International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Concept of End Water Poverty in Jabung District, Malang Regency, Indonesia

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Abstract: ***Some of the goals to be achieved by the SDGs are based on issues that are developing in all parts of the world. Often there are problems that are difficult to solve and are interrelated with one another. One of the SDGs goals is clean water and no poverty, while the condition of clean water in Jabung District causes other problems such as issues of health, welfare, to poverty. The research wants to know how the condition of clean water and poverty in Jabung District, Indonesia, so that it can provide an accurate understanding of the causes of poverty. Poverty measurement uses a clean water approach using the Water Poverty Index which combines five components, namely resource, access, capacity, use, and environment. The measurement of clean water poverty is carried out by comparisons between the non-poor and the poor, so that it can be seen the factors of clean water poverty that need to be improved and solve the poverty problem in Jabung District. The results of the analysis show the value of each component, and the components with poor conditions in Jabung District are the environment and water use. WPI conditions for poor people are worse in terms of access and capacity components, so WPI scores are lower than non-poor people. This shows that there is a need for attention to environmental conditions to solve the problem of poverty in Jabung District.***

Keywords: Clean Water, Accessibility, Rural Area, Water Poverty Index

1. Introduction

The problem of water availability and poverty occurs throughout the world until it has become a concern of UNDP [1] so that it is formulated in the 2015-2030 Sustainable Development Goals (SDGs), the first goal is "no poverty" and the sixth goal is "clean water and sanitation". The first objective is addressed because the poor do not have basic services such as health care, security, and education, experience hunger, social discrimination, and are excluded from the decision-making process. The sixth objective is to ensure that the community has access to clean water and sanitation management.

The number of poor families in Jabung District is 6,386 families or 29% of the total families in Jabung District [2]. Poverty measurement can be viewed from the condition of clean water through the analysis of the Water Poverty Index (WPI), which considers several components ranging from clean water resources, infrastructure in terms of access to clean water infrastructure, sanitation, waste, human resource capacity, water use, and the environment [3]. The problem of poverty that occurs in Indonesia is caused by social factors and infrastructure factors [4].

2. Literature Survey

The problem of poverty is a global problem that wants to be solved from the international to the local level on an urban scale. Malang Regency has a relatively high poverty rate compared to other areas in Malang Raya, namely Malang City and Batu City. Based on BPS data in Malang Regency in Figures in 2019 [5], it is known that the poverty in Malang Regency is 10,37%. The total population of Jabung District in 2019 [2] was 75.113 people, 22.275 heads of families with the number of poor families in Jabung District as many as 6.386 households or as many as 29% of poor families in Jabung District. The point of view of solving poverty is increasingly developing, not only related to the economy, but also from a broader perspective, such as the condition of infrastructure. There are 5 source of clean water used in Jabung District is divided into several different springs, such as HIPPAM, PDAM, and well water. The three water sources used that have been tested are PDAM sources, while for HIPPAM and wells the water quality has not been tested. Meanwhile, the quality of water that is suitable for consumption is water with "safe water" conditions or water that is safe for public consumption must have been treated so that it can achieve the specified quality so that it is safe for distribution and consumption by the community.

3. Methods

The scope of the research was in Jabung Subdistrict, which was divided into 15 villages, but due to constraints related to data collection in 3 villages that were self-isolating and forbidding researchers to enter, 12 villages were the study area. Determination of the number of samples using Slovinmethod [6] which is divided by proportioning the number of samples that can represent the population.

The water poverty index (WPI) is used to provide an understanding of the relationship between the physical level of water availability, convenience, and the level of community welfare [3]. The function of WPI is to identify water poverty using a combined approach between environmental, social and economic elements.

According to [7] the components used in the analysis of the Water Poverty Index are resource, access, capacity, use, environment. The resource component in terms of the water source used in Jabung District is piped water. The access component is viewed from whether the respondent can be served clean water, sanitation, and waste services. The capacity component is viewed from the condition of human resources in Jabung District such as education level, health, and income distribution. The utilization component is viewed from domestic needs and agricultural needs.

Environmental components in terms of water quality and vegetation cover in Jabung District.

The WPI calculation formula refers to the formula formulated by [2, 7], which considers the weight of the condition of the study area as shown in the following table.

Table 1: Weight of Each WPI Component

No.	Local Condition	Component Weight				
	Country Priority	R	A	C	U	E
1	Agricultural, Industry, and Social	1	2	2	3	1
2	Social	1	2	2	1	1
3	Environment and Social	1	2	2	1	2
4	Industry and Agricultural	1	2	2	2	1

Source: Sullivan, 2002

Local conditions based on the priorities of the Indonesian state are number 1 based on table 1, namely agricultural, industrial, and social. The existing condition of Jabung District is dominated by agricultural land use, so the weight that can be used is No. 1.

4. Result

Jabung District which is located in Malang Regency with an area of 13.568,55 Ha which is divided into 15 villages. The village with the largest area is GadingKembar Village, with an area of 24,47 km^2 or 18% of the total area in Jabung District. Meanwhile, the village with the smallest area is Sidorejo Village, which is 1,50 km^2 or 1% of the total area of Jabung District.

Table 2: Demographic and Poverty Conditions in Jabung District

Village	Num. of Family (KK)	Num. Poor Family (KK)	*BantuanBeras Sejahtera/* Prosperous Rice Aid(RASTRA)	*Program Keluarga Harapan/* Hope Family Program (PKH)	*KartuKeluarga Sejahtera/* Prosperous Family Card (KKS)
Kenongo	860	225	147	157	111
Ngadirejo	650	292	351	56	245
Taji	396	73	55	49	34
Pandansari Lor	1.462	198	418	127	300
Sukopuro	1.800	451	340	225	276
Sidorejo	1.067	380	589	75	405
Sukolilo	1.756	431	597	184	426
Sidomulyo	1.415	543	733	146	538
GadingKembar	1.246	582	837	163	333
Kemantren	3.537	295	252	139	44
Argosari	1.278	586	395	114	443
Slamparejo	1.480	376	57	209	-
Kemiri	1.736	928	806	252	594
Jabung	2.564	697	803	149	560
GunungJati	1.028	270	416	19	267
Total	22.275	6.327	6.796	2.064	4.576

Source: Jabung District Data, 2020

In the picture above, it can be seen that the red color shows the number of families in each village in Jabung District, the orange color shows the number of poor families. In some villages, Rastra's assistance exceeds the number of poor families. However, PKH and KKS assistance does not exceed the number of poor families.

a) Resource

Resource or water resources are water sources that are used by the community in Jabung District in each village for daily activities. Based on the survey results obtained, the water source used is piped water sourced from PDAM, HIPPAM, water company CV Mutiara Indah Jaya, and wells. Groundwater from wells that use water pumps in Jabung District used by the community has a depth of wells ranging from 10-20 meters. People who use two sources of water from piped water and groundwater, prioritize the use of piped water and groundwater using pumps from wells as an alternative if piped water has problems such as when the water stops flowing.

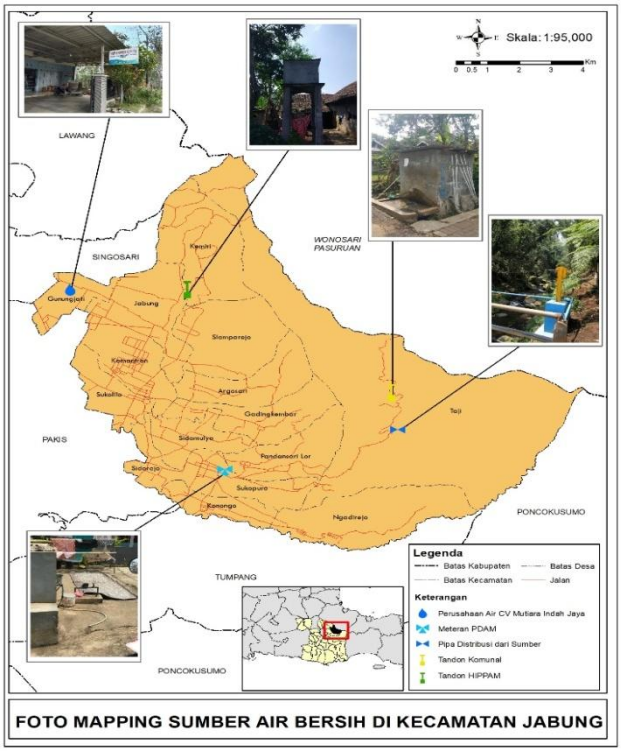

Figure 1: Photo Mapping Water Resource in Jabung District

b) Access

Accessibility variables discuss community access to settlement infrastructure, such as clean water, sanitation or septic tanks where waste water is disposed (black water), and access to latrine ownership or toilet facilities (MCK) [8] in Jabung District. The measurement of community accessibility to clean water is based on the house having access to clean water. Sanitation access owned by the people of Jabung District includes private ownership, shared use, and public use. Recorded data related to access to healthy waste includes the disposal of waste water (black water) that is disposed of in septic tanks (septic tanks), SPAL, ground pits, ponds or rice fields or rivers, gardens, and disposed of in other places.

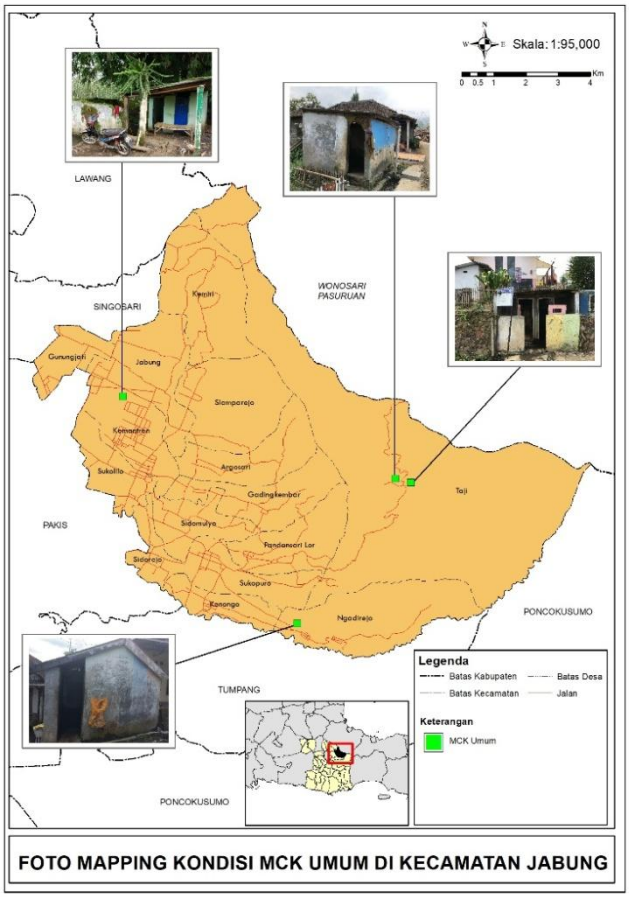

Figure 2: Photo Mapping of Sanitation Facility in Jabung District

c) Capacity

The capacity variable discusses aspects of human resources, namely the community's ability to manage clean water in terms of education level, health level, and how the distribution of expenditure with the community Gini index. Education level is measured by the number of people who take a minimum of high school education in accordance with the Decree of the Minister of Education and Culture in 2016[10] which states that compulsory education for Indonesians is 12 years. Health is measured by the number of people experiencing water-related illnesses such as vomiting, diarrhea in the past year.

d) Use

The variable of water use or use is used to find out how clean water is to meet domestic needs, as well as for agricultural activities. Agricultural activities are considered in measuring water use due to natural conditions and the livelihoods of the people of Jabung District. The condition of the use of clean water in terms of land use in Jabung District. domestic demand shows the amount of domestic water demand available for the community in Jabung District, while the existing domestic water use is the existing condition of water use by the community to meet domestic needs. The irrigation area and cultivation area were obtained from secondary data from BAPPEDA institution in Malang Regency.

e) Environment

Besides that it also considers the quality of the water used from the 4 water sources, PDAM, HIPPAM, CV. Mutiara Indah Jaya, and well water. Water quality test by measuring using the storet method, in accordance with the Decree of the Minister of the Environment No. 115 of 2003 [11] concerning Guidelines for Determining the Status of Water Quality. The water quality test is carried out by measuring several parameters such as pH, water temperature, turbidity, electrical conductivity, and dissolved oxygen.

The classification of WPI values used in the research, which divides the classification into 5 classifications [12] range value 0 – 47,9 is severe, range value 48,0 – 55,9 is high, range value 56,0 – 61,9 is medium, range value 62,0 – 67,9 is medium low, and range value 68,0 – 100 is low poverty index.

After collecting data and analyzing the Water Poverty Index, each WPI component value was obtained in the non-poor and non-poor samples. The determination of the classification of WPI values refers to [12].

Table 3: WPI in Jabung District Non Poor and Poor Samples

Village	Non Poor							Poor						
	R	A	C	U	E	WPI	Classification	R	A	C	U	E	WPI	Classification
1	100	68,33	80,00	26,50	57,00	59,24	Medium	100	69,00	64,00	26,50	57,00	55,83	High
2	100	69,33	81,00	26,50	59,50	59,96	Medium	100	48,00	65,00	26,50	59,50	51,67	High
3	100	73,00	85,00	34,50	54,00	63,72	Medium Low	100	53,33	69,00	34,50	54,00	55,80	High
4	100	72,33	70,00	31,50	67,50	60,74	Medium	100	58,67	75,67	31,50	67,50	58,96	Medium
5	100	76,67	85,00	33,00	56,00	64,26	Medium Low	100	70,00	69,00	33,00	56,00	59,22	Medium
6	100	72,67	70,00	34,00	69,00	61,81	Medium	100	59,00	76,00	34,00	69,00	60,11	Medium
7	100	73,67	78,00	35,00	67,00	63,93	Medium Low	100	67,67	69,67	35,00	67,00	60,74	Medium
8	100	74,33	70,00	40,50	43,50	61,52	Medium	100	69,33	70,33	40,50	53,50	61,59	Medium
9	100	68,33	82,00	28,00	41,50	58,46	Medium	100	42,33	69,67	28,00	41,50	49,94	High
10	100	70,00	77,00	29,50	52,50	59,44	Medium	100	65,33	65,67	29,50	52,50	55,89	High

Village	Non Poor							Poor						
	R	A	C	U	E	WPI	Classification	R	A	C	U	E	WPI	Classification
11	100	72,00	72,00	29,00	48,50	58,17	Medium	100	76,33	65,67	29,00	48,50	57,72	Medium
12	100	72,67	75,00	26,00	36,50	56,65	Medium	100	69,00	64,00	26,00	36,50	53,91	High

Source: Analysis, 2020

NB: 1) VillageNgadirejo; 2) Village Taji; 3) Village Pandansari Lor; 4) Village Sukopuro; 5) Village Sidorejo; 6) Village Sukolilo 7) Village Sidomulyo; 8) VillageGadingKembar; 9) Village Kemantren; 10) Village Argosari; 11) Village Kemiri; 12) Village Gunungjati

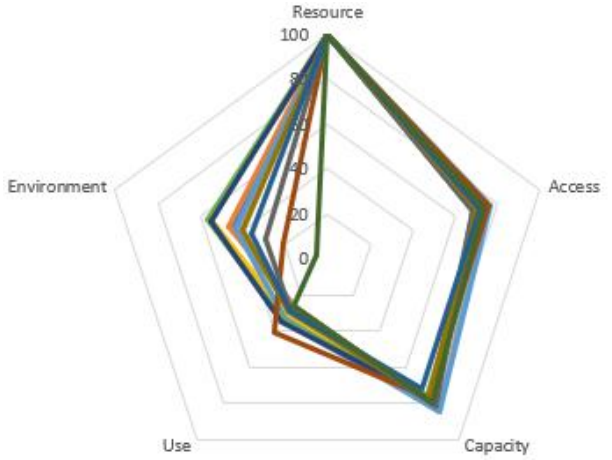

Figure 3: WPI Non Poor

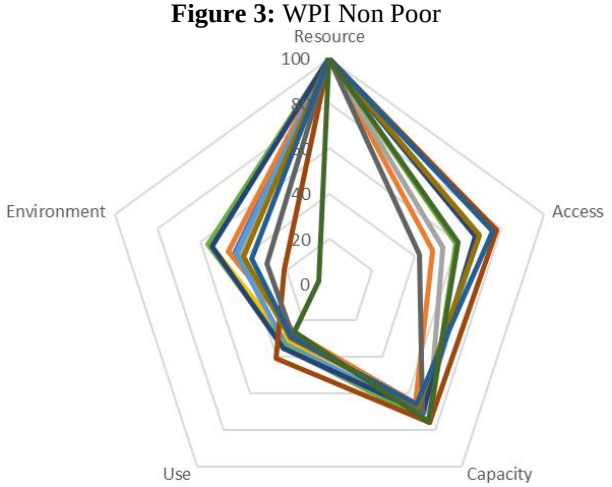

Figure 4: WPI Poor

Based on figure 3 and figure 4, it can be seen that there are differences between non-poor WPI and poor WPI. From the 5 WPI components, it can be seen that there are differences in access, capacity, and use components. The condition of the different components causes the poor sample to have a worse WPI value than the non-poor WPI sample. In the non-poor sample, WPI is classified as medium and medium low, while for the poor sample, it is classified as medium and high.

In the non-poor sample, the village with the highest WPI value was Sidomulyo Village of 63,93, and the lowest WPI value was Gunungjati Village of 56,65. Meanwhile, in the poor sample, the village with the highest WPI value was Kemantren Village of GadingKembar Village of 61,59, and the lowest WPI value was Taji Village of 51,67.

The pattern of the results of the WPI analysis on the non-poor and the poor is not too different. The main problem that obvious is the difference between the non-poor and poor samples in access, capacity, and use components.The poor sample with access, capacity, and use conditions has lower access than the non-poor sample. So that efforts to alleviate the problem of poverty in clean water can be prioritized for the poor, such as improving community access components to sanitation and domestic waste treatment which will also affect the condition of use and environment components. With these efforts, the problem of clean water poverty can be reduced.

5. Conclusion

The number of poor people in Jabung District, which is quite large, has received assistance from the government in the form of RASTRA, PKH, and KKS. Among the three aids from the government, not all of them reach the poor in Jabung District. So that the people of Jabung District must be able or empowered to get out of the poverty problems. If the community is able to solve the problem of poverty, the Jabung District can achieve the first UNDP (2015) goals, namely "No Poverty".

Based on the results of the analysis, it can be seen that the bad components in Jabung District and affect the WPI value, namely for components of access, capacity, and use. These components can be used as a reference to solve the problem of poverty in Jabung District, so that the problem can be solved on target.

WPI is an analysis that combines several things not only related to economic poverty, but also human resource factors, as well as infrastructure based on access to clean water infrastructure. The lowest WPI condition for the poor is classified as high, which means that the poor have problems with the low capacity of the community, as well as limited access for the poor to have access to infrastructure. If this is allowed to continue, it can result in the problem of poverty which is not immediately resolved and the welfare of the community does not increase. This has an impact on people who will continue to depend on assistance from the government and are less empowered.

6. Future Scope

The research understands several things that need to be perfected for future research, such as research conducted on the scope of all villages in Jabung District. In addition, it is related to the application of the theory of measuring the clean water poverty index (WPI) such as in measuring water quality by adding quality parameters both chemically and physically.

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