

POTENTIAL OF CIRCULAR ECONOMY IMPLEMENTATION IN MANAGING PLASTIC WASTE IN KABUPATEN BENGKALIS

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ABSTRACT

The problem faced by Kabupaten Bengkalis is the amount of waste, especially plastic waste, which continues to increase and causes accumulation in final processing sites and temporary shelters. This research aims to determine the implementation of a circular economy in plastic waste management, the most effective waste management model for the management of plastic waste in, the obstacles in the management of plastic waste, and the solutions that can be used to manage plastic waste in the circular economy. This research uses a descriptive qualitative research method. In this research, the data collection techniques are interviews, observation, and visual image techniques. The result of this research is that the manifestation of a circular economy with the 5R principle (Reduce, Reuse, Recycle, Recovery, and Revalue) still requires time and a gradual process. This is related to the behavior and mindset of the community in handling and managing plastic waste, which hasn't started from sorting waste from home.

Keywords: plastic waste, circular economy, final processing sites (TPA), temporary shelters (TPS), 5r

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INTRODUCTION

Modern economic realities require a fundamentally new approach to the implementation of economic activity, as commodity producers are currently experiencing serious restrictions, caused by a shortage of natural resources and unprecedented degradation of ecosystems. To ensure sustainable development, which presupposes economic progress, environmental security and improving the quality of life of the population, a different development paradigm is currently required (Tambovceva.T & Titko.J, 2017). From the environmental problems facing the world today, the application of a circular economy is a paradigm that is truly appropriate to be applied.

In recent years, the Circular Economy (CE) has gained worldwide attention as an effective alternative economic system to the current model of production and consumption of waste collection (Tonelli.M & Cristoni.N, 2019). The circular economy is an update of the linear economy. This update is carried out because in a linear economy, products are destined to be discarded, so manufacturers are constantly producing products by taking natural resources to produce new products. Of course, this will cause the growth of production waste to be higher. While the principles of a circular economy include reducing waste and pollution, keeping products and materials in use as long as possible, and regenerating natural systems (Ellen Macarthur Foundation, 2017). The circular economy concept is not only focused on

reducing waste. However, it provides an economic value for the waste. Waste can be processed into new products that have a higher value than the previous product. The waste problem that occurs in the world which is a serious matter and needs to be resolved is the problem of plastic waste. Plastic waste is a problem because it takes a very long time to decompose so it can pollute the environment (Sartono. A. D, 2022). The Circular Economy brought a revolutionary change for plastic waste management. Circular Economy emphasizes on zero waste methodology by innovation and rethinking design to increase product life cycle for better use and less frequent waste, reusability, and recyclability in all ways possible so that the waste would not end up in landfills or marine litter. The World Economic Forum also introduced The New Plastic economy which pointed out how plastic rethinking and redesigning will make major implications (World Economic Forum, 2016) in (Jaideep Balwada et.al, 2021).

Indonesia is also inseparable from the problem of waste, especially plastic waste and Indonesia is also the largest contributor to waste by being ranked second in the world. According to data from the Central Statistics Agency (BPS) and the Indonesian Plastic Industry Association (INAPLAS) in 2020, Indonesia is a contributor to plastic waste of around 67.8 million tons or there are 185,753 tons of waste every day. With this large amount of plastic, it causes the generation of garbage to build up in the provision of landfills and can create new problems because waste processing is still limited so that waste management becomes less than optimal. Nearly 80 percent of the world's plastic waste ends up in landfills (Bucknall, 2020).

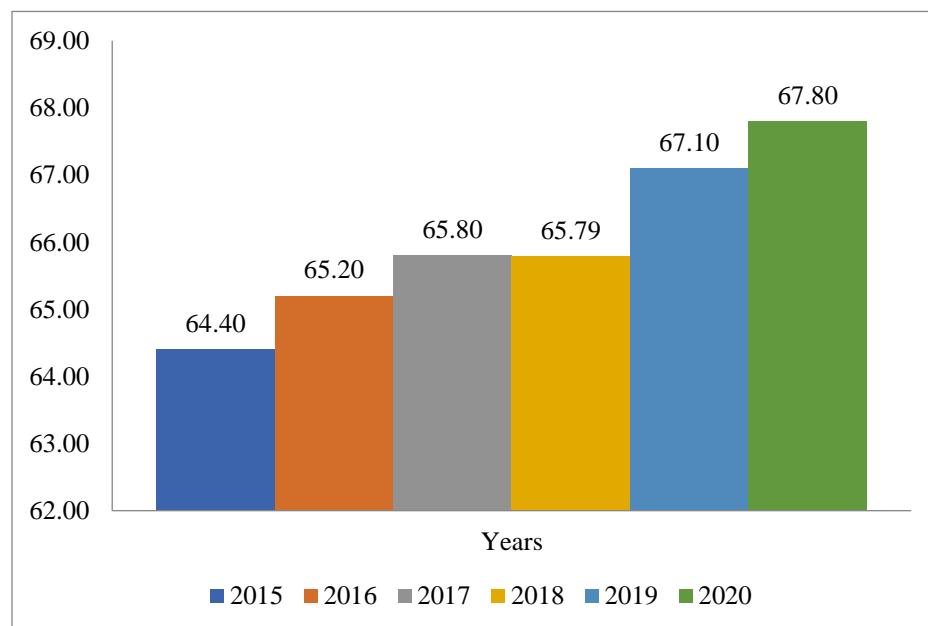


Figure 1 Illustration of Waste Generation Rate in Indonesia per 2015-2020
Source: BPS and KLHK Data

Plastic waste contributes 15% (28.4 thousand tons per day) of the total waste in Indonesia of 189 thousand tons per day (Kholidah et.al, 2019) in (Astuti, A.D. et al, 2020). Of the total plastic waste, only 10-15% is recycled, 60-70% is stored in landfill, and 15-30% is not managed which is then wasted into the environment (Purwaningrum, 2016). The data shows that more than half of the total amount of waste ends up in the TPA. Disposal of plastic

waste in the TPA will shorten the life of the TPA because of the nature of the plastic which cannot be decomposed naturally (non-biodegradable) (Astuti, A.D et al., 2019). If plastic waste is dumped into the landfill in large, continuous and compacted quantities, it will cause leachate to not penetrate into the bottom layer of the landfill because the plastic is impermeable to water. As a result, leachate comes out of landfills and causes wider environmental pollution (Horsák et al, 2016).

In Kabupaten Bengkalis, according to data from the Ministry of Environment and Forestry's SIPSN, piles of garbage in 2021 has reached 94,536.90 tons per year and the achievement of waste handling is 68.44% and waste reduction is 16.11% and there is 5% plastic waste in Kabupaten Bengkalis. The waste management system that is usually used by local governments such as collecting, transporting and disposing of is a waste management system that only creates a buildup of waste in the final disposal site (TPA).

The performance of the Dinas Lingkungan Hidup in handling waste in Kabupaten Bengkalis has not gone well, this can be seen from the limited land for the TPA, so it is not proportional to the amount of waste generated, and has not used environmentally friendly technology in the TPA (final processing site), socialization in management waste is not entirely limited to the apparatus, the coordination of tasks with the UPT (technical implementation unit) sub-district cleanliness is not optimal, the competence of employees is still of low quality, there is still a lack of waste management and limited facilities and infrastructure so that waste management has not been carried out optimally and lack of participation community in reducing the volume of waste, sorting waste, and utilizing waste. (Setiawan.H, et al, 2019). In addition, community of Kabupaten Bengkalis involvement in reducing the accumulation of plastic waste is in low category. This can be proven by the accumulation of garbage in each temporary shelter which always full every day and causing a foul odor.

METHOD

The method used in this research is descriptive qualitative, where a descriptive qualitative method is an analysis method by collecting data and information without using a certain calculation process (Sartono, A. D, 2022), which is the result of direct interviews in the field or data collection from various sources or documents (Sartono, A. D, 2022). In this research, the information collected comes from interviews, literature studies from regulations and policies from the government, as well as publications from several journals, both national and international journals. Interviews were conducted with the Government of Kabupaten Bengkalis through Dinas Lingkungan Hidup regarding activities that have been carried out in managing waste, especially plastic waste in Kabupaten Bengkalis and programs carried out by the government in supporting this both in terms of regulations and policies that have been carried out by the government. In addition, data were obtained through surveys and observations of temporary landfills (TPS) and final landfills (TPA). From the data collected, qualitative analysis is then carried out to obtain recommendations by describing the findings and input to the problems and topics raised in this paper.

RESULT AND DISCUSSION

According to data from the National waste management information system: Ministry of Environment and Forestry, the piles of garbage in Kabupaten Bengkalis for daily and annual categories can be seen in table 1 piles of garbage in Riau province.

Table 1 Waste Piles in Riau Province

No	District/City	Daily garbage pile (tons)	Annual piles of garbage (tons)
1.	Kab. Kampar	358.92	131,004.19
2.	Kab. Bengkalis	259.01	94,536.90
3.	Kab. Indragilir Hilir	299.93	109,472.70
4.	Kab. Siak	191.07	69,739.82
5.	Kota Pekanbaru	967.49	353,133.89
6.	Kota Dumai	161.73	59,029.99
	Total	2,238.13	816,917.49

Source: SIPSN Ministry of Environmental and Forestry, 2021

It can be seen in the table above that the achievement of piles of garbage in Kabupaten Bengkalis is 259.01 tons/day and 94,536.90 tons/year, although the achievement of these piles of garbage is not comparable to the piles of garbage in Pekanbaru City which reaches 353,133.89 tons/year and 967.49 tons/day. However, these piles of garbage must be handled immediately so as not to cause an increase in the volume of waste in the final processing site (TPA). Especially for plastic waste which takes a very long time to be decomposed by nature if left unchecked, this will have an impact on the environment and the natural surroundings occupied by the community. In handling and managing plastic waste, we can use a new paradigm, namely circular economy, which in this paradigm is to utilize waste by adding value so that it can be used as much as possible and can be used as long as possible to reduce the extraction of non-renewable natural resources. According to data from the national waste management information system: Ministry of Environment and Forestry, the composition of waste by type in 2020 in Kabupaten Bengkalis, food waste is the largest waste in Bengkalis district with a level of 75% and for plastic waste at a level of 5%, although the amount of plastic waste that accumulates is only 5% and is not a serious problem. However, attention is still needed in managing this plastic waste. Moreover, this plastic waste still has a selling price that can be utilized by the community so that this plastic waste will be very unfortunate if it is allowed to accumulate in the final processing site and become worthless waste. The community can get added value by recycling plastic waste into new products or can be sold to waste collectors and saved in waste banks, plastic waste in Kabupaten Bengkalis can be seen in the pie chart below:

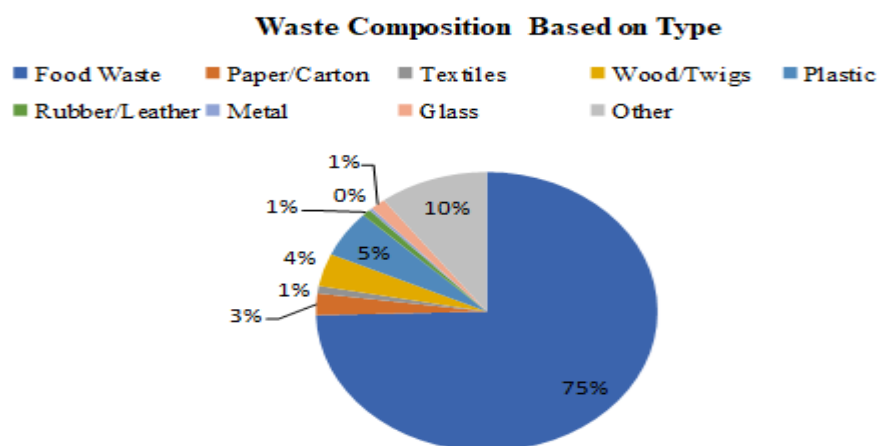


Figure 2 Waste composition based on type

Source: National waste management information: Ministry of Environmental and forestry

Waste management needs to be carried out in a comprehensive and integrated manner from upstream to downstream to provide economic benefits, be healthy for the community and safe for the environment and be able to change people's behavior. The local government of Kabupaten Bengkalis through the Dinas Lingkungan Hidup increasing the government's role in handling and managing plastic waste has several activities or programs, among others are:

1. Socialization to increase the role of the community in managing waste in Kelompok Swadaya Masyarakat (KSM) Duta Belading, Desa Petani, Kecamatan Bathin Solapan. Kab. Bengkalis. This socialization aims to increase the role of the community in managing waste, starting with sorting waste from the house and educate the public that waste can still be utilized and can provide rupiah value. (diskominfotik.bengkaliskab.go.id, 2022) .
2. Garbage charity action in Bengkalis in conjunction with Garbage Awareness Day. This action aims to educate the public that waste still has a rupiah value and this action also aims to educate the public about the existence of Waste Bank (diskominfotik.bengkalis.go.id, 2019).
3. The trash can assistance to the Yayasan Aisyah Berbagi Bengkalis is a form of embodiment of one of the principles of sustainable waste management, namely, waste to resources through the implementation of a circular economy and waste as an alternative energy source (berkabaronline, 2022).
4. World Cleanup Day and waste sorting carried out by the Dinas Lingkungan Hidup with the Desa Mentayan Community which aims to invite the community to do waste sorting and educate children to care more about the environment in which they live (Berkabar online, 2020).

According to data from the Ministry of Environment and Forestry's SIPSN for waste management, there are several facilities such as waste banks, TPS 3R, Recycling Centers (PDU), TPST outside the TPA, and Intermediate Treatment Facility (ITF), but in Kabupaten Bengkalis only has TPS 3R, waste banks, and Final Processing Sites (TPA). TPS3R technology is a waste management system with technological innovations in waste chopping machines and compost sifters that are more effective and efficient. TPS 3R waste management facilities are scattered in several areas in Kabupaten Bengkalis.

CONCLUSION

The implementation of circular economy in managing plastic waste in Kabupaten Bengkalis it still takes time and a gradual process; this is due to the behavior of the Kabupaten Bengkalis community who are not yet willing to manage plastic waste from home with the 5R principle. Education and socialization from the government through the Dinas Lingkungan Hidup is still needed to increase the role of the community in processing waste, which starts from sorting waste, limiting the use of plastic, reusing plastic waste, recycling by saving in the Waste Bank, retrieving plastic waste that has a rupiah value, and realizing that waste still has value that should not be thrown directly into the trash can.

The most effective waste management model for circular economy plastic waste management in Kabupaten Bengkalis is through waste banks to foster a circular economy in which waste banks can process waste by recycling and providing added value to waste. The local Government of Kabupaten Bengkalis through the Dinas Lingkungan Hidup has established the Main Waste Bank (BSI) and Waste Bank Unit (BSU) spread across the area of Kabupaten Bengkalis, but the success of this waste bank also depends on community participation. If the participation of people who save in waste banks is very high, then more

plastic waste will be recycled.

The obstacles in the management of plastic waste in the circular economy in Kabupaten Bengkalis. Although waste management facilities have been established by the government, this will not work well if community participation is at a low level. Community participation in the Bengkalis district in processing which starts from sorting waste from home has not been carried out optimally, because there is still a lot of accumulation of household waste and similar household waste in temporary shelters (TPS) and final processing sites (TPA). These piles of waste are only sorted by scavengers who seek sustenance from the waste.

The solutions that can be used to manage plastic waste in the circular economy in Kabupaten Bengkalis is a community that is fully aware and willing to sort waste from home and save waste in the Waste Bank that has been provided by the Kabupaten Bengkalis government through the Dinas Lingkungan Hidup. In the waste bank, the waste that has been saved by the community will be recycled and sold. So that this recycling activity will reduce the volume of waste in temporary shelters (TPS) and final processing sites (TPA).

Some suggestions that can be given are to establish a plastic recycling plant in every sub-district in Bengkalis Regency, with the existence of this plastic recycling plant it is hoped that it can recycle plastic waste with a larger capacity and make products of high economic value. One of them is plastic seeds, the raw material for manufacturing companies that produce products made from plastic. As well as by implementing a policy prohibiting the use of plastic bags when shopping this has been implemented in several regions in Indonesia. Increase training and mentoring programs on the dangers of plastic and the economic potential of plastic waste to the community. This research is the basis for further research with the theme of developing the concept of circular economy both from environmental aspects and aspects of environment-based entrepreneurship (ecopreneurship), further analysis can also be in the form of assessment/control and evaluation of environmental quality.

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