

## Planning of Waste Management System in the Al-Amin Living Lab and Industrial Park Area, Sampecita Village, Kutalimbaru Sub-District

Rahmadhani Fitri<sup>1\*</sup>, Faurantia Fauriana Sigit<sup>2</sup>, Benny Iskandar<sup>3</sup>, Andini Rahmadani<sup>4</sup>

<sup>1,2,3,4</sup>Universitas Pembangunan Panca Budi, Indonesia

\*Corresponding author: [rahmadhanifitri@dosen.pancabudi.ac.id](mailto:rahmadhanifitri@dosen.pancabudi.ac.id)

**Abstract.** *The growth rate of the population has become a problem in the environmental context, both at the regional, national, and global levels. This issue has become a topic with the awareness that an increase in population affects human socio-economic activities that threaten the environment. This research aims to find out the waste management system planning in the Al-Amin Living Lab and Industrial Park area. This type of research is qualitative descriptive research with a literature study research method through a literature study derived from previous research journals related to the title. The results of this study indicate that the waste management planning in Kutalimbaru Sub-District, Sampe Cita Village, in the Al-Amin Living Lab and Industrial Park area focuses on the Indonesian National Standard (SNI) 3234-2008, including activities such as sorting, composting, and recycling. Implementing a new waste management paradigm, such as collecting, sorting, transporting, processing, and disposing, views waste as a resource with economic value that can be utilized.*

**Keywords:** *Economic Value, Planning, Waste Management.*

### INTRODUCTION

The development of the population growth rate has become a problem in the environmental context, both at the regional, national, and global levels. This issue has become a topic with the awareness that an increase in population affects human socio-economic activities, posing a threat to the environment.

Population growth, in line with increasing diverse needs, will increase the amount of waste or residue, both from consumption processes and the results of various activities, in the form of garbage (Fitri & Siregar, 2023). Waste can be defined as residual material that cannot be reused or is unwanted, which is ultimately discarded. Thus, waste is a concept directed towards humans and is a consequence of human activities and natural processes (Kahfi, 2017).

Regarding the increase in waste volume, for example, humans produce a lot of waste due to a consumptive lifestyle and the production of goods and services (Wisdianti et al., 2023). Daily activities in households generate waste such as food leftovers, paper,

plastic, and others that accumulate over time with the emergence of new materials and substances, requiring special processing and handling systems (Saputro et al., 2016). Therefore, cleanliness and environmental health issues (including waste) are complex problems faced by all countries, including Indonesia, extending to provinces and municipalities.

Issues in Kutalimbaru Sub-District, Sampe Cita Village, in the Al-Amin Living Lab and Industrial Park include the absence of waste management, lack of facilities such as proper disposal sites, and obstacles to efficient waste management (Nuraini et al., 2022). Irregular or incomplete waste collection throughout Kutalimbaru Sub-District leads to waste accumulation and indiscriminate disposal. Additionally, the lack of public awareness regarding the importance of proper waste management can result in improper waste disposal behavior. Insufficient funds and human resources are also factors hindering waste management in Kutalimbaru Sub-District, Sampe Cita Village (Siregar et al., 2023). Effective waste management requires adequate budgeting and human resources; the lack of funds and personnel can impede the ability to build and operate efficient waste management infrastructure.

This research is crucial considering the waste management system in Kutalimbaru Sub-District, Sampe Cita Village, to maintain environmental and community health. Poor waste management systems can lead to environmental pollution, ecosystem damage, and soil and water degradation. This study is instrumental in identifying solutions to mitigate the negative impacts of environmental pollution, particularly in waste management.

## **LITERATURE REVIEW**

### **Waste**

Waste is defined as all forms of solid waste originating from human and animal activities, which are then discarded because they are no longer useful or their presence is no longer desired (Tchobanoglous et al., 1993). According to Law Number 18 of 2008 on Waste Management, waste is defined as residue from daily human activities and/or natural processes in solid form. Furthermore, in Government Regulation No. 81 of 2012 on Household Waste Management and Similar Household Waste, household waste is described as waste originating from daily activities in households, excluding feces and specific waste. Similar household waste refers to household waste originating from

commercial areas, industrial areas, special areas, social facilities, public facilities, and/or other facilities.

### **Waste Management System**

Waste processing is a part of waste management and, according to Law No. 18 of 2008, is defined as the process of changing the form of waste by altering its characteristics, composition, and quantity (Novalinda, 2023). Waste processing is an activity intended to reduce the amount of waste while utilizing the inherent value within the waste itself (recyclable materials, other products, and energy). Waste processing can take various forms, including composting, recycling, incineration (burning), and others (Ministry of Public Works and Housing, 2022).

### **Waste Sources**

Waste sources, as defined in Law No. 18 of 2008, are identified as the origin of waste generation. The waste to be managed is categorized into:

- a. Household Waste: Originating from daily activities within households, excluding feces and specific waste.
- b. similar Household Waste: Originating from commercial areas, industrial areas, special areas, social facilities, public facilities, and/or other facilities.
- c. Specific Waste includes:
  - Waste containing hazardous and toxic substances.
  - Waste containing hazardous and toxic material residues.
  - Waste generated as a result of disasters.
  - Demolition waste.
  - Technologically non-processable waste.
  - Waste generated periodically (Purnaini, 2011).

### **Waste Recycling**

Recycling is defined as a process of collecting, separating, processing, and selling materials that can be reused or transformed into new materials (Hidayah, 2018).

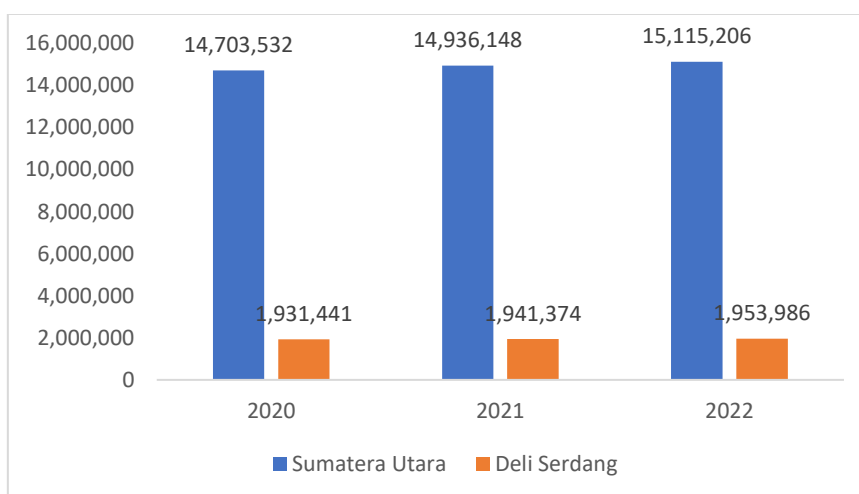
### **RESEARCH METHOD(S)**

This type of research is qualitative descriptive research using the literature study research method through a literature review derived from previous research journals

(Kurniawan, 2014) related to the title, as well as through accessing data obtained from websites as sources of information publication. Qualitative descriptive research can be interpreted as the researcher being a key instrument where data collection techniques are performed through the combination and inductive analysis of data (Sugiyono, 2012), resulting in processing data that is descriptive, such as narrating interviews and/or observation results.

## FINDINGS AND DUSCUSSION

According to the data from the Central Statistics Agency (BPS), North Sumatra is a province with significant potential. In terms of population, North Sumatra is the fourth most populous province in Indonesia after West Java, East Java, and Central Java. One of the regencies/cities in North Sumatra is Deli Serdang. This regency is the second most populous regency after Medan City, according to data collected by BPS Deli Serdang. This can be observed from the graph depicting the population growth of North Sumatra and Deli Serdang.

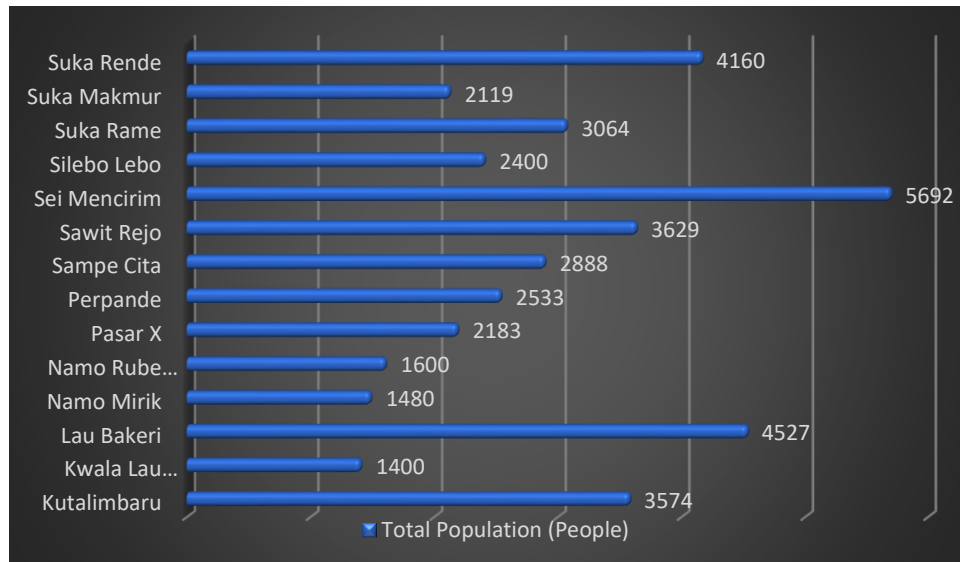


Source: (Central Statistics Agency of North Sumatra Province, 2023; BPS Deli Serdang Regency, 2023)

**Figure 1. Population Development of North Sumatra Province and Deli Serdang Regency from 2020 to 2022**

The information from Figure 1 indicates that over the past 3 years, there has been an increase in the population in both North Sumatra Province and Deli Serdang Regency. However, this increase is not significant. Population growth in a region is fundamentally based on three main elements: fertility, mortality, and migration.

The Al-Amin Living Lab and Industrial Park are located in Kotalimbaru District, Sampe Cita Village, Deli Serdang Regency. The figure below illustrates the population count for the entire Kotalimbaru District.



Source: Data from the Office of the Village Chief of Kotalimbaru Subdistrict

**Figure 2. Population Development of Kotalimbaru Subdistrict in the Year 2022**

Based on the information above, with the growth of the human population and the increasing complexity of human activities (Republic of Indonesia, 2009), the escalating waste generation day by day will reduce space and disrupt human activities. Consequently, the goal of improving the quality of life may paradoxically lead to a decline in the quality of life due to waste-related issues (Republic of Indonesia, 2008).

According to data from the Ministry of Environment and Forestry (LHK), households are the largest contributors to waste, accounting for about 48%, followed by traditional markets at 24%, and roads at 7%. The composition of the generated waste is predominantly organic waste, reaching 60%, and plastic waste at 15% (DLHK, 2020). Given this waste composition, serious waste management is necessary to reduce the amount of waste generated, and waste treatment methods are required.

According to Law Number 18 of 2008, waste management, as outlined in this law, involves waste handling and reduction. The Minister of Public Works Regulation Number 21 of 2006 on the national policy and strategy for waste management development states that waste reduction should be carried out as much as possible at its source. Managing waste fundamentally requires active participation from the community, especially in

reducing the amount of waste generated, sorting waste types to provide economic benefits, ensuring health for the community, environmental safety, and changing societal behavior. Waste management is a systematic, comprehensive, and sustainable activity that includes waste reduction and handling, one of which involves waste reduction (Aryenti & Kustiasih, 2013). Various components of waste hold the potential to be reused or processed to benefit both society and the environment (Windarawaswara et al., 2017).

To address the issues in Kutalimbaru Subdistrict, Sampe Cita Village, in the Al-Amin Living Lab and Industrial Park area, attention is needed based on SNI 3234-2008, which involves activities such as sorting, composting, and recycling. It is essential to adopt a new waste management paradigm, such as the "collect-sort-transport-treat-dispose" approach, viewing waste as a resource with economic value that can be utilized, for example, in composting and fertilizer production (Sitanggang et al., 2017).

## **CONCLUSION AND RECOMMENDATION**

The waste management system planning in the Kutalimbaru District, Sampe Cita Village, in the Al-Amin Living Lab and Industrial Park area focuses on the Indonesian National Standard (SNI) 3234-2008. This involves activities such as sorting, composting, and recycling. The approach adopts a new paradigm in waste management, viewing waste as a resource with economic value that can be utilized. The process follows a gather-sort-transport-process-dispose model, recognizing waste as a valuable resource.

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