

Local Community-Based Plastic Waste Management in Bangun Village, Mojokerto District

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Abstract

This research aims to analyze and describe local community-based plastic waste management in Bangun Village, Mojokerto Regency. This research method is a case study because it is based on efforts to understand plastic waste management practices in Bangun Village, identify the role of the community in the plastic waste management process, and evaluate the social, economic, and environmental impacts of local community-based plastic waste management. The research results show the waste management cycle, where at the downstream industrial level, waste producers supply waste to the community, in this case as scavengers. Then, scavengers sell the waste to collectors. Next, collectors sell the waste they buy from scavengers to other consumer industries. The point of the problem occurs at the level of scavengers and collectors, where two cycles occur. However, there is no added value from waste managed by the community. This can be detrimental to the community itself in waste management, both in economic, social, and environmental aspects. For this reason, government intervention is needed to improve the community-based plastic waste management system in Bangun Villages through institutional restructuring so as to shorten the waste distribution cycle. It is recommended to strengthen support and cooperation from various parties, including the government, society, and the private sector, which is very necessary to create a waste management system that is inclusive, sustainable, and provides benefits for all interested parties.

Keywords: management, plastic waste, local community-based, bangun village

INTRODUCTION

Plastic waste is a global environmental problem that creates serious challenges for managers tasked with finding optimal solutions to plastic pollution. This situation has created a global plastic pollution crisis and raises the question of how to implement plastic waste management properly [1]. Hence, priority waste management includes reducing waste at the source, reusing the waste produced, recycling waste that cannot be reused, and recycling waste that is difficult to recycle thermally [2]. To make this happen, community participation is needed in waste management.

Investigating further, the waste management activities carried out by the Bangun village community are relevant to the condition of plastic waste in Indonesia, which continues to increase, although, on the other hand, waste management in Indonesia is considered less effective and tends to damage the environment so that it does not lead to sustainable development, which has been proclaimed in

various cities in Indonesia. This condition is exacerbated by the import of waste from developed countries into various regions of Indonesia. According to [3], several paper production and recycling companies in East Java use 4 million tons of waste paper every year as raw material for paper factories.

For data for 2021, the Directorate General of Waste, Waste, and B3 (Hazardous & Toxic Material) Management (Ditjen PSLB3) of the Ministry of Environment and Forestry (KLHK) reports that the amount of Indonesian waste has reached 68.5 million tons and will increase by 70 million tons in 2022 [4]. Data from the Ministry of Environment and Forestry shows that throughout 2021, East Java Province produced around 1.28 million metric tons of waste. Based on BPS data, Mojokerto district is not the largest waste producer among cities and regencies in East Java province because BPS in 2022 reported a total amount of waste of 1,927,520 kg. This data is inversely proportional to the facts of waste processing activities in Mojokerto district because it has become a national concern due to the discovery of types of plastic waste originating from various countries that allegedly ended up in Bangun Village, Mojokerto Regency.

In 2019, the Ecological Observation and Wetlands Conservation (Ecoton) Foundation discovered around 12 paper factories in East Java

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that used waste as raw materials import. One of the paper factories is in Mojokerto district, Bangun village [5]. Confirmed through a working visit, Johan Rosihan and members of Commission IV DPR-RI held a working visit in Bangun Village, District Pungging, Kab. Mojokerto, East Java To the second location, namely in Bangun Village, Pungging District, Purworejo. During the visit, the phenomenon of local people working as sorters of recyclable waste from various countries was discovered [6].

The phenomenon of waste selection carried out by the community is illegal dumping. This is allegedly the impact of waste imports that arise from illegal dumping. According to the EPA (Environmental Protection Agency), illegal dumping is a place where waste is intentionally dumped to avoid the costs, time, and effort required to dispose of waste in a legal place [7]. The existence of illegal dumping can change the social system that exists in the surrounding community. This change in the social system is the emergence of the phenomenon of waste farmers, as happened in the Mojokerto district.

Bangun Village, Pungging District, Mojokerto Regency, consists of three hamlets, namely Bangun, Kalitengah, and Ploso hamlets, this decade known as "trash villages or villages" [8]. This is because the majority of people in the village work as waste collectors and sorters and were previously farmers [9]. So the people of Bangun Village are in the spotlight because of the problem of importing illegal plastic waste into Bangun Village. Apart from various polemics related to illegal plastic waste, most of the village community depends on this plastic waste for their livelihood.

Historically, Bangun Village received its waste supply from the Pakerin paper factory (Indonesian Paper Factory), which has been operating since 1977. According to [10], most of the village land used to be rice fields, but since the PT paper factory in Pakerin, farming work began to be abandoned, and he changed his profession to become a waste farmer. One of the residents of Bangun Village said that every day around 30 dump trucks are working to dispose of the remaining industrial waste in the Bangun Village settlement [11]. This means that the transition is due to the opportunity to get plastic waste for free or buy it, which can be managed and has economic value.

According to [12], in general, every family in Bangun has a pile of plastic waste, and every day or two they buy unwanted plastic from a paper

factory or from a truck driver, or ask the driver to drop it off at the local area or plot that has been provided, or who has been rented. However, according to [13], waste processing requires the utilization and use of adequate facilities and infrastructure. It can be seen that the waste in Bangun Village does not have proper containers and processing processes because the waste is just piled up on available land without a good planning process that takes into account environmental aspects but only focuses on economic aspects.

Garbage, which is a dirty item and a place of disease for the residents of Bangun Village, Pungging District, and Mojokerto Regency, is a very promising economic resource to fulfill their survival. Judging from the pattern of waste processing carried out by the residents of Bangun Village, they can be classified into two groups: waste collectors and waste farmers. Waste collectors are buyers of waste from waste scavengers; the waste purchased is sorted and reprocessed to be sold to smelters and grinders [14]. Meanwhile, scavengers are residents who purchase and sort waste from waste obtained directly from paper factories or waste-selling companies to sell to collectors or tofu factories according to the type of waste [15].

The activities of waste scavengers in processing and sorting waste not only bring economic benefits but also have an impact on health and the environment. According to [9], recycling or plastic waste sorting activities carried out by Bangun village residents have economic value as a source of opinion, but on the other hand, according to [17], the village residents are not aware of the negative impacts of industrial plastic waste management. The negative impact is the destruction of the environmental ecosystem due to the plastic waste residue and toxic hazardous materials.

A study conducted by the IPEN Institute and [18], revealed that eggs from the dump site in Bangun Village were also contaminated by PFOS and per- and polyfluoroalkyl substances (PFAS), which was comparable to the concentration of waste in heavy industrial areas in Europe. Higher concentrations of PFOS and PFOA in mothers are associated with delayed pregnancy, decreased quality of human semen (sperm), and penis size. These chemicals are released into the environment, the source of which comes from piles of plastic waste in Bangun Village. These chemicals dissolve in fat and accumulate in the

eggs, after which the eggs are eaten by local residents [19].

There was an impact on health and the environment resulting from waste processing activities carried out by the community in Bangun Village, so the government then took firm steps by giving a warning to PT. Pakerin is a paper company located in Bangun Village and the main supplier of plastic waste to the community. The aftermath of the warning was the cessation of waste processing activities carried out by the community and, at the same time, stopping the income of the Bangun village community. According to [20], in the conclusion of their study, people are indifferent or don't pay attention because they are not aware that waste and garbage disposal activities result in environmental pollution. This behavior arises because people depend on their livelihoods from their activities of recycling waste or rubbish thrown away in their environment.

Thus, the preposition in this research is that waste processing and sorting activities carried out by plastic waste farmers in Bangun Village can provide economic benefits and support the survival of the local community. But on the one hand, management and supervision policies related to waste management are not good enough, resulting in impacts on health and the environmental ecosystem. Therefore, it is urgent to analyze and describe local community-based plastic waste management in Bangun Village, Mojokerto Regency.

MATERIAL AND METHOD

In this case study research, the research will explore the research methods used to investigate local community-based plastic waste management in Bangun Village, Mojokerto Regency. This research aims to understand plastic waste management practices in Bangun Village, identify the role of the community in the plastic waste management process, and evaluate the social, economic, and environmental impacts of local community-based plastic waste management. The interview number is 30 respondents.

Identification and selection of case studies

The initial stage was to identify Bangun Village as a relevant case study for this research. The selection of case studies was carried out based on criteria such as the existence of significant local community-based plastic waste

management initiatives and the availability of adequate data.

Data collection

Data was collected through various research techniques, such as participant observation, interviews with relevant stakeholders (such as the community, village leaders, and non-government organizations), and analysis of documents related to plastic waste management in Bangun Village.

Data analysis

The collected data will be analyzed qualitatively to identify patterns, trends, and main findings related to local community-based plastic waste management in Bangun Village. This analysis involves data grouping, thematic findings, and in-depth interpretation.

Impact Evaluation

The social, economic, and environmental impacts will be evaluated by considering aspects such as increasing public awareness, reducing plastic waste, increasing people's income, and improving environmental quality.

Through this case study research method, it is hoped that it can provide an in-depth understanding of local community-based plastic waste management in Bangun Village, Mojokerto Regency, as well as provide valuable input for developing policies and efforts to manage plastic waste that is more sustainable.

RESULT AND DISCUSSION

Description of the research location

Bangun Village is located in Pungging District, Mojokerto Regency, East Java Province. Bangun Village consists of three hamlets, including Bangun, Kalitengah, and Ploso. Bangun Village is located in the northern part of Mojokerto Regency. The village is located on approximately 320,120 hectares of land. The population of Bangun Village reaches 1037 families with a total population of 3205 people. The founding of Bangun Village has only been told about by people from generation to generation, without clear historical records.

Bangun Village, Pungging District, is an area that has a lot of productive agricultural land, consisting of 45,325 ha. Some of the people of Bangun Village make their living as farmers, but over time, they have started to give up their livelihoods and then move to other livelihoods, which they feel can fulfill their needs by becoming garbage collectors [9].

Community Plastic Waste Management System in Bangun Village, Mojokerto Regency

The people of Bangun Village initially requested that industrial waste be collected and stored on empty land or in their yards to be sold to other industries as an alternative source of building materials and other industries (such as tofu and tempeh). However, in response to various developing dynamics, PT Pakerin was forced to no longer maintain its commitment to provide free waste but then charge the waste from IDR 120,000 to IDR 300,000 per truck. Apart from that, the Bangun Village Community also buys waste from other companies, such as PT Tjiwi Kimia, a billiard factory, PT Sun Paper, and so on. Basically, there is no official agreement between the people of Bangun Village to obtain supplies and/or buy waste from these various companies.

Garbage collection activities carried out by the community gain economic benefits. Therefore, waste management activities are the main source of income for the Bangun village community. How could it not be that in one day the community is able to earn quite a large income, where the waste, which is sorted based on the type of plastic, cans, and aluminum, and the rest is small plastic waste, is valued at \$120,000 per pickup car? The results of interviews with informants as scavengers revealed that:

“Previously, income from this waste was very profitable economically. where we buy waste from several sources, then the waste is sorted by type, namely plastic, cans, and aluminum, as well as small plastic waste, then dried in the sun until dry to be sold to tofu manufacturing factories at a price of IDR 120 thousand per pickup. We sell

plastic, cans, and aluminum to collectors in the village. Almost all of the waste purchased from factories is not wasted; everything is resold or can be of economic value, especially plastic waste, which is the most abundant type of waste”

This is confirmed by the purchase price from collectors of types of waste such as plastic waste, which is priced at around IDR 1,700 per kilogram, canned waste around IDR 800 per kilogram, and aluminum waste around IDR 10,000 per kilogram. Waste is bought by collectors, then sold back to industries that need it. As the results of interviews with informants (collectors) show:

“For myself, as a collector, once I buy rubbish from scavengers (the community), I can spend quite a large amount of capital, which is in the range of IDR 1 million to IDR 2 million. Where waste such as plastic is priced at around IDR 1,700 per kilogram, canned waste is around IDR 800 per kilo, and aluminum waste is around IDR 10,000 per kilogram, In terms of volume, the largest type of waste is plastic waste. The waste purchased from scavengers is then sold back to grinders and smelters, as well as tofu factories. The profits can reach double the capital spent”

The description above shows that the local community-based plastic waste management system in Bangun Village, Mojokerto Regency, is carried out quite simply, starting from the waste supply industry, to the scavengers (community), then to the collectors, and back again to the waste processing industry. However, this system is what makes it ineffective and inefficient from a sustainability perspective as local-based waste management for the community in Bangun village. An illustration can be seen in the image below:

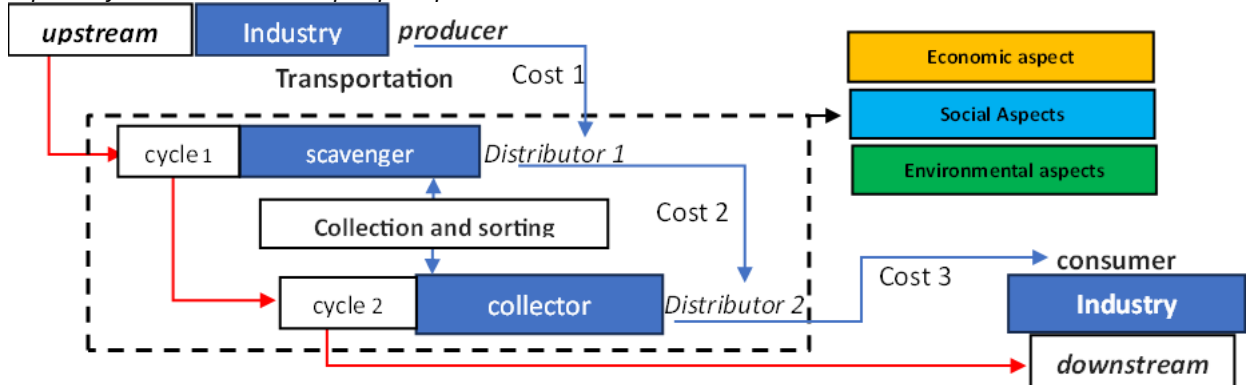


Figure 2. Local community-based waste management cycle, Bangun Village, Mojokerto

At the downstream industrial level, waste producers supply waste to the community, in this case, as scavengers. Then, scavengers sell the waste to collectors. Next, collectors sell the

waste they buy from scavengers to other consumer industries. The point of the problem occurs at the level of scavengers and collectors, where two cycles occur. However, there is no

added value from waste managed by the community. This can be detrimental to the community itself in waste management, both in economic, social, and environmental aspects.

If the waste distribution cycle for sale becomes long and there is a change in selling value between scavengers as distributors 1 and 2 (collectors) before it reaches consumers as the last economic cycle, there will be no additional value. In fact, according to [22], producing products with added value will have a profitable economic impact. However, this does not happen in local community-based waste management in Bangun Village, so several economic problems that can arise include:

- **Decreased selling value:** Every time waste changes hands between scavengers and collectors, there is a possibility that the selling value will decrease. This may result in scavengers getting a price lower than its actual value, while collectors may profit by selling it at a higher price. As a result, scavengers become less profitable economically.
- **Income uncertainty:** In long distribution cycles, waste collectors may face income uncertainty. Price fluctuations and competition in the waste market can cause scavengers' income to become unstable, which in turn can affect their financial condition.
- **Dependence on intermediaries:** In the long distribution cycle, scavengers become highly dependent on intermediaries (collectors) to sell their waste to industrial consumers. If there is injustice or a lack of transparency in the relationship between scavengers and collectors, it may be difficult for scavengers to gain a fair profit from their efforts.

If there is a change in sales value and a long waste distribution cycle, and if it is linked to accountability and competition in waste collection, the social impacts that can occur include:

- **Unhealthy dependence:** Scavengers who are trapped in long distribution cycles and changing sales values can experience unhealthy dependence on collectors. They may feel bound to sell waste to certain collectors without having a strong sense of choice or negotiation. This can lead to social injustice and an imbalance of power between scavengers and collectors.
- **Unclear accountability:** In situations of intense competition, accountability for waste management may be unclear. This could be the result of recycling procedures not being

regulated in policy [23]. As a result, waste pickers may be tempted to ignore responsible waste management practices, such as sorting or recycling, in order to gain a greater advantage over the competition.

- **Inequity in access:** Intense competition can lead to inequity in access to waste resources. Scavengers who are more powerful or have better access may dominate waste collection, while other scavengers may have difficulty obtaining sufficient resources to run their business.
- **Stigma and marginalization:** In some cases, waste pickers may experience social stigma and marginalization because of their work related to waste collection. In the context of changing sales values and long distribution cycles, this stigma can be strengthened, resulting in waste pickers facing social discrimination and difficulties in gaining access to services and other opportunities [24]. This can be confirmed by the stigma given to waste villages as trash villages. The spotlight came on various groups related to waste management activities carried out by the Bangun Village community some time ago. As a result, the Bangun village community is closed off and suspicious of outsiders who come to Bangun village because they think they are treated unfairly for news about waste management.

Some of the negative environmental impacts that can occur if competition in waste collection is not balanced with responsible management practices are:

- **Increase in unmanaged waste:** If scavengers compete to collect waste without paying attention to proper sorting, this can lead to an increase in the amount of waste that is not managed properly. Waste that is not properly sorted can be difficult to recycle or process efficiently, leading to excessive waste buildup and potential environmental pollution.
- **Environmental pollution:** When waste is not managed properly, especially waste containing hazardous materials, it can cause environmental pollution. Hazardous materials that are not properly separated or disposed of incorrectly can pollute soil, water, and air, threatening the sustainability of ecosystems and human health. According to [25], the release of odorous compounds from landfills has a very local (micro) impact because it impacts local residents.

Overall, it is important to consider the economic, social, and environmental impacts of

waste management. Responsible and sustainable local community-based waste management efforts not only provide economic benefits for scavengers and local communities but also reduce negative impacts on society and the environment. It is a mistake if waste management is generally seen as the responsibility of local governments only. This approach does not encourage cooperation between the community and local government [26]. This will result in low local community involvement and provide limited space for the community to participate in waste management [27].

Therefore, it is very inappropriate if waste management activities carried out by the community are stopped. As happened with local community waste management in Bangun Village, which has now been closed or stopped by the government. Closures like this can have detrimental impacts on scavengers and/or communities that depend on waste collection as their source of livelihood. Apart from that, closing waste management activities carried out by the community can also cause an increase in waste that is not managed properly, environmental pollution, and the waste of natural resources. According to [28], the most common problems associated with inappropriate management include disease transmission, fire hazards, odor nuisance, atmospheric and water pollution, aesthetic disturbances, and economic losses.

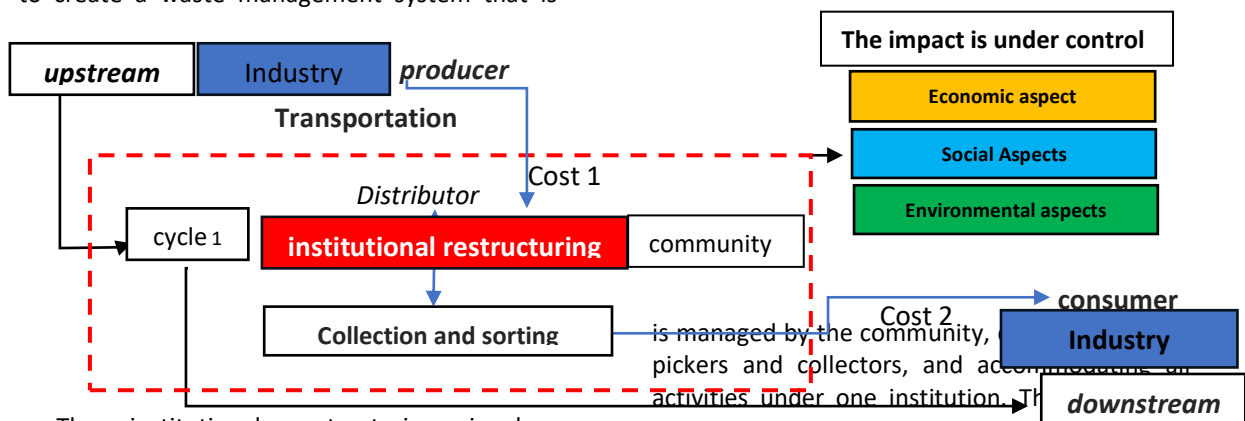
Instead, a more appropriate step is to increase responsible waste management practices, including proper sorting, recycling, and reducing resource use. Support and cooperation from various parties, including the government, society, and the private sector, is very necessary to create a waste management system that is

inclusive, sustainable, and provides benefits for all interested parties [29]. A social contract between the city government and the community is needed to manage this phenomenon well. Communities and companies, as consumers of goods and producers of waste, must show responsibility and support the government in its waste management approach[30].

Alternative Local Community-Based Plastic Waste Management

Community-Based Solid Waste Management (CBSWM) is a waste disposal system that is built, launched, maintained, and used by the community with the aim of reducing residents' anxiety about maintaining environmental cleanliness through the environmentally friendly use of waste [31]. Conceptually, local community-based plastic waste management is very appropriate to implement. Although the findings of this research show that there are problems that arise in the institutional system that have an impact on economic, social, and environmental aspects, However, it would be inappropriate if community-based waste processing activities were stopped. Because it can cause more complex problems in the form of loss of sources of community income, environmental pollution, and waste of natural resources.

The intervention that can be done to improve the community-based plastic waste management system in Bangun village is institutional restructuring to shorten the waste distribution cycle. If institutional restructuring is implemented, the community-based waste management system in Bangun village will be depicted as follows:



The institutional restructuring involves establishing a waste management institution that

community to actively participate in organizing and managing waste. This effort aims to take

control of plastic waste management, providing direct benefits to the community and the environment [32]. The economic value of waste management becomes a driving force in depicting the socio-economic needs and motivations that encourage community activities [33] in waste management.

Sustaining efforts in strategies that target economic motivations has the greatest impact on reducing plastic pollution. Involving community members to maintain the well-being of their local environment is likely to improve management. The government must continue to adapt its waste management strategy to the social and environmental conditions of society if it wants to succeed in reducing plastic pollution. Encouraging local management and providing services that simplify proper waste disposal are key strategies that can reduce plastic pollution locally [34].

It is important for local governments to provide the necessary waste infrastructure (for example, proper waste containers) so that residents can separate waste from the source. This is important because if the infrastructure to collect waste is not available, society cannot do much. If funds are not available to purchase the required infrastructure, it is necessary to apply to donors interested in waste management programs. In addition, there is a need to encourage waste segregation at source by providing incentives to local communities [35]. Of course, support and cooperation from various parties, including government, society and the private sector, is needed to create a waste management system that is inclusive, sustainable and provides benefits for all interested parties [36].

CONCLUSION

Waste management based on the local community in Bangun village has caused several problems, including:

- Economic aspect: decrease in market value. Every time waste changes hands between scavengers and collectors, there is a possibility of a decrease in market value. If there are changes in market value, long waste distribution cycles, and the responsibility and competition in waste collection are taken into account,
- Social aspect: Unhealthy dependency: Scavengers trapped in long distribution cycles and fluctuating market values may develop an unhealthy dependency on collectors. Stronger

scavengers or those with better access may dominate waste collection, while others may struggle to obtain sufficient resources to sustain their businesses.

- Environmental aspect: uncontrolled waste increase. If the competition in waste collection is not balanced with responsible management practices, it can result in an increase in poorly managed waste. When scavengers compete to collect waste without proper sorting, it can lead to an increase in the amount of unmanaged waste.

The closure of community waste management activities carried out by the government can cause a loss of community sources of income, an increase in waste that is not managed properly, environmental pollution, and the waste of natural resources. Therefore, it is important to improve waste management based on local communities that is responsible and sustainable, not only providing economic benefits for scavengers and local communities but also reducing negative impacts on the environment. Relevant efforts to be made in this context include institutional restructuring so as to shorten the waste distribution cycle and provide waste infrastructure. Of course, this can be achieved with support and cooperation from various parties, including the government, society, and the private sector, which is very necessary to create a waste management system that is inclusive, sustainable, and provides benefits for all interested parties.

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REFERENCES

- [1]. Phan, T. T. T., V. V. Nguyen., H. T. T. Nguyen., Y. J. Chen., C. H. Lee. 2023. Evaluating citizens' willingness to participate in

- hypothetical scenarios towards sustainable plastic waste management. *Environmental Science & Policy*. 148.1-12. DOI. 10.1016/j.envsci.2023.07.003
- [2]. Kim, I., Y. Jang. 2022. Material efficiency and greenhouse gas reduction effect of industrial waste by material circulation in Korea. *Journal of Cleaner Production*. 376.1-10. DOI. 10.1016/j.jclepro.2022.134053
- [3]. Basyaiban, M. K., Wartiningih,. 2021. Penegakan Hukum Lingkungan terhadap Pencemaranlingkungan oleh PT. Pakeirn di Kabupaten Mojokerto. *Environmental Pollution Journal*. 1(2).119-149. DOI. 10.58954/epj.v1i2.14
- [4]. Dewan Perwakilan Rakyat Republik Indonesia. (2022). Ditjen PSLB3 KLHK Didesak Miliki Langkah Terukur Tangani Volume Sampah. accessed via (online) <https://www.dpr.go.id/berita/detail/id/40924/t/Ditjen+PSLB3+KLHK+Didesak+Miliki+Langkah+Terukur+Tangani+Volume+Sampah> [20/09/2023]
- [5]. Karuru, Z. (n.d.). Jejak Sampah Impor. Antarafoto. accessed via (online) <https://www.antarafoto.com/id/foto-cerita/view/680/jejak-sampah-impor> [20/09/2023]
- [6]. Humas Fraksi PKS. (2020). Usai Kunjungan Spesifik di Jatim, Johan Ajak Pemerintah Hentikan Impor Sampah. FPKS. accessed via (online)<https://fraksi.pks.id/2020/02/02/usa-i-kunjungan-spesifik-di-jatim-johan-ajak-pemerintah-hentikan-impor-sampah/>[20/09/2023]
- [7]. Elamin, M. Z., K. N. Ilmi., T. Tahirah., Y, A. Zarnuzi., Y, C. Suci., D, R. Rahmawati., et.al. 2018. Analisis Pengelolaan Sampah Pada Masyarakat Desa Disanah Kecamatan Sreseh Kabupaten Sampang. *Jurnal Kesehatan Lingkungan*. 10(4).368-375.
- [8]. Srilambang, P. (2021). Sampah Plastik Desa Bangun, Sandaran Hidup dan Ancaman. Dw.Com. accessed via (online) <https://www.dw.com/id/sampah-plastik-desa-bangun-antara-sandaran-hidup-dan-ancaman/a-51994033> [20/09/2023]
- [9]. Kumalasari, R., S. B. Widodo. 2016. Studi Tentang Faktor-Faktor Yang Menyebabkan Perubahan Pekerjaan Dari Petani Menjadi Pemilah Sampah Industri (Studi Kasus di Desa Bangun Kecamatan Pungging Kabupaten Mojokerto). *Journal Swara Bhumi*. 1(1).48-53.
- [10]. Suarasurabaya.net, edisi 20 November 2019. Dulu Bertani, Lalu Pindah ke Sampah Karena Lebih Untung. accessed via (online) <https://www.suarasurabaya.net/kelanakota/2019/Dulu-Bertani-Lalu-Pindah-ke-Sampah-Karena-Lebih-Untung/> [05/07/2021].
- [12]. Petrlik, J., Ismawati, A, Y., DiGangi, J., Arisandi, P., Bell, L., and Beeler, B. (2019). Sampah Plastik Meracuni Rantai Makanan Indonesia. accessed via (online) https://ipen.org/sites/default/files/documents/indonesia-egg-report-long-v1_2web-id.pdf [05/07/2021].
- [13]. Sahil, J., M H, I, Al. Muhdar., F. Rohman., I. Syamsuri. 2016. Sistem Pengelolaan dan Upaya Penanggulangan Sampah di Kelurahan DufaDufa Kota Ternate. *Jurnal Bioedukasi*. 4(2).2301-4678. DOI. 10.33387/bioedu.v4i2.160
- [14]. Putri, G. A. D. 2018. Potensi Pengelolaan Sampah Yang Dilakukan Oleh Sektor Informal Informal Di Wilayah Kabupaten Sleman. Tugas Akhir. Program Studi Teknik Lingkungan. Universitas Islam Indonesia. Yogyakarta.
- [15]. Hutagalung, E. C., D. N. Santi., I. Marsaulina. 2015. Peran Pemulung Dalam Pengelolaan Sampah dan Timbulan Sampah di TPA Terjun Kecamatan Medan Marelau Kota Medan Tahun 2015. *Jurnal FKM USU*. 1-8.
- [22]. Ketsakhon, P., A. Thammasittirong., S. N. R. Thammasittirong. 2023. Adding value to rice straw waste for high-level xylanase production using a new isolate of *Bacillus altitudinis* RS3025. *Folia Microbiologica*. 68(1).87–99. DOI.10.1007/s12223-022-00998-x
- [23]. Leong, S. Y., S. Y. Lee., T. Y. Koh., D. T. C. Ang. 2023. 4R of rubber waste management: current and outlook. *Journal of Material Cycles and Waste Management*. 25(1).37–51. DOI.10.1007/s10163-022-01554-y
- [24]. Swastika, D. J. 2020. Peran Pengepul Sampah Dalam Mensejahterakan Pemulung Di Padukuhan Gowok, Caturtunggal, Kecamatan Depok, Kabupaten Sleman, Provinsi D.I. Yogyakarta. Skripsi. Ilmu Kesejahteraan Sosial. Universitas Islam Negeri Sunan Kalijaga. Yogyakarta.
- [25]. Misganaw, A. 2023. Assessment of potential environmental impacts and sustainable management of municipal solid

- waste using the DPSIRO framework: a case study of Bahir Dar, Ethiopia. *Environmental Monitoring and Assessment*, 195(2). DOI.10.1007/s10661-023-10929-z
- [26]. Sinthumule, N. I., S. H. Mkumbuzi. 2019. Participation in community-based solid waste management in Nkulumane Suburb, Bulawayo, Zimbabwe. *Resources*, 8(1).1-16. DOI.10.3390/resources8010030
- [27]. Zurbrügg, C., S. Drescher., A. Patel., H. C. Sharatchandra. 2004. Decentralised composting of urban waste - An overview of community and private initiatives in Indian cities. *Waste Management*. 24(7).655–662. DOI.10.1016/j.wasman.2004.01.003
- [28]. Ahmed, F., S. Hasan., M. S. Rana., N. Sharmin. 2023. A conceptual framework for zero waste management in Bangladesh. *International Journal of Environmental Science and Technology*. 20(2)1887–1904. DOI.10.1007/s13762-022-04127-6.
- [29]. Parajuly. K., C. Fitzpatrick., O. Muldoon., R. Kuehr. 2020. Behavioral change for the circular economy: A review with focus on electronic waste management in the EU. *Resources, Conservation and Recycling: X*. 6.1-9. DOI. 10.1016/j.rcrx.2020.100035.
- [30]. Gabor, M. R., A. López–Malest., M. C. Panait. 2023. The transition journey of EU vs. NON-EU countries for waste management. *Environmental Science and Pollution Research*, 30(21).60326–60342. DOI. 10.1007/s11356-023-26686-y
- [31]. Lestari, T., E. Sarjanti. 2023. Optimasi Pengelolaan Sampah Rumah Tangga Berkelanjutan Berbasis Masyarakat Dengan Pendekatan Spasial Di Desa Ajibarang Kulon. *Nusantara: Jurnal Ilmu Pengetahuan Sosial*. 10(7).3268-3274. DOI. 10.31604/jjips.v10i7.2023.3268-3274
- [32]. Karadimas, D., E. Garner., J. Seay. 2023. A sustainable approach to plastic waste management in the Global South. *Cambridge Prisms: Plastics*. 1.1-6. DOI.10.1017/plc.2023.5
- [33]. Brunhara, J. P. C., K. G. Macedo., T. K. Das., M. D. D. M. Innocentini. 2023. A Driving Force-Pressure-State-Impact-Response (DPSIR) tool to help waste pickers' cooperatives self-evaluate their environmental and economic performance. *Hygiene and Environmental Health Advances*. 6.1-11. DOI.10.1016/j.heha.2023.100054
- [34]. Willis, K., B. D. Hardesty., J. Vince., C. Wilcox. 2022. Local waste management successfully reduces coastal plastic pollution. *One Earth*. 5(6).666–676. DOI.10.1016/j.oneear.2022.05.008