Domestic Waste Management Based on Collaborative Governance in Pekanbaru City

Suryani
Sekolah Tinggi Ilmu Kesehatan Payung Negeri Pekanbaru

Correspondence Email: suryani@payungnegeri.ac.id

Abstract: *Waste management in Pekanbaru City is not optimal. This can be seen by the many piles of garbage on the sides of roads, rivers, and bridges. This is because there is still a lack of public awareness and cooperation in managing domestic waste in the city of Pekanbaru. Stakeholders in domestic waste management are a collaboration involving the government, the private sector, and the community in managing domestic waste in Pekanbaru City. This study aims to determine collaborative governance in the management of domestic waste in Pekanbaru City and to determine the factors that hinder the collaboration of stakeholders in the management of domestic waste. This study uses a descriptive qualitative approach with data collection techniques that include in-depth interviews, documentation studies, and observations. Data analysis was carried out by reducing data, analyzing data, presenting data and drawing conclusions. The results of the study found The results showed that waste management in Pekanbaru City still uses conventional methods, namely by sorting, collecting, transporting, processing, and final processing by sending it to the collaborative Muara Fajar Rumbai Pesisir Final Disposal Site. The study also concluded that stakeholders in the management of domestic waste in the city of Pekanbaru were not optimal due to several inhibiting factors such as the absence of work programs and a lack of awareness to collaborate in the management of domestic waste in the city of Pekanbaru.*
Keywords: *Collaborative Governance, Waste Management, Domestic Waste, Stakeholders.*

Introduction

The environmental problem that occurs is a decrease in the carrying capacity of the environment due to low public awareness of the importance of environmental management (Jazuli, 2015). This is caused by several factors, including changes in the function and arrangement of the environment, a decrease in the carrying capacity of the environment and the quality of the environment, the lack of integration in the management of human, natural and artificial resources in environmental management between various parties, the less than optimal utilization of urban space, and environmental pollution produced by the presence of waste (Tijow, 1972).

Garbage is a major problem that must be faced by the region, both in big cities and in small cities. The cleanliness of the area from waste and waste management services by the government is one of the main improvements that must be made by local governments (Dongoran et al., 2018). One of the problems in the

environment is the growing population and increased community and government activities in a development, particularly those related to increased waste production (Salinding et al., 2016).

The waste problem can have an impact on social, economic, health, and environmental aspects, even causing the greenhouse effect (Wardi, 2011), which is the cause of climate change (Sumampouw, 2019). This condition is further exacerbated by the government's inability to provide management facilities and infrastructure, low public awareness and participation, involvement of the private sector, human resource problems, budget and regulatory compliance, and lack of integration (Sumampouw, 2019).

To overcome the wider impact, systematic, comprehensive, and sustainable waste management is needed both in reducing and handling waste as regulated in Law Number 18 of 2008 concerning Waste Management. In this regulation, the responsibility for waste management is not only borne by the government but also the source of waste, both household, community and private. In fact, the responsibility for waste management is often borne by the government and local governments as a consequence of the imposition of levies on waste services carried out by the government on the community (Nugraha et al., 2020). The limited capacity of the government and the low awareness and participation of the community, the problem of coordination (Indartik et al., 2018), resulted in the problem of waste management not being able to be resolved. Therefore, efficient and effective waste management is needed to prevent a bigger impact on social,

environmental, health and other aspects (Mulasari et al., 2014).

Based on the laws and regulations regarding waste management, one of the main foundations of waste management is the division of tasks and roles of all parties involved in waste management, where the parties involved are: (1) government (ministry/institution at the central level, provincial government, district/city government), (2) non-government parties (business world/private institutions, area managers), and (2) community. This explains why in waste management it is necessary to apply the principles of collaborative governance because waste management is a problem that is in the interest and responsibility of all stakeholders (Jahro, 2018).

Collaborative Governance is one way to respond to the wishes of stakeholders to be involved in the implementation of development and to the limitations of government funding, which cannot keep up with the development of community demands for better government performance. The aim is to obtain resources to carry out development according to the expectations of these stakeholders. These resources are located and owned by these stakeholders (Islamy, 2018).

The principles and concepts of collaborative governance that have been applied in various countries or regions are relatively the same. The difference lies in the sector, objectives, structure, processes, and impacts. With these differences, it becomes a special attraction to be understood and studied more deeply, especially in cases that occur at the district or city level (Hardi, 2020). Trust, commitment, and authority

among stakeholders in each region or city always have their own dynamics. There are regional localities that can lead to differences between one region and another. Studying a case of governance, collaborative governance is intended to find out the best practices and worst practices (Ansell & Gash, 2008). Ansell & Gash compile several prerequisites for the creation of a collaborative process, namely: (1) There is stakeholder participation, (2) There are conditions where there is equality of power, and (3) There are competent actors.

In waste management, stakeholders have an important role in cooperating or collaborating in managing household or domestic waste (Rosyadi & Lestianingrum, 2013). In addition, stakeholder collaboration has meaning as a process of mutual agreement between stakeholders in solving a problem that involves the unification of different points of view among the various parties involved so as to be able to produce cooperation in achieving common goals (Qalby, 2018).

Community participation in collaborating on domestic waste management is one of the important factors in solving the waste problem. Currently, the participation of the community in general is only limited to waste disposal. It has not yet reached the stage of waste management that provides benefits for the community again. Many people do not know how to manage waste properly. This is due to a lack of socialization and public knowledge about waste management and the utilization of what is good and right (Sulistyani & Wulandari, 2017). Therefore, it takes an element of cooperation that involves the community and the private sector in the management of existing domestic waste.

Pekanbaru is one of the cities that face waste management problems, so waste management is not optimally carried out. In 2020, the daily production of municipal waste reaches approximately 1,052.16 tons, or equivalent to 384,039 tons per year, but the waste that reaches the landfill for the last five years on average has not reached half (46.72%) (BPS, 2020). This condition is also supported by the results of the Basic Health Research of Riau Province in 2018, which found that only 25% of waste was transported while the largest proportion (64%) was burned or thrown into rivers/sewers (4%) and even disposed of carelessly (Ernawaty, 2018).

To overcome the waste problem, the Pekanbaru City Environment and Hygiene Service (DLHK), as a technical regional work unit (SKPD) responsible for cleanliness and environmental affairs, carries out waste management in collaboration with two private parties. However, the problem of waste management every year is often in the public spotlight and even enters the realm of law (mediaindonesia.com, 2021).

Waste management policies by cooperating with actors outside the country cannot only be carried out by two stakeholders (Melyanti, 2014; Freddy et al., 2022). For this reason, community involvement in managing waste is also needed to reduce the generation of waste that is disposed of in the TPA (Artiningsih, 2008). Another study was also conducted by Yumi Puspitawati and Mardwi Rahdriawan, who saw that community-based waste

management was able to increase community responsibility in managing waste (Puspitawati & Rahdriawan, 2012). However, this research aims to fill a research gap by looking at partnerships in waste management through three stakeholders, namely the government, the private sector, and the community.

Method

This research uses qualitative research. Qualitative research methods, according to Creswell (2016), explore and understand the intentions of a number of individuals or groups of people who have social problems. Qualitative research is often used in research on people's lives, behavior, history, and others. This study aims to describe and describe events and phenomena that occur in the field and present data in a systematic, factual, and accurate manner for a particular population or area regarding certain characteristics, characteristics, or factors. This study uses a qualitative approach because this research seeks to understand collaborative governance in waste management and local government policies on waste management. Using more than one data collection approach allows the evaluator to combine the activity and validity of a data source.

Data analysis in this study begins with collecting raw data that has been obtained during observations, interviews, and surveys. The raw data, obtained either in written form, soft copy, recordings or notes during the research, is then collected to be combined into data and information that is simpler to read and understand. The results of collecting interview and survey data obtained were then compiled based on the guidelines for extracting data, which became the instrument in the research that had been prepared beforehand. Then the data is prepared to be read and understood so that it is easy for the author to analyze the description of the data. Then the results of the interviews are identified according to the questions posed by the researcher to several sources who have been designated as informants in the study. The results of the grouping carried out will be used as research material to prepare the data to be analyzed.

Result And Discussion
Waste Management in Pekanbaru City

Based on the Pekanbaru City Regional Environmental Management Performance Information Document (DIKPLHD), the amount of waste generated by Pekanbaru City residents in 2019 is estimated at 1,052.16 tons/day, or 384,039.5 tons/year. Meanwhile, the projected waste pile for the next 3 (three) years is expected to increase. The projected waste heap is calculated based on the multiplication of the population by 3.84 liters per day (Afriyanni et al., 2022). This figure is based on the estimated amount of waste generated by each person each day based on the Pekanbaru City Waste Master Plan.

The increase in the rate of waste accumulation is proportional to the increase in the population. The sub-districts that have the highest potential and projected waste generation are Tampan, Marpoyan Damai, and Tenayan Raya sub-districts. However, there are three (3) sub-districts that are projected to reduce their waste dumps, namely

Marpoyan Damai, Tenayan Raya District, and Sukajadi. This condition shows that there are efforts to reduce the amount of waste piled up by the community and local government.

Observing the implementation of waste management in the city of Pekanbaru is important in the context of waste management. This is because the Pekanbaru city government in terms of waste management has collaborated with third parties to partner with the government to deal with city waste problems (Zainal et al., 2021). After the partnership is reached between the two parties (in this case, the Pekanbaru City Government and PT. Samhana Indah), then the implementation stage becomes important to pay attention to whether the reality on the ground is in accordance with what has been previously designed and agreed.

Based on the MoU between the Pekanbaru City government and the private sector (PT. Samhana Indah), the waste management system by the private sector is only limited to the stage of the transportation process. So that the stages of planning and monitoring/control remain with the Pekanbaru City government. Partners for this stage of transportation are carried out because the government lacks resources, especially with regard to the availability of fleets of cars for transporting waste. It is hoped that the winning bidder in this case, PT. Samhana Indah, who manages waste transportation management in zone 1, is fully responsible for cleanliness in her work area.

According to the Sanitation and Landscaping Office of Pekanbaru City, waste management is a technical application of waste management that includes sorting, collection, transportation, management, and final processing of waste. This study uses indicators from the technical implementation of waste management based on government policy regarding waste management based on Pekanbaru City Regulation No. 08 of 2014 (Article 15).

Sorting

Garbage is all material that is disposed of by household activities, trade, industry, and agricultural activities. Or in other words, waste is part of something that is not used, disliked, or something that must be thrown away, which generally comes from activities carried out by humans (including industrial activities), but not biological ones. Segregation of waste based on the composition of waste, namely organic and non-organic, has been carried out in several places. Because there are still a few people who do waste sorting, they are more likely to mix it into one container. Garbage sorting is also carried out by the officers who collect the garbage. However, the sorting process carried out in several places is still limited to sorting in the container, while in the process of transporting the waste it is still combined between organic and non-organic. Pekanbaru City, in sorting waste, has not yet done the sorting in an effective way. This is because people tend to be lazy when sorting. This condition is due to indirect support from the government to exacerbate this by transporting waste through dump trucks whose containers are put together. All waste from various types of waste,

whether organic, non-organic, or B3 waste, is put together in one container on the truck. This is what makes people reluctant to sort their waste due to the unavailability of containers and transportation systems that are still unified. This sorting of waste is a good start for the community in the increasingly advanced waste management system. Along with raising public awareness of environmental concerns, particularly the waste problem, below are some of the benefits of separating organic and inorganic waste: 1). Encourages the community to recycle waste. 2) Make waste recycling easier. 3) Reducing waste quotas 4). Increase knowledge.

Collection

Garbage collection is a method or process of collecting waste starting from the place where waste is collected from the source of waste generation to the temporary collection point or at the same time to the final disposal site (TPA). Collection is generally carried out by city janitors or non-governmental organizations (waste sources, private agencies, or RT/RW). Community participation in waste management is largely determined by the level of the city's ability to bear the burden of the city's waste problems.

Garbage collection can be done once a day because the market is a producer of large amounts of waste, especially organic waste, which can cause bad odors and breed flies and mice. Garbage collection can be done as follows: 1). Individuals are people who collect waste to be disposed of in a temporary garbage dump. 2). The government is the janitor who collects by using trucks or garbage carts. 3). The private sector only takes certain wastes as raw materials for the company, such as the manufacture of paper, cardboard, and plastic.

In terms of garbage collection in Pekanbaru City, it is still carried out by cleaning officers assigned by the cleaning service and private parties to do this work. In Pekanbaru City, the collection is carried out by officers using several approaches, including from house to house using a cart by janitors from both the government and the private sector, with the mechanism of collecting waste and then collecting it at the nearest TPS.

From the results of the author's observations, garbage collection from households is generally done using a cart or motorized tricycle. Where the collection is done by officers coming to the house one by one to pick up the garbage that has been placed in large plastic bags or in other containers. Later, the community will pay around Rp. 10,000 to Rp. 15,000 for the transportation of the waste by the cleaning staff. Garbage collection is quite varied; some are done every day, usually in the morning; some are done approximately 2-3 times a week.

Freight

Garbage transportation is the transfer of waste from a temporary disposal site to a relatively large final disposal site. Transportation is intended as an operational activity starting from the last collection point of a collection cycle to the TPA at the collector with a direct individual pattern or from a transfer depot (Transfer Depo, Transfer Station), temporary shelter (TPS, TPSS,

LPS), or shelter; communal to the final disposal site.

Based on the author's observations, waste transportation in Pekanbaru City is carried out using dump trucks by cleaning staff. The time chosen was every morning around 7 o'clock, when the transport truck started picking up garbage at TPS (Temporary Collection Places) in the sub-districts of Pekanbaru City to then take it to the Muara Fajar TPA in Rumbai Pesisir District.

Processing

Waste processing is an advanced stage in which there is processing through potential waste processing units in Pekanbaru City. In this study, the existing waste processing units are compost processing units and waste banks. Waste processing is an effort to reduce the volume of waste or change its form to be useful, including burning, recycling, crushing, and drying. Waste processing has not been optimal in each processing unit (compost unit and waste bank). This is because the waste is already mixed and not specifically allocated for its collection and transportation from the source to the processing unit. So, there is still a lot of waste that can be processed and carried to the TPA.

Waste Final Processing

It is the last alternative if all other methods have been optimized. Final processing is a stage where all the remaining waste is brought to a large area, in this study, called the Muara Fajar IPA. In the existing condition, based on the analysis of the existing life cycle of waste in Pekanbaru City, there is about

166,447.7 tons, or about 84.99 percent of the waste that goes to the WTP and is not managed.

The final waste disposal site (TPA) is a physical facility for the ongoing waste disposal activities. It's a place to get rid of city trash, so it's safe. Final disposal is the place provided to dispose of waste from all waste transportation results for further processing. TPST-3R waste processing unit, which is still not operating. Until early 2017, this TPST-3R unit has not been able to operate. The physical building is already available, but for supporting facilities, and the 3R system has not been carried out at this TPS. The condition of the building was found to be in a condition that was not good due to it being allowed to take too long and some of it being used as an ordinary TPS whose function was only to collect. The lack of alternative waste treatment plans is due to limited costs and technology adopted.

Collaborative Governance of Domestic Waste Management in Pekanbaru City

In this study, the authors found several shortcomings that occur in collaboration between government and private institutions, when it leads to the principles of collaborative governance according to Chriss Ansell and Alison Gash. Based on the results of an interview with the Head of the Waste Management Section of the Pekanbaru City Environmental Service, he gave the following responses:

"If we want to look at who has a bigger role, it's the government or private institutions in this collaboration. It is clear and proven by facts on the ground that the result is the government. So far, the

government has been active in the implementation process, both in planning and monitoring while in the field. We always have deliberations in the community so that we know and understand where the mistakes and shortcomings lie in the event of public dissatisfaction with the services provided. Meanwhile, private institutions only collaborate by providing facilities and infrastructure assistance, but there is no follow-up on what programs will be implemented after that. They only seem to provide assistance after it is finished".

Good cooperation between the government, in this case, the Pekanbaru City Environmental Service, and private institutions is very necessary in the collaboration process for the creation of common goals to be achieved. This does not mean that the efforts made by private institutions by providing assistance are not sufficient, but that they are not appropriate if carried out according to a collaboration mechanism. The author focuses on the leadership element because it refers to the principles of collaborative governance according to Chriss Ansell and Alison Gash. So, in the initial conditions, it only focuses on the role of inter-stakeholders. Based on the results of an interview with the Head of the Waste Management Section of the Pekanbaru City Environmental Service, he gave the following responses:

"As far as the collaboration process with private institutions in waste management is concerned, no conflict problems have occurred. Everything went

according to plan, and everyone helped each other. It's just enough to be worried that there has been no further discussion regarding what program will be implemented next. Will it just stop by providing assistance or will other cooperation systems be implemented?".

Based on the data collected by the author and previously submitted, the author thinks that this collaboration program has been working, even though there have been disagreements from both sides. However, it has not been put into place in a complicated way, and only a few programs have been put into place.

The collaborative process that occurs between the government and private institutions is the first step in implementing the waste management program in Pekanbaru City. This established foundation supports the successful implementation of collaborative domestic waste management. Furthermore, implementing collaborative governance by involving the community can be done in the following ways:

Shared Motivation

The shared motivation for the collaboration of household waste management in Pekanbaru city from each stakeholder involved in the collaboration already exists, including to provide knowledge or socialization to the community about waste management, from the private sector, namely to make it easier to get raw materials for waste management. managed, from the waste bank, namely to gain knowledge and facilities in waste management. While from the

government side, it is to facilitate cooperation in waste management and provide awareness to the public so that they want to manage waste, especially household waste. Because of the common problems that must be solved in a common way, we need mutual encouragement or motivation that must be continuously enhanced and strengthened in a collaboration by equating perceptions, visions, missions, and common goals to be achieved, namely to overcome the problems of household waste management.

Mutual Trust

Mutual trust in the collaboration of stakeholders in household waste management is important because, without mutual trust from each of the stakeholders involved, cooperation or collaboration will be difficult to carry out. The mutual trust in waste management in Pekanbaru City already exists among each stakeholder involved in the collaboration of domestic waste management.

Mutual Understanding

There is a common understanding in the collaboration of waste management in Pekanbaru City from each party involved in the collaboration, already understanding their respective duties and goals in collaborating. However, the problem is that there are still many people who do not understand the existence of cooperation in waste management. Therefore, education and socialization are needed to form cooperation or collaboration in household waste management. This is done and must be conveyed to the community so that they

realize and understand the importance of waste management and so that they can implement their understanding in their daily life.

Internal Legitimacy

Internal legitimacy or recognition from internal stakeholders to collaborate in the management of household waste in the city of Pekanbaru can be concluded that each stakeholder accepts the collaboration or cooperation in managing household waste in the city of Pekanbaru.

Commitment

Strong involvement and commitment from the parties involved, starting from the government, private sector, and community, in conducting collaboration is very necessary. The strength of the collaboration process is largely determined by the commitment that exists among the collaborating parties, because a strong commitment will greatly determine the success or failure of the collaboration in achieving the expected goals.

Conclusion

The performance of solid waste management in Pekanbaru City in terms of technical operations, institutions, financing, community participation, and regulations is still not optimal. This has resulted in a low percentage of the amount of waste being handled, and the realization of the target for retribution on waste services has not yet been optimally achieved. The results of the study found that there were several problems faced by the Pekanbaru City Government in implementing waste management, especially public

awareness and participation. The lack of public information about collaborative governance-based waste management is to blame for the low community participation in waste management. From the results of the author's interviews with respondents, it was found that the collaboration that has been going well is only between the government and the private sector as a third party that manages waste in the city of Pekanbaru. In an effort to involve the community more in waste management, especially household or domestic waste in the concept of collaborative governance, can be done by fostering mutual motivation, mutual trust, mutual understanding, internal legitimacy and mutual commitment.

Acknowledgement

References

Afriyanni, A., Hayati, K., Kusumaningrum, N. R., & Amri, K. (2022). KINERJA PENGELOLAAN PERSAMPAHAN DI KOTA PEKANBARU. *Inovasi Pembangunan: Jurnal Kelitbangan*, *10*(01), 81-94.

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of public administration research and theory*, *18*(4), 543-571.

Artiningsih, N. K. A. (2008). *Peran serta masyarakat dalam pengelolaan sampah rumah tangga (Studi kasus di Sampangan dan Jomblang, Kota Semarang)* (Doctoral dissertation, program Pascasarjana Universitas Diponegoro).

Creswell, J. W. (2016). Research design: pendekatan metode kualitatif, kuantitatif, dan campuran. *Yogyakarta: Pustaka Pelajar*, *5*.

Dongoran, H. S., Harahap, R. H., & Tarigan, U. (2018). Implementasi Peraturan Walikota Medan tentang Unit Pelaksanaan Teknis Pelayanan Kebersihan dan Bank Sampah. *Jurnal Administrasi Publik: Public Administration Journal*, *8*(1), 47-64.

Ernawaty, E. (2018). Implementation Of Law Number 18 Year 2008 Regarding Waste Management.

Freddy, H. T. R., Achmad, W., & Nasution, M. S. (2022). The Effectivity Of Public Services Based On Smart Goverment In Bukit Raya Distric Pekanbaru City. Journal of Governance, 7(1), 239-259.

Hardi, W. (2020). Collaborative Governance Dalam Perspektif Administrasi Publik.

https://mediaindonesia.com/nusantara/374557/dprd-soroti-masalahpengelolaan-sampah-di-kotapekanbaru

Indartik, S. E., Djaenudin, D., & Pribadi, M. A. (2018). Penanganan Sampah Rumah Tangga Di Kota Bandung: Nilai Tambah Dan Potensi Ekonomi. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan*, *15*(3), 195-211.

Islamy, H. L. O. S. (2018). *Collaborative Governance Konsep dan Aplikasi*. Deepublish.

Jahro, S. (2018). Collaborative Governance Dalam Pengelolaan Sampah Di Kelurahan Kiduldalem, Kelurahan Jogosari, Dan Desa Pleret Kabupaten Pasuruan.

Jazuli, A. (2015). Dinamika hukum lingkungan hidup dan sumber daya alam dalam rangka pembangunan berkelanjutan. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, *4*(2), 181-197.

Law Number 18 of 2008 concerning Waste Management.

Melyanti, I. M. (2014). Pola kemitraan pemerintah, civil society, dan swasta dalam program bank sampah di Pasar Baru Kota Probolinggo. *Jurnal kebijakan dan manajemen publik*, *2*(1).

Mulasari, S. A., Husodo, A. H., & Muhadjir, N. (2016). Analisis situasi permasalahan sampah kota Yogyakarta dan kebijakan penanggulangannya. *KEMAS: Jurnal Kesehatan Masyarakat*, *11*(2), 259-269.

Nugraha, A. P., Hardjomidjojo, H., & Munandar, J. M. (2020). Faktor-Faktor Yang Mempengaruhi Partisipasi Masyarakat Dalam Mereduksi Sampah Rumah Tangga Di Kota Bogor. *Ecolab*, *14*(1), 31-41.

Puspitawati, Y., & Rahdriawan, M. (2012). Kajian pengelolaan sampah berbasis masyarakat dengan konsep 3R (reduce, reuse, recycle) di Kelurahan Larangan Kota Cirebon. *Jurnal pembangunan wilayah & kota*, *8*(4), 349-359.

Qalby, A. N. (2018). *Collaborative Governance Dalam Pengelolaan Sampah Di Kelurahan Paropo Kecamatan Panakkukang Kota Makassar (Bank Sampah Pusat).* Makassar: Unismuh.

Rosyadi, S., & Lestianingrum, E. (2013). PERMODELAN SAMPAH PEMUKIMAN BERBASIS MANAJEMEN KOLABORASI (Studi Kasus di Desa Palimanan Barat Kabupaten Cirebon). *Pembangunan Pedesaan*, *13*(2).

Salinding, R. A., Posumah, J. H., & Palar, N. A. (2016). Efektivitas Pengelolaan Sampah Oleh Dinas Kebersihan Dan Pertamanan Kota Manado. *Jurnal Administrasi Publik*, *3*(41).

Sulistyani, A. T., & Wulandari, Y. (2017). Proses pemberdayaan masyarakat Desa Sitimulyo Kecamatan Piyungan Kabupaten Bantul dalam pembentukan kelompok pengelola sampah mandiri (KPSM). *Jurnal Pengabdian Kepada Masyarakat (Indonesian Journal of Community Engagement)*, *2*(2), 146-162.

Sumampouw, O. J. (2019). *Perubahan Iklim dan kesehatan masyarakat.* Deepublish.

Tijow, L. (1972, June). Kebijakan Hukum Pengelolaan Lingkungan Hidup Di Indonesia. In *Conference on the Human Environment" yang diselenggarakan di Stockholm tanggal* (Vol. 5, p. 16).

Wardi, I. N. (2011). Pengelolaan sampah berbasis sosial budaya: Upaya mengatasi masalah lingkungan di Bali. *Bumi Lestari Journal of Environment*, *11*(1), 167-177.

Zainal, Z., Rambey, R. R., & Rahman, K. (2021). Governance of Household Waste Management in Pekanbaru City. *MIMBAR: Jurnal Sosial dan Pembangunan*, *37*(2).