.

Table 1: The results of the analysis of the amount of water demand

Village	Number of Respondents (persons)	Drinking/Cooking Needs (liters)	Need for bathing, washing, defecating, urinating (liters)	Total Water Usage (liters)	Total water usage per person per day (liters)
1	2	3	4	5	6
Sukamenati Baru	331	484,67	34.600,00	35.084,67	106.00
Sawah Lama	138	188,07	26.833,33	27.021,40	195.81
Kota Sepang	13	208,70	13.563,00	13.771,70	102.01
Rajabasa Pemuka	155	906,00	24.100,00	25.006,00	161.33
Jumlah	**759**	**1.787,40**	**99.096,30**	**100.883,77**	**565.10**

The calculation of Water Needs is based on several assumptions. The first assumption is that the total need for clean water for drinking and cooking is 1,787.40 liters/family/day, which is the amount of clean

water needed for the four urban villages in Bandar Lampung. Therefore, to calculate the need for clean water for drinking/cooking purposes, it can be found by dividing the data by the number of respondents and calculated as follows by (Radhika *et al*., 2018):

Clean Water Needs for Drinking and Cooking = $\frac{\text{Number of Third Columns}}{759}$

Clean Water Needs for Drinking and Cooking = $\frac{1.787,40}{759}$ liters/person/day

Clean Water Needs for Drinking and Cooking = 2, 35 liters/person/day

The second assumption is that the amount of clean water needed for bathing, washing and other purposes is 99,096.30 liters, which is the amount of clean water needed for the four urban villages. Therefore, to calculate the need for clean water for bathing, washing and other purposes in four urban villages, it is sought by dividing the amount of clean water needed for bathing, washing and other purposes by the number of respondents, which is calculated as follows by (Radhika *et al*., 2018):

Clean Water Needs For Bathing, Washing, Others = $\frac{\text{Number of Fourth Column}}{759}$

Clean Water Needs for Bathing, Washing, Others = $\frac{99.096,30}{759}$ liters/person/day

Clean Water Needs for Bathing, Washing, Others = 130, 56 liters/person/day

The third assumption is that the total need for clean water in the four kelurahan in this study is the sum of all types of clean water needs such as drinking/cooking needs, bathing, washing, and other needs, if the family does not have a vehicle. The need for clean water per capita is obtained by adding up the two previous calculations. The result is 2.35 liters plus 130.56 liters, which is 132.92 liters / person / day. This means that the total per capita water requirement for a household in the region is 132.92 liters per day per person; this amount is needed to meet daily needs. Kindler & Russell (1984) state that the need for water for housing (domestic needs) includes all water needs for residents' needs, such as water needs for preparing food, toilets, washing clothes, bathing (houses or apartments), washing vehicles, and for flushing. yard. The average water use for households is 295 liters/person/day. This means, the results obtained in this study are much different from the results in the Kindler and Russell study. However, if we look at it based on the standard for domestic (household) water needs issued by the Directorate General of Human Settlements, Ministry of Settlement and Regional Infrastructure in 2003, which states that Big Cities, namely cities with a population of 500,000 – 1,000,000, have water needs. domestic 120 liters/person/day – 150 liters/person/day. Based on this, the amount of water needed by residents from the results of this study still meets the established standards.

Water Source Characteristics

The results of the survey on water sources are intended to obtain information about the main water sources used by the community, namely for cooking, bathing, washing, and others. The survey results are presented in Table 2.

Table 2: Main Water Sources

Source of drinking water, cooking, and others	Sukamenanti Baru Village		Sawah Lama Village		Kota Sepang Village		Rajabasa Pemuka Village	
	Number of participants (people)	Percentage (%)	Number of participants (people)	Percentage (%)	Number of participants (people)	Percentage (%)	Number of participants (people)	Percentage (%)
Boreholes	54	84.375	25	69,4	27	75	35	100
Protected Well	5	7.8125	8	22,2	9	25		0
Rainwater	0	0		0		0		0
River	0	0		0		0		0
Local water company	5	7.8125	3	8,3		0		0
Refill drinking water	0	0		0		0		0

As seen from the data in Table 2, most of the residents in the four villages use drilled wells as their main water source. Even in the village of Rajabasa Pemuka the percentage reaches 100%. This condition occurs because drilled wells can be made with a small area of land, considering that the four villages are densely populated areas. Of course, this shows that their water needs are highly dependent on the quality and quantity of groundwater. Groundwater conditions are highly dependent on environmental conditions. Generally, groundwater contains mineral substances with high concentrations which can have a negative impact on health (Munfiah *et al*., 2013). This looks quite risky because basically the water used by the community in terms of quantity of water must continue to flow or be available and in quality, it must meet quality standards. This is explained in the Regulation of the Minister of Health Number 492 of 2010 concerning

Water Quality Requirements. In addition, waste disposal management is also a problem that can affect the quality of well water, such as waste disposal management (Adicita *et al*., 2021). At least the distance between the septic tank and the well must be 10 meters. This is necessary so that the well is not contaminated. However, if we look at some of the sample houses surveyed and interviewed by residents, most of the distance has not been reached. This is quite worrying because it poses a risk to the health of residents who use the water for cooking, bathing, washing, and others.

To obtain information related to the condition of water sources, researchers conducted a satisfaction survey of the quality of the water used. The results of the survey showed that the respondents' answers were varied, but the majority of respondents in each village stated that the water used was satisfactory and easy to obtain. The ease of obtaining a water source is because most respondents have a well as the main source for drinking, cooking, bathing, washing, and so on.

Getting enough water in the dry season

The dry season is a season where the quantity of water decreases. This condition can be a problem for residents in the four villages. In this study, an adequacy analysis was carried out based on residents' recognition and analysis of water adequacy in the following year. The data from the survey are presented in Table 3.

Table 3: Results of the water adequacy survey during the dry season

Sukamenanti Baru Village		Sawah Lama Village		Kota Sepang Village		Rajabasa Pemuka Village	
Enough	**Not enough**	**Enough**	**Not enough**	**Enough**	**Not enough**	**Enough**	**Not enough**
97%	3%	25	6%	69&	31%	100%	0

From the data in Table 3, in general, water adequacy during the dry season is good. However, if you look back, the percentage of insufficiency in Kota Sepang Village is still very high, namely 31%. In fact, the inhabitant of this village fully relies on groundwater for their daily needs (see data in Table 1). The results of interviews with several respondents from this village provide an overview of this condition. During the dry season, there are several efforts by the village community to meet their water needs, including reducing the amount of water used and asking for water from other locations, such as relatives or neighbours. Unfortunately, the community does not choose to use water from PDAM, which is a government water management company. This is because using PDAM services requires a number of costs that are considered high by the community.

Analysis of water availability in the following year

The amount of water needed in 2022 will be different from the water needs in the following year. By paying attention to population growth, the researcher calculates the amount of water needed for the next five years until 2027. How to calculate population growth, researchers use the formula for total population growth. The population growth rate based on total growth is obtained from the difference in the number of births, deaths, immigration, and emigration that occur in an area. The calculation of the total population growth rate is based on the following formulation (Radhika *et al*., 2018).

$$P_t = P_o + (L - M) + (I - E)$$

$$\% = \left((L - M) + \frac{(I - E)}{P_o} \right) x100\%$$

Information:

P_t = total population in the final year of calculation

P_o = total population in the initial year of calculation

L = number of births

M = number of deaths

I = number of immigration (number of people entering an area)

E = number of emigration (number of people leaving an area)

% = percentage of total population growth

From the formula above, the total population growth can be obtained in percentage as seen in Table 4. By knowing the percentage of population growth, it can be analyzed the amount of water demand for the next five years. The need for water increases every year in line with population growth as well as the need for access to clean water is needed to meet the needs of clean water.

Table 4: Percentage of Population Growth

Village	Total population in 2021	Total population in 2022	The difference between deaths, births, emigration, immigration	Percentage of population growth
Rajabasa Pemuka	6.976	7.156	180	2,58
Sukamenanti Baru	3.985	4.055	70	1,76
Sawah Lama	4.844	4.929	85	1,75
Kota Sepang	4.173	4.246	73	1,75

If we look at the per capita water demand data and population growth data, we can get an overview of the water demand in the next five years. The results of the water demand for the next five years for the number of samples studied can be seen in Figure 2. Figure 2 shows the increase in water demand over the next 5 years. This is directly proportional to population growth. Whereas with the increase in population, the amount of development will also increase (Dewi & Mardiansjah, 2020; Manurung *et al*., 2019). This can lead to a decrease in the quantity of water due to 1) a decrease in the land surface; 2) inhibition of groundwater absorption due to obstruction of the building above it; and 3) damage to the environment as a reservoir for water, especially during the dry season (Źróbek *et al*., 2015). Therefore, efforts are needed from the government to be able to begin to regulate the development system in order to minimize the impact that will occur.

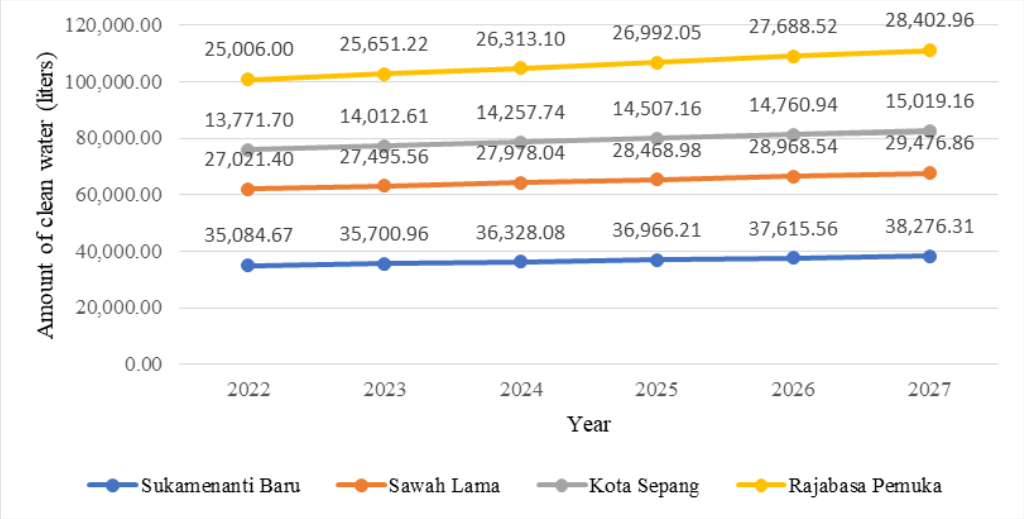

Figure 2: Graph of water demand for the next five years

CONCLUSION

Based on the results of the analysis in the previous chapter, it can be concluded that most of the water supply is met throughout the year. Among the four sub-districts of respondents, there are still some that have not met the adequacy of water, namely in the Kota Sepang sub-district, where 31% of respondents stated that there is not enough water in the dry season. This needs to be the government's attention regarding the fulfilment of water needs in the village. In addition, development arrangements need to be made because it is seen that over the next five years the number of occupations will increase so that it demands an increase in the amount of water used. Meanwhile, development, especially irregular ones, will have an impact on reducing the amount of ground water which is the main source of meeting the need for clean water.

ACKNOWLEDGEMENT

The author would like to thank all parties who helped in carrying out this research.

REFERENCES

- Adicita, Y., Suryawan, I. W. K., & Pesurnay, A. J. (2021). Analisa faktor yang mempengaruhi akses air minum dan pengelolaan tinja berbasis masyarakat di Provinsi Maluku. *Region : Jurnal Pembangunan Wilayah Dan Perencanaan Partisipatif*, *16*(1), 1. https://doi.org/10.20961/region.v16i1.40088
- Dewi, D. P., & Mardiansjah, F. H. (2020). Tingkat Aksesibilitas Pelayanan Air Bagi Masyarakat di Kawasan Padat Penduduk. *Borneo Engineering : Jurnal Teknik Sipil*, *4*(1), 45–54. https://doi.org/10.35334/be.v4i1.1103
- Enralin, J., & Lubis, R. H. (2003). *Akses Air Bersih dan Sanitasi Layak Pada Masyarakat Permukiman Kumuh Perkotaan Studi Kasus Pada Warga RW 3 Kelurahan Jembatan Besi, Jakarta Barat*. Universitas Indonesia.
- Fitria, N., & Setiawan, R. P. (2014). Identifikasi Karakteristik Lingkungan Permukiman Kumuh di Kelurahan Kapuk, Jakarta Barat. *Jurnal Teknik ITS*, *3*(2).
- Hakim, D. L. (2010). *Aksebilitas air bersih bagi masyarakat di permukiman Linduk Kecamatan Pontan Kabupaten Serang*. Universitas Diponegoro.
- Haseena, M., Malik, M. F., Javed, A., Arshad, S., Asif, N., Zulfiqar, S., & Hanif, J. (2017). Water pollution and human health. *Environmental Risk Assessment and Remediation*, *01*(03). https://doi.org/10.4066/2529-8046.100020
- Hosain, M., Pendley, C., Pervaiz, A. N., Samina, T., & Akbar, M. (1999). *Process monitoring for improving sustainability : a manual for project*

managers and staff. World Bank Regional Water and Sanitation Group South Asia.

- Ibrahim, A., & Sjarmidi, A. (2017). Pengembangan metode bioasesmen untuk penilaian kualitas air Sungai Cihampelas di DAS Citarum. *Jurnal Sumber Daya Air*, *13*(1), 37. https://doi.org/10.31028/jsda.v13.i1.37-52
- Khomarudin. (1997). *Menelusuri Pembangunan Perumahan dan Permukiman, Jakarta: Yayasan Real Estate Indonesia*. PT. Rakasindo.
- Kindler, J., & Russell, C. (1984). National Perspective in Water Demand Modeling. In *Modelling Water Demands* (pp. 207–219).
- Manurung, H., Aulia, D. N., & Bahri, S. (2019). The Impacts of Slum Structuring On The Increase In People's Quality of Life at Bagan Deli, Belawan. *Inovasi*, *16*(1), 1–10.
- Marganingrum, D., Rusydi, A. F., Santoso, H., Makhfuddin, D., Wijaya, D. P., & Nur, W. H. (2010). Konsep Pengurangan Kemiskinan Berdasarkan Analisis Kemiskinan Air. *Prosiding Geoteknologi LIPI*. http://jrisetgeotam.lipi.go.id/index.php/proceedings/article/view/731
- Masduqi, A., Mochtar, N. E., & Soedjono, E. S. (2008). Sistem Penyediaan Air Bersih Perdesaan Berbasis Masyarakat: Studi Kasus HIPPAM di DAS Brantas Bagian Hilir. *Seminar Nasional Pascasarjana VIII-ITS, Surabaya*.
- Munfiah, S., Nurjazuli., & Setiani, O. (2013). Physical and Chemical Water Quality of Dug and Bore Well in the Working Area of Public Health Center II Guntur Demak Regency. *Jurnal Kesehatan Lingkungan Indonesia*, *12*(2).
- Notoatmodjo, S. (2012). *Metodologi Penelitian Kesehatan*. Rineka Cipta.
- Radhika, R., Firmansyah, R., & Hatmoko, W. (2018). Perhitungan ketersediaan air permukaan di Indonesia berdasarkan data satelit. *Jurnal Sumber Daya Air*, *13*(2), 115–130. https://doi.org/10.32679/jsda.v13i2.206
- Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Surtiani, E. E. (2006). *Faktor-Faktor yang Mempengaruhi Terciptanya Kawasan Permukiman Kumuh di Kawasan Pusat Kota (Studi Kasus: Kawaasan Pancuran, Salatiga)*. Universitas Diponegoro.
- Turok, I., & Borel-Saladin, J. (2016). Backyard shacks, informality and the urban housing crisis in South Africa: stopgap or prototype solution? *Housing Studies*, *31*(4), 384–409. https://doi.org/10.1080/02673037.2015.1091921
- Uar, E. D. (2016). Strategi dan Tantangan Penanganan Kawasan Kumuh di Kota Ambon. *FIKRATUNA: Jurnal Penelitian Sosial Keagamaan*, *8*(2), 127–144.
- UN Millennium Development Project -New York, N. USA. T. F. on W. and S. (2004). *Achieving the millennium development goals for water and sanitation : what will it take? : interim full report*.
- Warlina, L. (2004). *Pencemaran Air: Sumber dan Dampak Penangulanganya*. Institut Pertanian Bogor.
- Zamili, M. (2015). Menghindar dari Bias: Praktik Triangulasi Dan Kesahihan Riset Kualitatif. *LISAN AL-HAL: Jurnal Pengembangan Pemikiran Dan Kebudayaan*, *9*(2), 283–304. https://doi.org/10.35316/lisanalhal.v9i2.97
- Źróbek, S., Trojanek, M., Źróbek-Sokolnik, A., & Trojanek, R. (2015). The infl uence of environmental factors on property buyers' choice of residential location in Poland. *Journal of International Studies*, *8*(3).
- Zulkarnaini, W. R., Elfindri, & Sari, D. T. (2019). Faktor-Faktor Yang Mempengaruhi Permukiman Kumuh di Kota Bukittinggi. *Jurnal Planologi*, *16*(2), 169. https://doi.org/10.30659/jpsa.v16i2.5047