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THE IMPACT ANALYSIS OF A WASTE TREATMENT PLANT ON ENVIRONMENTAL QUALITY

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Abstract. Pollution and deterioration in environmental quality are influenced by many factors, one of which is the existence of industrialization in various sectors of the economy. Industrial pollution is an industrial activity that causes a decrease in environmental quality because of the pollution of substances produced into an environment. Any waste should not be a problem if managed properly, but if there is limited funds in a company and lack of concern for industrial entrepreneurs, then the waste is not managed. The purpose of this study is to determine the impact of the construction of B3 waste treatment plants on environmental quality. This research was carried out in the Village of Lakardowo, Jetis District, Mojokerto Regency. Data collection was carried out for 2 months from October to November 2018. Variable analysis of the impact of sewage treatment plants on environmental quality included water and soil analysis carried out at the Jember Polytechnic BioSains Laboratory and odor around the waste treatment plant with survey methods to the surrounding community.

Keywords. *Air, environment, land, residue,*

1. Introduction

Environmental factors have an important role in the quality of life of the community. A clean, healthy and beautiful environment has a huge influence on the pattern and comfort of living in a community. Environmental conditions directly or indirectly have an impact on people's living standards both in terms of social, economic, educational and other sectors. For this reason, good environmental quality must always be maintained and maintained so as not to decrease in terms of quality. Pollution and deterioration in environmental quality are influenced by many factors, one of which is the existence of industrialization in various sectors of the economy. In terms of the interests of a nation's economy, industrialization is indeed important for the continuity of high economic growth and stability. However, industrialization is not the final goal, but only is one strategy that must be taken to support the economic development process in order to achieve a high level of per capital income.

Industrial pollution is an industrial activity that causes a decrease in environmental quality because the amount of pollutants produced into an environment, namely land, water and air in the form of waste or by-products from industrial production processes in the form of dust, liquid or gas that can cause pollution [1]. Any waste should not be a problem if it is managed properly but if there is limited funds in a company and lack of concern for industrial entrepreneurs, then the waste is not managed [2]. Based on the Government Regulation of the Republic of Indonesia Number 101 of 2014, the definition of Hazardous and Toxic Waste is defined as the remainder of a business and/or activity containing substances, energy, and/or other components due to its nature, concentration and/or amount, both directly and indirectly directly, can pollute and/or damage the environment, and/or endanger the

environment, health, and the survival of humans and other living things. One of the major environmental problems facing the world today is pollution of soil, water, and air contaminated by chemicals [3]. Some examples of industrial waste research on environmental changes that have been widely studied include Suhartono's research [4] regarding the identification of coastal water quality due to domestic waste in East Monsoon; Megarini *et al.* [5] namely the effect of liquid waste from hotels in Kupang on turbidity and oil and fat at several points of water samples; Darmawan and Masduqi [6] regarding the index of sea water pollution in the northern coast of Tuban; Rezka *et al.* [7] Water pollution by domestic, agricultural and industrial waste from activities on land and at sea; Muammar *et al.* [8] Industrial waste in the Tallo River to Port Paotere has affected lead concentrations in water, fish, and soil. According to Pohan *et al.* [9] Declining water quality is characterized by changes in water color and odor. The purpose of this study is to determine the impact of the construction of waste treatment plants on environmental quality.

2. Methods

This research was carried out in the Village of Lakardowo, Jetis District, Mojokerto Regency. Data collection was carried out for 2 months from October to November 2018. Data collected in the form of primary and secondary data with variable impact analysis of the construction of a B3 waste treatment plant on environmental quality includes soil and water analysis carried out at the Jember Polytechnic BioSains Laboratory and smell around the factory waste treatment with survey methods to the surrounding community. Monitoring of groundwater quality for initial environmental hue conditions is taken at 1 (point) of the monitoring location, namely the groundwater of the population in the nearest settlement from the location of the PPSLI plan used for community clean water sources. The parameters observed included physical and chemical parameters (organic and non-organic) and microbiology. The quality standard of groundwater quality used as a standard measure is referring to the Republic of Indonesia Minister of Health Regulation Number 12 of 2017 concerning Standard Environmental Quality Standards for Media Water for Sanitary Hygiene Needs.

3. Experiment Results and Discussion

The results of the impact on water quality are shown in Figure 1. These results are based on perceptions that occur in the Lakardowo village community, who feel and are directly involved in consuming water. So that there are changes in the quality and quantity of water, although a little, can still be directly felt by the surrounding population.

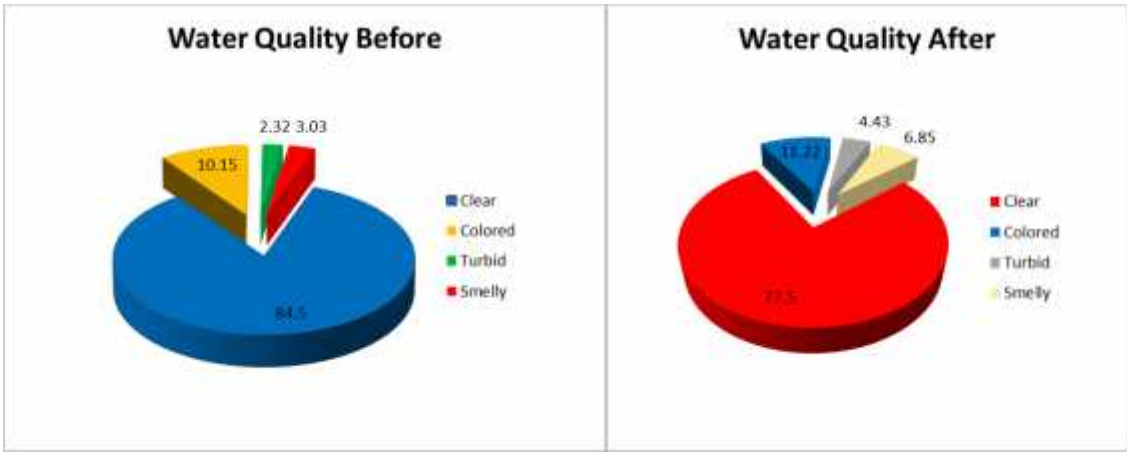

Figure 1. Water Quality Before and After There is a waste treatment plant

Based on the results above, it can be seen that there is a decrease in water quality in Lakardowo Village by 7% accompanied by the appearance of water that smells. The percentage value of clear water before the presence of a sewage treatment plant of 84.5 percent clear water changed to 77.5 percent. This decrease is allegedly due to the influence of the conditions of underground assistance as in the 2017 report from the audit of the environmental team from Brawijaya University stating that high-smelling and colored water is caused more by the nature of the local underground water so it cannot immediately be concluded that the change was due to the presence of a waste treatment plant. According to Sulistiowati and Wardhani [9] several factors that cause water congestion are determined by suspended fine objects, microorganisms which are planktons and water colors caused by colloidal substances derived from extracted organic materials. This is also supported by testing of water and soil samples taken from several points in the research location. The test results on the obtained water samples are shown in table 1.

Table 1. Reports on the results of testing of water samples

No	Test Parameter Type	Unit	Content in the sample (Water Source)	Method Analysis / measuring instrument
1.				
1)	*E. Coli*	Cfu/ml	255	Metode APM SNI 01-2897-1992
2)	Total Coliform Bacteria	Cfu/100ml	>1100	
3)	Total Salmonella Bacteria	Cfu/ml	6	
2.				
1)	Nitrite (as NO2-)	mg/L	250	Kjedalh
2)	Nitrate (as NO3-)	mg/L	300	
3)	Iron (Fe	mg/L	27,550	Oksidasi basah HNO3+HCLO4, AAS, flamephotometry
4)	Chhloride (Cl)	mg/L	17,188	
5)	Zinc (Zn)	mg/L	*nd*	
6)	Copper (Cu)	mg/L	*nd*	
7)	Sulphate (SO4)	mg/L	232,192	Spectrometry
8)	Ammonium (NH4)	mg/L	100	Kjeldalh
9)	Boron (B)	mg/L	0,031	Spectrometry
10)	Hardness (CaCO3)	mg/L	470,327	Titrimetry
11)	TDS *(Total dissolved*	mg/L	0,577	TDS
12)	pH	-	6,98	pH Meter

Note: nd: no detected

Testing of water and soil samples was carried out at the State Polytechnic Laboratory of Jember. The report on the results of testing of soil samples is shown in table 2. In addition to the two tests, also tested the residues in the soil, the results of which are presented in table 3.

Table 2. Report on the results of testing soil samples

Analysis Parameters	Unit	Analysis results	Analysis Method
Lead (Pb)	%	0,001	Wet oxidation, HNO_3+$HClO_4$,AAS, Flamephotometry
Copper (Cu)	%	*nd*	Wet oxidation , HNO_3+$HClO_4$,AAS, Flamephotometry
Iron (Fe)	%	2,331	Wet oxidation, HNO_3+$HClO_4$,AAS, Flamephotometry
Zinc (Zn)	%	*nd*	Wet oxidation, HNO_3+$HClO_4$,AAS, Flamephotometry
Nitrate (as NO3-)	%	0,565	Kjedalh
Ammonium (NH4)	%	0,165	Kjedalh

Note: *nd = Not Detected*

Table 3. Report on the results of testing of residues in the soil

No	Area (%)	Retention Time (minutes)	Name of Compound	Information*)
1.	40.78	16.529	Hymexazol	• Pesticide (fungicide) • Water pollution potential • Ecological toxicity
2.	18.98	1.825	Triadimefon	• Pesticide (fungicide)
3.	17.41	13.053	Dimethipin	• Pesticide (herbicide)
4.	15.92	25.545	Dibutyl Phthalate; 1,2-Benzenedicarboxylic acid, dibutyl este	• Plasticizer (solvent) for resin synthesize, • Insoluble in water, • Produced by adhesives, sealants, Plastic, rubber products, • Decomposed by heating
5.	2.67	31.120	Aldicarb	• Insecticide, acaride, nematocide • dangerous poison
6.	2.52	33.498	Prohydrojasmon-1	• Pesticides, antiparasitic agents, antineoplastic agents, material for coating,
7.	1.52	31.671	Cyromazine	• Insecticide derivated from melamine
8.	0.18	32.617	Methoprene	• Insecticide (pesticide) does not kill the insects, • Used to againts the growth of insects

9.	0.03	1.558	Dazomet ; 3,5-dimethyl-1,3,5-thiadiazinane-2-thion	• Soil fumigant • Acts as herbicide, fungicide and nematocide

Note: *) Detailed information about Safety and Hazards from the above compounds can be seen at:
https // pubchem.ncbi.nlm.nih.gov/compound/

The next test carried out was observation of the water discharge available at the wells of the residents of Lakardowo Village to see the quantity of water. The results of the observations can be seen as in Figure 2. Based on the analysis that has been carried out, that the quantity of water in the village of Lakardowo also decreased after the existence of the factory, from 81% to 78%. Given that this village was previously included in a dry village which is difficult to obtain water, it can be concluded that there is no impact on the existence of a factory to reduce the quantity of water. The reduction in water supply is more due to the fact that during the research it was still included in the dry season, therefore it was not caused by the activity of the waste treatment plant.

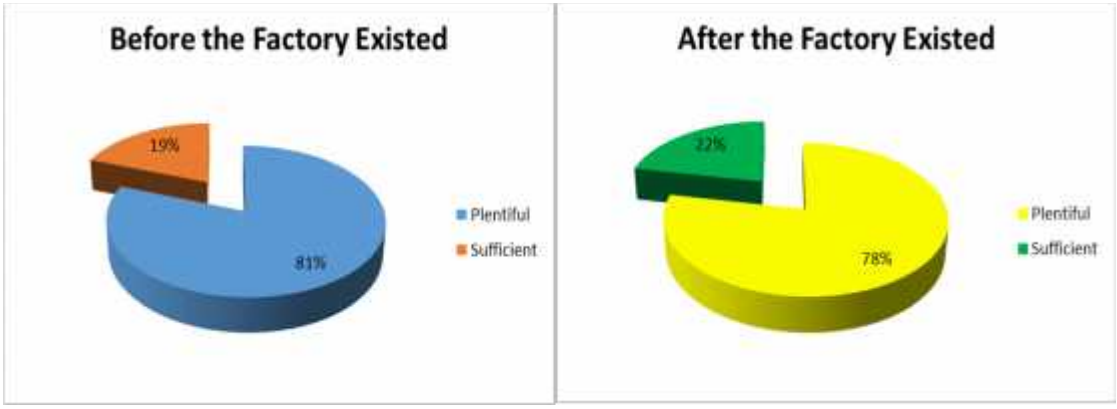

Figure 2. Water Quantity Before and After There is a waste treatment plant

The impact on air can be seen in Figure 3, it can be seen that people who smell and people who smell fresh are 49% and 46.36%. This air condition shows that in the Lakardowo village area there was no significant impact from the waste treatment plant.

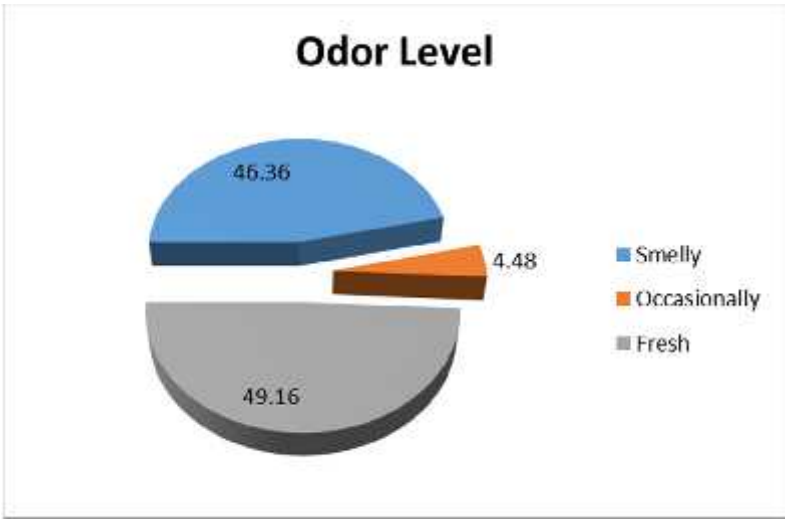

Figure 3. Impact of air odor

4. Conclusion

The impact of the processing of waste plants in Lakardowo Village quantitatively does not significantly affect environmental change. This is based on the results of the analysis of the impact of the quality and quantity of water, soil and the impact on air (odor).

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