GEOGRAPHICAL INFORMATION SYSTEM FOR TEMPORARY SHELTERS IN SEKERNAN SUBDISTRICT MUARO JAMBI REGENCY

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ABSTRACT

Background: *The population of Sekernan Subdistrict in 2020 is 45.207 people, with the development of an increasing population, it will affect the increase in the amount of waste scattered in illegal locations, so it is increasingly necessary to improve the availability of Temporary Waste Shelters.*

Objective: *The purpose of this study was to analyze and to map temporary waste shelters in Sekernan Subdistrict, Muaro Jambi Regency..*

Method: *Descriptive research with the results of mapping temporary waste shelters based on Global Positioning System and Geographic Information System, data using total sampling in Sekernan Subdistrict. The data analysis used is descriptive analysis and is presented in the form of output in the form of maps and tabulation of data.*

Results: *The results showed that in Sekernan Subdistrict there are 24 illegal temporary waste shelters, more than half with a waste volume of 0.1-3.5 m3 (54.17%), most of them are located near neighborhood roads (83.33%), and most of them are located at high population density levels (75%). Furthermore, according to SNI 19-2454-2002, the minimum standard is 180 legal temporary waste shelters in Sekernan District.*

Conclusion: *The minimum standard for temporary waste shelters in the Sekernan Subdistrict is 180 points, which can be mapped based on population density figures and qualified land availability.*

Keywords: *analysis, mapping, temporary waste shelters*

INTRODUCTION

The population growth rate in an area will have a direct or indirect impact on the level of community needs in various aspects of life, the more demand it will raise new problems, or old problems that are not resolved, such as the increasingly numerous and complex waste problems, especially in developing countries such as Indonesia. Both by number, type, and volume of waste will continue to increase in proportion to the rate of population growth and increased use of various technologies and socio-economic activities in the community. Waste is the remnants of daily human activities in the form of a solid, this is in accordance with the definition expressed in the Waste Management Law No. 18 of 2008, can be in the form of

organic, inorganic, and hazardous and toxic waste.[1,2]

Improper waste collection and processing methods will increasingly have an impact on environmental conditions that become dirty and irregular, environmental pollution occurs which is harmful to humans and ecosystems, becomes a chain of disease transmission, air pollution occurs as a result of the process of burning waste or the existence of long-term waste piles, pollution of ground and surface water, damage to the beauty of the environment, and will produce unpleasant odors. Nationally, the waste problem has become a major problem and has been prioritized to find solutions for many years, both by government agencies, private institutions, and non-governmental organizations. One of the first factors that can be improved is how to regulate the pattern of temporary waste shelters in the community. A sufficient number of temporary waste shelters must be available to accommodate the increasing amount of waste every day. If there are not enough temporary waste shelters, it will result in the practice of dumping waste in the wrong place (illegal temporary waste shelters).[3]

Geographic information system is a computer-based system that can handle geo-referenced data, which consists of entering data, managing data, manipulating and analyzing data, and producing an output that can then be used as a reference in decision making. At present, GIS is growing rapidly and has been applied to every aspect of life, such as education, environment, health, geography, and so on. If implemented in the aspect of waste problems, then GIS plays a role in mapping the location of temporary waste shelters that can be accessed quickly, easily, and accurately.[4,5,6]

Muaro Jambi Regency is one of the districts located in Jambi Province with an area of 5,246 km2 which has eleven subdistricts, one of which is Sekernan Subdistrict. Recorded in 2020, Sekernan Subdistrict consists of 16 villages, 49 hamlets and 162 RT and has a population of 45,207 people consisting of a male population of 23,320 people and a female population of 21,887 people. With the increase in population development that continues to increase, it will definitely affect the increase in the amount of waste generation. So the more necessary waste management patterns including related to temporary waste shelters.[7,8]

The results of observations in Sekernan Subdistrict, some people still tend to have the habit of disposing of waste not in temporary waste shelters. This can be proven by the fact that there are still many people who dispose of garbage around the house yard, on the edge of the ditch, on the side of the road to burn garbage, and it was found that there were at least 3 (three) illegal temporary waste shelters. To facilitate the relevant agencies in solving waste problems, especially at the illegal temporary waste shelters, it is

necessary to obtain information in the form of geographical and demographic mapping that can be used as a reference in decision making with relevant stakeholders on how to improve the pattern of distribution/mapping of temporary waste shelters in Sekernan Subdistrict in accordance with the level of need and affordability for the wider community both in terms of quantity and feasibility.

METHOD

This research is a descriptive study and is in the form of mapping temporary waste shelters based on Global Positioning System and Geographic Information System data. This research was conducted in the area of Sekernan Subdistrict, Muaro Jambi Regency. The Indonesian Landform Map of Sekernan Subdistrict was used as the basis for determining the area. The data collection method uses the census method which is found directly during field observations, then analyzed descriptively and presented in the form of output in the form of maps and data tabulations.

RESULT

The area of Sekernan Subdistrict is 162.48 km^2 with a population of 45,207 people. From the results of the survey that has been carried out, 24 temporary waste shelter locations were obtained, all of which have the status of illegal temporary waste shelters and are on vacant land with a total volume of 120.9 m3 of waste spread across all kelurahan in Sekernan Sub-district, namely 1 point (4.17%) in Sekernan Village, 16 points (66.67%) in Sengeti Village, 2 points (8.33%) in Bukit Baling Village, 4 points (16.67%) in Gerunggung Village, and 1 point (8.33%) in Tunas Mudo Village.

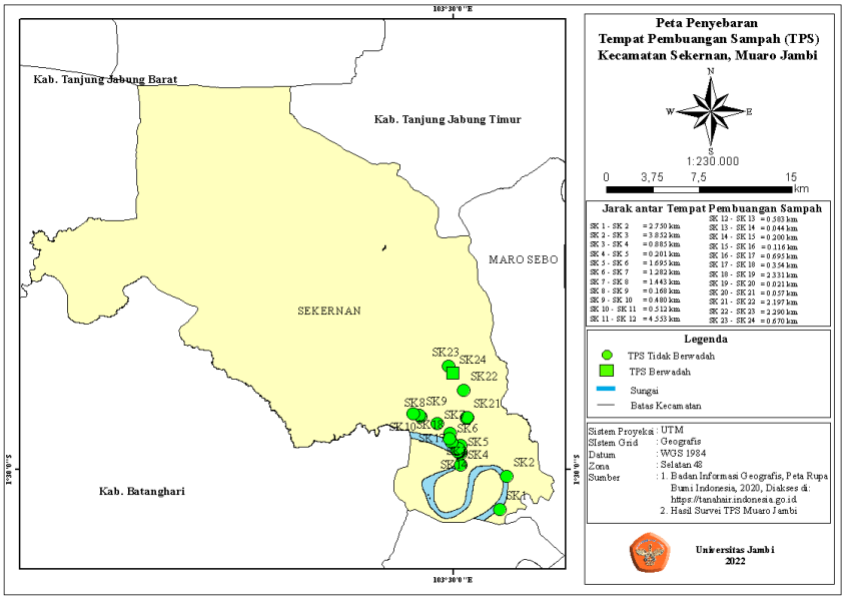

Figure 1. Location Map of Illegal Temporary Waste Shelters in Sekernan Subdistrict
Source: Researcher, 2022

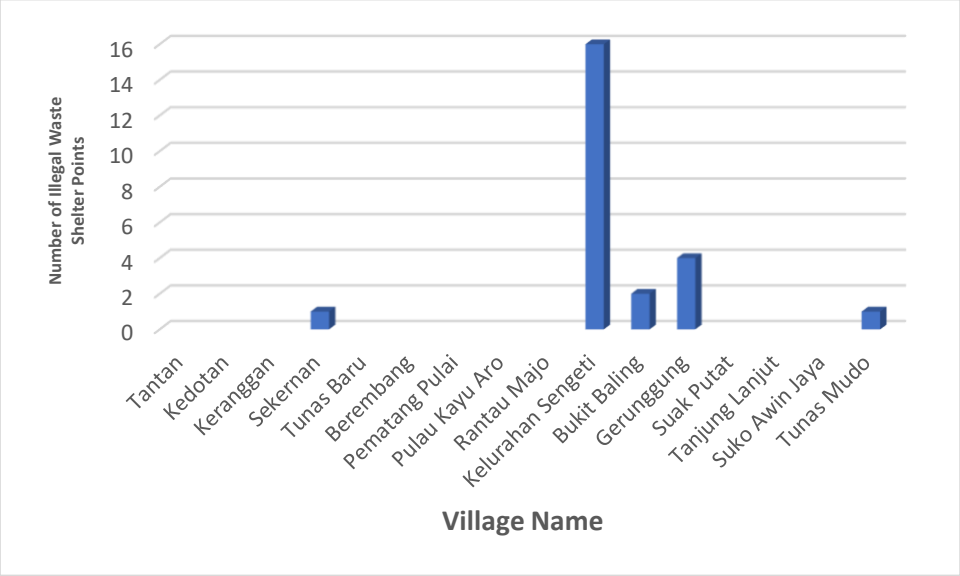

Figure 2. Histogram of the Number of Points of Location of Illegal Temporary Waste Shelters Based on Village in Sekernan Subdistrict
Source: Researcher, 2022

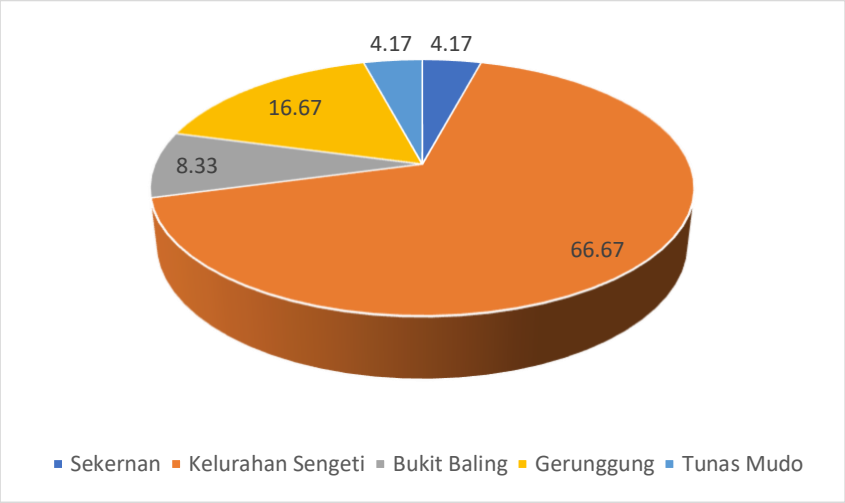

Figure 3. Percentage Distribution of Illegal Temporary Waste Shelter Location Points Based on Villages in Sekernan Subdistrict
Source: Researcher, 2022

The results of the data analysis of the location points of temporary shelters in all villages in Sekernan Subdistrict showed that there were 24 illegal temporary shelters spread across five villages, namely 1 point (4.17%) in Sekernan Village, 16 points (66.67%) in Sengeti Village, 2 points (8.33%) in Bukit Baling Village, 4 points (16.67%) in Gerunggung Village, and 1 point (8.33%) in Tunas Mudo Village. Factors that are expected to influence the distribution of illegal temporary waste shelter locations in Sekernan Subdistrict are geophysical and anthropogenic, and population factors.

Table 1. Characteristics of Illegal Temporary Waste Shelters in Sekernan Subdistrict

No	Village Name	Size of Area (km^3)	Number of Population (People)	Density of Population	Category of Population Density	Number of Illegal Temporary Waste Shelter Points by Volume			Total
						1-3,5 m^3	3,6-12 m^3	12,1-37 m^3	
1	Sekernan	0,93	3.727	4007,52	Tinggi	-	1	-	1
2	Kel. Sengeti	2,4	8.248	3436,67	Tinggi	10	6	-	16
3	Bukit Baling	51	8.252	161,8	Rendah	1	1	-	2
4	Gerunggung	1,99	613	308,04	Rendah	2	2	-	4
5	Tunas Mudo	0,23	1.732	7530,44	Tinggi	-	-	1	1
	Jumlah								24

Source: Researcher, 2022

DISCUSSION

Geophysical factors include the type of land use. The data shows that the type of land that becomes a temporary waste shelter is unoccupied and unused vacant land so it can be concluded that the more and wider the vacant land in a location, the greater the potential for the formation of illegal temporary waste shelters, due to the availability of land for waste disposal and in line with research by Faradilla R et al (2018) and Siswandi E et al (2020).[9,10]

Anthropogenic factors that are in accordance with the distribution of illegal temporary waste shelter locations in Sekernan Subdistrict include the type of road that is close to the temporary waste shelters. The type of road in this study refers to Government Regulation of the Republic of Indonesia Number 34 of 2006 concerning Roads, which categorizes road functions into arterial, collector, local and environmental roads. From the results of the research analysis data, it is known that the distribution of illegal temporary waste shelters in Sekernan District is mostly near neighborhood roads, which is 83.33% while 16.67% are near local roads.

From the survey results to each illegal temporary waste shelters point, it is known that the type of road adjacent to the temporary waste shelters point affects the occurrence of illegal temporary waste shelters location points in Sekernan Subdistrict, these results are in line with the research of Siswandi E et al (2020), Faradilla R et al (2018) and Ristianto A et al (2022) which state that the type and access of roads affect the occurrence of illegal temporary waste shelters location points. The number of locations of illegal temporary waste shelters is close to neighborhood roads because the most common type of road is neighborhood roads. With many neighborhood roads, residents who pass through the road can be encouraged to dispose of their waste there or near the road. And the local community is not the only one who disposes of waste in these illegal temporary waste shelters, because anyone can easily dispose of waste there because they are crossing the road.[9,10,11]

Population factors are related to population density, the volume of waste generated in an area will increase in

proportion to the increase in population in the area. Population density is obtained through data on population (people) divided by area (km^2), then population density will be divided into three classes, namely low class (1000 people/km^2). Based on the distribution of population density in Sekernan Subdistrict which is related to the number of illegal temporary waste shelter points, it is known that there is a tendency that high population density has more illegal temporary waste shelter points in line with the research of Ristianto A et al (2022).[11]

Based on the results of this study, it is found that in Sekernan Subdistrict there are no legal temporary waste shelter facilities in accordance with the Regulation of the Minister of Public Works Number 03/PRT/M/2013 concerning the Implementation of Waste Infrastructure in Handling Household Waste and Waste Similar to Household Waste, which are scattered only in the form of waste piles as many as 24 locations. Based on the calculation of SNI 19-2454-2002, there should be 180 communal legal temporary waste shelter (the number of households is 14,396 households in 2020) scattered with a distance that is not too close and not too far away, so an integrated effort between stakeholders is needed in fulfilling legal temporary waste shelters both in terms of quantity and feasibility.[12s]

$$\text{Minimum Standard} = \frac{number\ of\ heads\ of\ households}{80\ KK}$$
$$= \frac{14.396}{80} = 180$$

Figure 5. Calculation of the Minimum Standard for the Number of Legal Temporary Waste Shelters

CONCLUSION

The distribution of temporary waste shelter points in Sekernan subdistrict consists entirely of illegal temporary waste shelters in the form of using vacant land, while the minimum standard is 180 legal temporary waste shelters. In addition, medium and high population densities encourage the increasing number of illegal temporary waste shelters. The existence of these illegal temporary waste shelters has the potential to pollute the environment and become a chain of disease transmission because they are located close to neighborhood roads in local residential areas.

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