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Submission date: 09-Jan-2023 08:13AM (UTC+0700)

Submission ID: 1989936171

File name: tion_of_Waste_Pollution_from_Bolu_Animal_Market_in_Indonesia.pdf (96.04K)

Word count: 3737

Character count: 19740

Community Perception of Waste Pollution from Bolu Animal Market in Indonesia

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Received August 29, 2022; Revised November 11, 2022; Accepted December 22, 2022

Cite This Paper in the Following Citation Styles

(a): [1] Sitti Nurani Sirajuddin, Amidah Amrawaty, Siti Nurlaelah, Nur Dwiana Sari Saudi, "Community Perception of Waste Pollution from Bolu Animal Market in Indonesia," *Environment and Ecology Research*, Vol. 10, No. 6, pp. 749 - 754, 2022. DOI: 10.13189/eer.2022.100610.

(b): Sitti Nurani Sirajuddin, Amidah Amrawaty, Siti Nurlaelah, Nur Dwiana Sari Saudi (2022). *Community Perception of Waste Pollution from Bolu Animal Market in Indonesia*. *Environment and Ecology Research*, 10(6), 749 - 754. DOI: 10.13189/eer.2022.100610.

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Abstract The existence of the Bolu animal market, Indonesia is not only a source of local revenue from market levies, but also a tourist attraction for both domestic and foreign tourists so that the animal market needs to be managed including the waste produced from livestock that is marketed. This study aimed to determine public perceptions of waste pollution from the Bolu Animal Market, North Toraja Regency, South Sulawesi Province, Indonesia. This research was conducted from May 2022 to July 2022. The type of research used was descriptive research. The number of samples used in this study was 22 respondents using the purposive sampling method or those chosen intentionally. The data collection methods used were observation and interviews. The analysis of the data used was descriptive. Based on the results of the study, the perception of the community around the Bolu Animal Market shows that the average community is disturbed due to waste from the animal market in terms of air pollution and fecal waste that has not been appropriately managed, which can interfere with public health.

Keywords Public Perception, Bolu Animal Market, Feces, Buffalo, Pollution

1. Introduction

The high demand for buffalo at this time is because

traditional parties held by the Toraja people are often carried out, so it is expected that the main buffalo farming business can develop [1,2]. Livestock is also profitable and a source of income for many others, but livestock activities often generate waste. The waste can cause environmental pollution. The existence of an animal market is necessary to assist traders in buying and selling livestock. Public perception of the existence of the animal market, including its waste, also greatly affects the success of marketing in the animal market [3]. Perception is a direct reaction (acceptance) to something known through one's five senses [4]. Perception plays an essential role in doing something, influencing human thinking and behavior so that it can encourage decisions about what to do. The assessment of something is strongly influenced by the perception given to it and can be assessed negatively or positively depending on the perception [5]. The word perception represents a series of "psychological constructs, including knowledge, belief, attitude, involvement, concern, and risk observed" [6].

Buffaloes are the most important animal for the Toraja, an ethnic minority on the Indonesian island of Sulawesi. For the Toraja people, the buffalo is the most important animal in their social life. Buffalo, or Tedong in the local language, cannot be separated from people's daily lives. Buffaloes are also the main animals at parties and ceremonies [7]. The rambu tuka' (thanksgiving party) and rambu solo' (death party) ceremonies are parties that require buffalo to be slaughtered and consumed. People slaughter more buffalo at death parties than at weddings

[8,9].

One of the attractions of North Toraja is the existence of the Bolu Animal Market. Bolu Animal Market, Tallunglipu District, North Toraja Regency, is one of the markets with its characteristics in North Toraja Regency. Buffalo marketing activities occur every six days a week while the livestock market consists of local buffalo, buffalo from other regions and pigs. The existence of the animal market is not only a source of local revenue from market levies but also a tourist attraction for both domestic and foreign tourists [3].

Bolu Animal Market is the largest selling center for buffalo in Asia, which has facilities in the form of cages used by traders to put their livestock if the buffalo have not been sold. The number of buffalo sold is about 500 heads/day on every market day. According to [10], a buffalo can produce about 25 kg/day of feces. Therefore, the Bolu Animal Market is estimated to produce around 12,500 kg/day of buffalo feces. This large amount of buffalo feces causes the environment around the Bolu Animal Market to become dirty and polluted, making people uncomfortable with it. The production of faeces continues to increase as we approach Christian celebrations such as Christmas and New Year's Day. Buffalo feces in the Bolu Animal Market have not been used optimally because much waste is still around the cattle pens, which disturbs community settlements.

The settlements at the Bolu Animal Market are very densely populated, so many are affected by this market, especially food stalls, which are disturbed by the presence of piles of waste left unattended. So it is necessary to research the waste management strategy of the Bolu Animal Market, North Toraja, by knowing in advance about the perceptions of the community towards waste from the Bolu Animal Market, North Toraja Regency, Indonesia.

2. Materials and Methods

The research was carried out from June 2022 – August 2022 at the Bolu Animal Market, North Toraja Regency, South Sulawesi Province, Indonesia. This area was chosen as the research location because it is a center for selling

buffalo in Toraja, producing much livestock waste (feces). Descriptive research explains the characteristics and phenomena of the population that is the object of study. The illustrative method focuses on presenting the research so that events will answer this research. Descriptive-type research is not intended to test hypotheses. The types of data used in this study are quantitative and qualitative. While the data sources used are primary data and secondary data. The data collection method used is direct observation of the community around the Bolu Animal Market, North Toraja Regency, and interviews, namely data collection by conducting direct interviews with the community around Bolu Animal Market, North Toraja Regency using a data collection tool, namely a questionnaire.

The population is people who live around the Bolu animal market. The sample to be taken is a sample that represents the entire population around the Bolu Animal Market, as many as 22 respondents. The sampling technique of this research is purposive sampling (deliberate sampling) with a distance of 1–100 m from the location of the Bolu Animal Market. Analysis of the data used in the study of public perceptions of livestock waste (faeces) at the Bolu Animal Market, North Toraja, using descriptive analysis methods. According to [11], descriptive analysis is the simplest but powerful enough to explain the relationship between variables. Therefore, descriptive analysis was cross-tabulated to provide a complete picture of the relationship between variables.

3. Result and Discussion

Public Perception of Air Pollution

Air pollution is caused by methane gas, which causes unpleasant odors from the Bolu Animal Market to disturb people. The smell is sometimes continuous, sometimes even smelled, depending on the distance of the house from the market and the direction of the wind. The level of public perception of air pollution at the Bolu Animal Market can be seen in Table 1.

Table 1. Level of Public Perception of Air Pollution

Indicator	Answer Category	Score	Number of Souls	Total	Percentage (%)
Air Pollution	a. very disturbed	5	-	-	-
	b. disturbed	4	4	16	18,2
	c. quite disturbed	3	9	27	40,9
	d. no disturbed	2	8	16	36,4
	e. very undisturbed	1	1	1	4,5
Amount			22	60	100

Source: Primary Data, 2022

Table 1 shows that the public's perception of air pollution has the highest percentage, namely 40.9% in the moderately disturbed category and 36.4% in the undisturbed category. People feel quite disturbed by the smell caused by livestock faeces, but some people are not bothered by the smell from the market because they are used to this situation. This is in accordance with the opinion of [12] that livestock businesses can cause odors from feces containing high ammonia gas. In addition, some people who live around the livestock business are not disturbed because they are used to the farm's existence and provide benefits to the surrounding community. People in the vicinity of the livestock pen area smell the bad smell of disturbing livestock faeces. The presence of livestock businesses in residential areas will cause various negative impacts that can be felt by the community, such as the impact of the smell of feces and ultimately invite many flies into the house. However, the presence of the negative impact of the smell does not bother some people too much because of the good social relations carried out by the livestock owners to prosper and help the people living in the farm area. The community from the farm feels many negative impacts, but the community can also accept them as if they are used to the situation [13]. Farmers' lack of interest in using livestock faeces causes pollution of settlements due to unpleasant odors. Unprocessed feces cause air pollution, namely unpleasant odours, water pollution and disease. Livestock can cause air pollution due to the pungent smell of ammonia gas generation, which is harmful to the human body. Ammonia gas at a concentration of 40 ppm begins to cause headaches, nausea and loss of appetite in humans. The unpleasant odour from the release of ammonia gas can affect the health of local residents if it continues to be ignored [14].

Public Perception of Water Pollution

Water pollution can be caused by livestock activities, such as at the Bolu Animal Market, which causes cloudy and smelly water so that people feel disturbed. The stench in the water is sometimes continuous, sometimes there and not even sometimes it doesn't smell depending on the distance of the house from the market. However, for drinking water needs for the people who live around the Bolu animal market, they use water from PDAM. The level of public perception of water pollution at the Bolu Animal Market can be seen in Table 2.

Table 2 shows that the public's perception of water pollution is obtained by the highest percentage, namely 100% in the undisturbed category. People who live around the Bolu Animal Market have water that is not polluted by market activities because they use PDAM (Regional Drinking Water Company) water. This is in

accordance with the opinion of [15] that PDAM water provides clean water that has been processed by regional companies that can be consumed or drunk. PDAM water provides raw water sourced from water treatment through chemical, physical, and bacteriological processes so that the water obtained can be directly consumed and drunk. The phenomenon of water source pollution will risk access to clean water sources and have an impact on the processing of clean water by the Regional Drinking Water Company (PDAM). In line with this phenomenon, the increase in water pollution in water sources is caused by the high content of organic matter. This condition has the potential to increase operating costs. The consequence of rising operational costs due to increased river pollution is the possibility to occur in PDAMs in Indonesia. Sources that cause river water pollution and increase pollution load include industrial waste, household waste and agricultural waste. In addition to pollutants, changes in weather and land use also affect the quality of river water and the burden of pollution. Therefore, monitoring water quality and pollution load is a consideration in controlling water pollution [16]. Water is a chemical compound that is very important for the life of living things. The best water to drink is clean water. Water is said to be clean if it is colorless, smells, tastes, and is not contaminated with harmful substances or pathogens. Clean water is crucial for survival, so it is necessary to maintain the availability of clean water. In addition to well water, the community also uses PDAM for their daily clean water needs. PDAM is a regional company that provides clean water, supervised and monitored by the regional executive and legislative officials [17].

Public Perception of Faecal Waste from Bolu Animal Market

Fecal waste is buffalo dung waste in the Bolu Animal Market in very abundant quantities. This fecal waste is piled chiefly behind the cage and in the drain. If left alone, this fecal waste will pollute the environment, such as air and water pollution, based on the distance from people's homes (1-100 m). The level of public perception based on the distance of the house from the Bolu Animal Market can be seen in Table 3.

Table 3 shows the community's perception of fecal waste based on the distance from the community's house, and the highest percentage is 45.5% at a distance of 1-50 m and 22.7% at a distance of 51-100 with the category of moderately disturbed. The faeces in the Bolu Animal Market have often been cleaned but not completely, so there is often a strong smell from a distance of < 250. This is in accordance with [18] that the farm's location is around a residential area only a few meters from the farm, so there is a strong smell of fecal waste. The distance of residential residents from the farm is at least 250 m.

Table 2. Level of Public Perception of Water Pollution

Indicator	Answer Category	Score	Number of Souls	Total	Percentages (%)
Water Pollution	a. very disturbed	5	-	-	-
	b. disturbed	4	-	-	-
	c. quite disturbed	3	-	-	-
	d. not disturbed	2	22	44	100
	e. very undisturbed	1	-	-	-
Amount			22	44	100

Source: Primary data, 2022

Table 3. Level of Public Perception of Faecal Waste Based on Distance from House

distance (m)	category	Score	Amount of soul	Total	Percentage (%)
1-50	a. very disturbed	5	-	-	-
	b. disturbed	4	4	16	18,2
	c. quite disturbed	3	10	30	45,5
	d. not disturbed	2	-	-	-
	e. very undisturbed	1	1	1	4,5
51-100	a. very disturbed	5	-	-	-
	b. disturbed	4	-	-	-
	c. quite disturbed	3	5	15	22,7
	d. not disturbed	2	2	4	9,1
	e. very undisturbed	1	-	-	-
Amount			22	114	100

Source: Primary data, 2022

Faeces can cause air pollution and flies that interfere with activities and will become disease vectors. Sales of food vendors will also decline due to odour and flies. The causes arising from the conflict between the distance between the farm and the community settlements are relatively close to around 50-250m, causing environmental pollution and disrupting community activities. Therefore, the village government makes a new rule that the distance between cattle pens and settlements is at least 500m. Farmers must process livestock waste, such as being obliged to give medicine to livestock faeces so that it does not smell and must always establish communication with the surrounding community to find out existing problems [19].

Indiscriminate disposal of livestock waste on agricultural land, direct disposal into waterways, and penetration into groundwater is a major problems for human and animal health because livestock faeces contain many pathogens. In addition, livestock faeces are a source of unpleasant odour from cattle pens, storage and use of faeces in the field. The intensity of the stench is often disturbing, especially for people around residential areas. Livestock faeces are generally associated with human and animal health problems if not appropriately managed

[20,21].

2) With no management of feces which is waste from the Bolu Animal market, North Toraja Regency, it is necessary to involve the government in this management. This is in accordance with the opinion of [22] that so, it is advisable to propose the international classification of information on the state of pretrial investigation of air pollution by the following criteria: 1) country of emissions; 2) the area of distribution of emissions; 3) pollution level; 4) identification of perpetrators; 5) calculation of damage to atmospheric air; 6) expediency of carrying out environmental regenerative activities; 7) transfer of the case to court. In order to solve the identified problems, the following six objectives of the proposed reforms can be provisionally confirmed: 1) making investigations and prosecutions more efficient by updating the scope of the Directive; 2) clarification or elimination of vague terms used in the definition of environmental crimes, pre-trial investigation stages; 3) ensuring effective, convincing and proportionate types and levels of sanctions for environmental crimes; 4) facilitating cross-border investigations and prosecutions; 5) improving informed decision-making on environmental crimes by introducing a consolidated collection and

dissemination of statistics; 6) increasing the operational efficiency of national law enforcement chains to stimulate investigation, prosecution and imposing sanctions.

4. Conclusion

Most of the public's perception of waste pollution at the Bolu Animal Market, North Toraja, is quite disturbed by the smell from the market. Some people also think they are not disturbed because they are used to the situation. The community is also not disturbed because the community uses PDAM water. However, the presence of buffalo waste in the Bolu Animal Market disturbs people whose houses are 1-100 m apart because they have not been appropriately managed and can be a source of disease. Therefore, it is better if the Bolu Animal Market in North Toraja pays more attention to the cleanliness of its livestock waste so as not to disturb the surrounding community's health. It is necessary to manage waste so that livestock waste does not just pile up around the Bolu Animal Market, North Toraja.

Conflict of Interest

None

Financial Support

None

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