

Waste Management in Lalin Village, South Halmahera

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Abstract. Waste is an ecological problem today and will always increasing rapidly according to the needs of the community. The problem of waste in coastal areas occurs because of the limited land for the community who live in coastal areas, it supported by inadequate infrastructure facilities, especially waste disposal facilities. The condition that occurs in the coastal area of Lalin village is most people throw solid waste in the area around their homes, they hope the waste will be carried by the tidal currents of the seawater. The result is the accumulation of solid waste along the residential area of the fishing community of Lalin village. This study aims to provide direction for waste management so that the community can live in a healthy environment. The study method uses observation and literature review. The result shows the community who throws the waste to sea because no government regulation arranges waste management and low awareness of the community who care about the environment. Therefore, waste management is needed for coastal sustainability.

Keywords: Waste Management, Lalin Village, South Halmahera.

1 Introduction

Waste is an ecological problem today and will always increase rapidly according to the community's needs and inversely proportional to land growth over time. According Ministry of Economy, Maritime Affairs, and Investment of Indonesia (2017), Indonesia is an archipelagic country with 17,504 islands, including 1,448 islands that have not been recorded or verified, hence makes Indonesia a country that has a vulnerability to water pollution [1].

North Maluku is one of Indonesia's provinces, which is geographically composed of clusters of islands. The area of the ocean is larger than the total land area. One of the areas in North Maluku Province that is the object of research is Lalin Island.

Lalin village or Lalin island has an area of 2.10 km² with a population of 2,724 people [2]. The ethnic Lalin village is Bajonese. The settlement pattern of the Bajonese is mostly above seawater, with the main livelihood being as fishermen. The type of house is a model of a stilt house, and it is still possible to enter and exit the tide of the tide and recede past the bottom of the house.

The waste problem in coastal areas occurs because of the limited land for the community who live in coastal areas and inadequate infrastructure facilities to support it, especially waste disposal facilities and resulting in people throwing waste out of place [3].

The condition that occurs in the coastal area of Lalin village is most people throw solid waste in the area around their homes, and they hope the tidal currents

of the seawater will carry the waste. The result is the accumulation of solid waste along the residential area of the fishing community of Lalin village.

This research provides solutions in the form of waste management systems for the people of Lalin Village, South Kayoa District. With waste management, the community can live in a healthy environment.

2 Research Methods

The study method uses qualitative methodology with observation and literature review. The analysis used data collection on existing site conditions and wastes at the site and analyzed with literature reviews related to waste problems and their management as a whole.

This research was conducted in Lalin Village, South Kayoa District, South Halmahera Regency, North Maluku Province.



Fig. 1. Lalin Village Map [4].

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3 Result and Discussion

3.1 Existing Site Conditions

The development of Bajo Settlement in Laluin village is influenced by the potential of marine resources in the vicinity. Bajoneese built simple houses from wood as poles, beams, and lontar leaves for walls and roofs [4]. BPS data shows that the number of facilities in Laluin Village only has one boat mooring and one kindergarten, and it does not yet have a market and a health center. The total population is 2697 people, consisting of 1382 males and 1315 females [5].

With a reasonably large population with village facilities that are still very minimal, coupled with the character of Laluin village, which is located above the water surface, it has the potential for careless disposal of community waste, especially household waste. Based on field data, there is a buildup of debris in the garbage next to residents' homes.

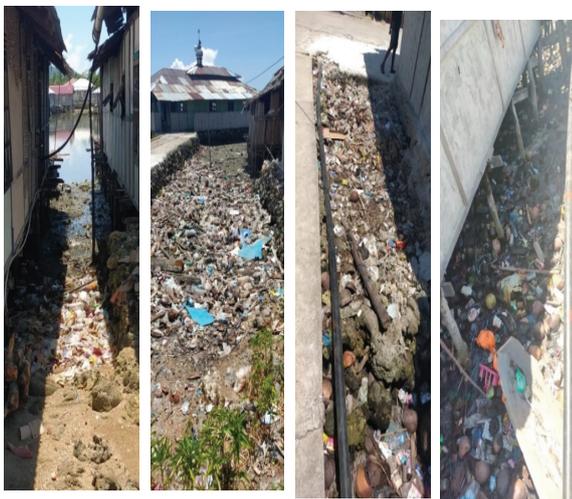


Fig. 2. Laluin Village Settlement Waste

Waste that comes from households which is settlement waste, is divided into organic and inorganic waste [6]. Some of the reasons that result in people throwing garbage next to their homes include:

- a. There is no availability of final disposal (TPA) and quick removal for waste collecting (TPS) near the house and its surroundings. Based on SNI 3242: 2008, TPS should be in each settlement environment [7]. The active participation of the community in every waste management activity is highly expected.
- b. Tidal conditions of seawater

According to Idawarni in Dharma, a coastal area is a meeting area between land and sea land. The coastal zone includes parts of the land, both dry, and submerged in water, which are still influenced by marine properties such as tides, sea breezes, and saltwater seepage. People who live in coastal areas predominantly have a livelihood as fishermen, so the site can also be said to be a fishermen's settlement area.



Fig. 3. Rumah Panggung in Laluin Village

The habit of the people of Laluin village is to throw waste beside the house hoping that the tidal conditions of the seawater will bring destruction to the sea. The unstable situation of the sea waterway, coupled with the silting of the soil, causes the low tide to accumulate waste under the house.

Another factor is waste disposal and acceptance of litter directly throughout the year on small islands. The waste received is waste that is carried away by currents and waves every day, and this causes the presence of trash in coastal areas that will affect aquatic ecosystems [9].

- c. Absence of waste retribution fees

The absence of waste management services and hygiene maintenance from the government has caused the people of Laluin village not to know and not pay the waste retribution fees.

3.2 The Waste Management System

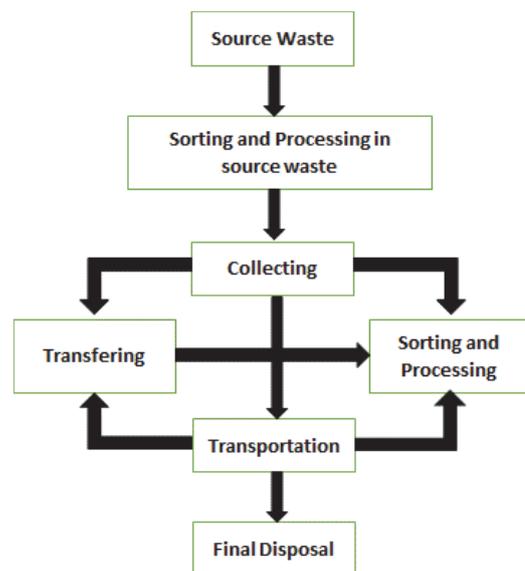


Fig. 4. Diagram of Waste Management Operational Techniques [10]

According to SNI 19-2454-2002, the waste management system is an operational technique for managing urban waste, which consists of housing activities to landfills, which must be integrated by sorting from the source.[10]. The characteristics of Laluin village, which is located in an archipelago and based on the distribution of people's houses along the coast, there are several solutions in handling waste, including:

- a. Waste bank implementation

The implementation of the waste bank is a form of community initiative in terms of waste management. According to Sutandyo-Buchholz in Koesrimardiyati, waste management carried out by the community itself is part of the responsibility of the community itself [11]. Most people in Lalin village have not cared about waste management because there is no economic impact of waste management on the community, and waste is left over from an undesirable activity and has no monetary value [12]. In addition, the community does not understand the 3R waste management approach (reduce, reuse, recycle). Waste is no longer seen as useless. However, it can be used as something of added value [11].

With the existence of a waste bank in Lalin Village, it can be one of the incomes of the community whose majority of livelihood is as fishermen. In certain seasons where sea conditions do not allow fishermen to fish, waste banks are one of the alternatives for community assimilation. Another expected impact is that with the existence of a waste bank, there is a change in behavior in handling household waste and a waste bank as an alternative to environmental conservation in the residential area of Lalin village.

- b. Procurement of temporary disposal (TPS) near the house and the area around the house The location of the TPS is very influential in increasing public awareness of throwing waste in its place. If area is not strategic will make people lazy to throw garbage at a predetermined location. Besides that, it will also cause a new problem, namely the place where flies gather, which is the source of the disease.

The existence of settlement areas within the distance of temporary landfill areas will affect the density of flies in residential areas [13]. Criteria for location and placement of waste containers can be seen in SNI 19-2454-2002 concerning Procedures for Urban Waste Engineering Management [10]

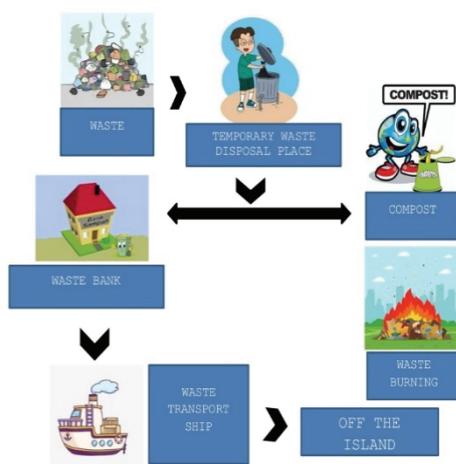


Fig. 5. Waste Management Scheme in Lalin village

- c. Composting
 Sorting and separating inorganic and organic waste is aimed at further processing activities such as recycling where organic waste can be made into compost [14]. The

remaining non-recyclable waste is then burned with special technology [15].

- d. Socialization about the importance of environmental cleanliness
 - Workshop on Waste Bank Establishment and Waste Management
 - Socialization of handling waste processing in Lalin village and providing education to the community about waste banks starting from the establishment to administrative mechanisms [16].

4 Conclusion

Based on the explanation above and adjusted to the social conditions and geographical conditions of Lalin village, the need for a waste management system is as follows:

- A Waste management system that can be optimized as a source of family income and reduce the problem of unemployment by helping the survival of family life by managing waste into additional family income [17].
- The location of the waste bank must be close to the source of inter-island transportation, making it easier for officers to distribute waste to the nearest reservoir in Lalin village. It also avoids stacking waste that is too long in the waste bank.
- Placement of TPS that is easily accessible to the community has a closed form and is easily transported by garbage officers.

References

- [1] A. Pranata and S. Huwae, “Penerapan Konsep Bangunan Nol Sampah Pada Desain Fasilitas Pengolahan Sampah Di Muara Angke,” *J. Sains, Teknol. Urban, Perancangan, Arsit.*, vol. 3, no. 2, p. 3123, (2022), doi: 10.24912/stupa.v3i2.12349.
- [2] P. K. Halmahera Selatan, “Kabupaten Halmahera Selatan,” <https://www.halmaheraselatankab.go.id/>, 2022.
- [3] R. R. Susanto, “Penataan Permukiman Nelayan Menuju Kawasan Zero Waste,” *ARTEKS, J. Tek. Arsit.*, vol. 1, no. 1, p. 83, (2016), doi: 10.30822/artk.v1i1.84.
- [4] M. Rahim, A. Basri, and H. Fauzi, “Spatial and Environmental Condition of Bajo Tribe Settlement in South Halmahera,” vol. 1, no. Icst, pp. 384–386, (2018), doi: 10.2991/icst-18.2018.80.
- [5] B. K. H. Selatan, “Kecamatan Kayoa Dalam Angka (2020),” 2020.
- [6] Menteri Hukum Dan Hak Asasi Manusia Republik Indonesia, “Undang-Undang Republik Indonesia Nomor 18 Tahun (2008) Tentang Pengelolaan Sampah,” (2008). [Online]. Available: <http://www.ainfo.inia.uy/digital/bitstream/item/7130/1/LUZARDO-BUIATRIA-2017.pdf>
- [7] J. Dobiki, “Analisis Ketersediaan Prasarana

- Persampahan Di Pulau Kumo Dan Pulau Kakara Di Kabupaten Halmahera Utara,” *J. Spasial*, vol. 5, pp. 220–228, (2018).
- [8] R. T. H. Manik, I. Makainas, and A. Sembel, “Sistem Pengelolaan Sampah Di Pulau Bunaken,” *Spasial*, vol. 3, no. 1, pp. 15–24, (2016).
- [9] W. F. Mandala, “Kendala dan Strategi Pengelolaan Sampah Pulau Barrang Lompo,” *J. Fish. Dev.*, vol. 2, no. 2, pp. 61–68, (2016), [Online]. Available: <http://jurnal.uniyap.ac.id/index.php/Perikanan/article/view/252/242>
- [10] Badan Standarisasi Nasional, “Tata Cara Teknik Operasional Pengelolaan Sampah Perkotaan,” no. ICS 27.180, p. 1, (2002), [Online]. Available: <http://portal.acm.org/citation.cfm?doid=1833349.1778770>
- [11] A. S. Suryani, “(STUDI KASUS BANK SAMPAH MALANG) (A Case Study of MalangWaste Bank) Anih Sri Suryani,” *Aspirasi*, pp. 71–84, (2014).
- [12] D. Asteria and H. Heruman, “Bank Sampah Sebagai Alternatif Strategi Pengelolaan Sampah Berbasis Masyarakat di Tasikmalaya,” *J. Mns. dan Lingkungan.*, vol. 23, no. 1, p. 8, (2016).
- [13] M. Majdi, E. Siswandi, H. Solehah, L. Kukuh, and A. Diyatna, “Jarak Tempat Pembuangan Sementara (TPS) Sampah Dan Tingkat Kepadatan Lalat Di Desa Montong Betok , Kecamatan Montong Gading , Kabupaten Lombok Timur Distance Of A Temporary Disposal Site Of Waste And Flies Density Level In Montong Betok Village , Monton,” *J. Sanitasi dan Lingkungan.*, vol. 2, no. 1, pp. 111–120, (2021).
- [14] L. Nurpratiwiningsih, P. Suhandini, and E. Banowati, “Pengelolaan Sampah Rumah Tangga Berbasis Masyarakat Di Kelurahan Sekaran Kecamatan Gunungpati Kota Semarang,” *J. Educ. Soc. Stud.*, vol. 4, no. 1, pp. 1–6, (2015), [Online]. Available: <http://journal.unnes.ac.id/sju/index.php/jess>
- [15] R. D. Harahap, “Pengaruh Sampah Rumah Tangga Terhadap Pelestarian Lingkungan Ditinjau Dari Aspek Biologi Di Komplek Perumahan Graha Pertiwi Kel. Urung Kompas Kec. Rantau Selatan Effect of Household Waste Viewed From the Aspect Environmental Conservation Biology in Housing Complex Graha Pertiwi Kel. Undo Kompas Kec. South Rantau,” *Cahaya Pendidik.*, vol. 2, no. 1, pp. 92–104, (2016), doi: 10.33373/chypend.v2i1.609.
- [16] I. Nyoman Widnyana Wartama and N. Putu Sawitri Nandari, “Pemberdayaan Masyarakat Dalam Pengelolaan Sampah Rumah Tangga Melalui Bank Sampah Di Desa Sidakarya Denpasar Selatan,” *PARTA J. Pengabd. Kpd. Masy.*, vol. 1, no. 1, pp. 44–48, (2020), [Online]. Available: <http://journal.undiknas.ac.id/index.php/partahttp://journal.undiknas.ac.id/index.php/parta>.
- [17] R. Ratnah, I. K. Sudirman, S. Suratman, and R. Fiqry, “Workshop Pengolahan Sampah dan Pendirian Bank Sampah bagi Ibu Rumah Tangga Desa Bolo Kecamatan Madapangga,” *Bima Abdi J. Pengabd. Masy.*, vol. 1, no. 2, pp. 56–62, (2021), doi: 10.53299/bajpm.v1i2.66.