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Waste Management Performance Towards A Circular Economy In Waste Bank Management System From Maros Regency, Indonesia

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Abstract

Waste management has been in the spotlight in recent years because the amount of waste generated each year is increasing. The circular economy is an economic concept that implements sustainable development goals related to responsible and sustainable levels of consumption and production that can support the community's economy. This study aims to determine performance in understanding waste development and management towards developing an efficient city waste management system that can become a circular economy. The methodology used in this research is an interpretive descriptive qualitative method with a case study approach in Maros Regency, Indonesia, a way of collecting data obtained from various trusted references such as journals, books, etc., this data is then processed by the author. The results of the research show that the performance of the existing waste management system in Maros Regency is running well. The involvement of stakeholders in forming community participation to implement a circular economic system is very helpful because the community can independently improve the economy by managing waste. The Turikale Waste Bank is the central bank. The waste management in Maros Regency is successful because it can provide a turnover of tens of millions per month.

Keywords: Waste Management Performance, Circular Economy Development, Waste Bank, SDGs, Maros Regency

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Introduction

In the modern era and globalization, city development faces various negative impacts (Salman & Hasar, 2023). One of the negative impacts of urban development is the increasingly complex problem of urban waste management (Guerrero et al., 2013; Salman & Hasar, 2023; Mesjasz-Lech, 2021). As cities become more complex, waste has emerged as a problem that requires special attention and disposal. One of the causes of poor waste management and management is the lack of integrated management policies or programs, as well as the lack of community support and involvement both in the business world and the general public (Guerrero et al., 2013; Salman & Hasar, 2023; Mesjasz-Lech, 2021). The waste problem for which no solution has been found lies in waste management that is not managed properly (Ajrina, & Putri, 2020).

An environmental problem that often occurs in cities is inadequate urban waste management (Haseli et al., 2023; Mohammadi et al., 2023). Waste which is part of the remainder of human activities needs to be disposed of properly so that it does not cause various problems or environmental disturbances in human life (Haseli et al., 2023; Mohammadi et al., 2023). As a mediator of pollution, disease outbreaks, aesthetic decline, and disease (Guerrero et al., 2013; Salman & Hasar, 2023; Mesjasz-Lech, 2021; Haseli et al., 2023; Mohammadi et al., 2023). Indonesia's urban waste management has not yet achieved optimal results (Kurniawan et al., 2023; Budihardjo et al., 2023). Of course, related to the problems faced, waste management needs to be carried out by the central government in a comprehensive and integrated manner from upstream to downstream with a circular economy approach (Kurniawan et al., 2023; Budihardjo et al., 2023). Local governments and communities become economically beneficial, healthy for their communities, and safe for the environment (JDIH Marves, 2021; Kurniawan et al., 2023; Budihardjo et al., 2023).

Through the development of waste bank management, the public will learn how to consider waste worthy of being stored in a waste bank (Fatmawati et al., 2022; Ghosh et al., 2023; Ismiraj et al., 2023; Jaya & Machdum, 2022). In addition, efforts are made to train the general public to manage the type and value of waste through a sorting process. This makes it possible to grow the economy of communities/community groups in a circular economy (Fatmawati et al., 2022; Ghosh et al., 2023; Ismiraj et al., 2023; Jaya & Machdum, 2022). A circular economy system aims to make the best use of materials cyclically to minimize waste generation by collecting and reusing as many products and materials as possible (Fatmawati et al., 2022; Ghosh et al., 2023; Ismiraj et al., 2023; Jaya & Machdum, 2022). However, due to system constraints, limited government funding, number of staff, and amount of available equipment often hinder good waste management. By using waste banks, the general public can learn how to consider valuable waste to be stored in waste banks ((Fatmawati et al., 2022).

Reporting from the Women's Obsession Ministry of Environment and Forestry (Ratnawati, 2021), there are three objectives in waste management. First, strengthening the commitment and active role of local governments in implementing waste management by making waste an economic raw material. Second, strengthening public participation in efforts to make waste an economic raw material with the waste sorting movement. The third objective is to strengthen the commitment and active role of producers and other business actors in implementing green business by making waste an economic raw material.

A circular economic system on waste management productivity and recovery methods in waste management requires significant changes in the structure of the waste management system which can give rise to new problems, one of which is an increase in externality costs for society. Therefore,

it is necessary to understand the community's waste cycle before making policies, this is because waste management facilities are built using public funds to provide public services to the community. Long-term recovery of waste resources generates high revenues because it can increase waste management investments (Tomić and Schneider, 2020).

Table 1. Waste generation in Maros Regency, Indonesia

No	Sub-District	Total population (Persion)	Waste Generation (m^3/day)
1	Mandai	36,440	130
2	Moncongloe	17,614	63
3	Maros Baru	24,766	88
4	Marusu	25,926	93
5	Turikale	42,580	152
6	Lau	24,886	89
7	Bontoa	27,043	97
8	Bantimurung	28,669	102
9	Simbang	22,693	81
10	Tanralili	25,020	89
11	Tompobulu	14,460	52
12	Camba	12,793	46
13	Cenrana	13,948	50
14	Mallawa	10,949	39
Total		**327.787**	**1.171**

Source: Maros Regency Environmental Service, 2022

In Table 1 above, it can be explained that the average daily waste generation in the 14 sub-districts in Maros Regency is quite varied considering the number of residents, especially in Turikale sub-district which is the largest contributor of waste because, on the other hand, Kota sub-district also has the largest population. there are many among the 14 sub-districts in Maros Regency and the largest waste collectors are 152 m3 per day. If the total accumulation of waste per day in 14 sub-districts in Maros Regency is accumulated, the average amount per day is 1,171 cubits of waste per day.

This problem is the development of waste bank management in Maros Regency which is considered to fulfill a circular economy because it is considered to have great potential because the waste bank provided by the government can have better economic value. Apart from that, waste management not only makes the city clean and beautiful but also provides economic benefits to the community. The management of the waste bank managed by the Maros Regency government has a director and tellers who will of course receive and weigh the waste. Each waste that is saved is then valued at a certain amount of money per kilo and then sold back to the central waste bank. Currently, the central waste bank in Maros is the Turikale waste bank. Currently, there are 10 waste banks, but the ones that are active and active are six waste banks whose monthly turnover can reach tens of millions (Fitriani, 2023).

The phenomenon that occurs has encouraged the emergence of innovative ideas about how waste can be managed and reused, as well as being a blessing for society, environmentally friendly, and even raising the level of economic movement in society. Will be built. One effort that can be implemented to minimize the problems caused by waste is to apply the 3R principle (reduction, reuse, recycle) or reduce, reuse, and recycle waste. Apart from the benefits of reducing the amount of landfill waste, waste management can also create economic incentives for interested parties by implementing the 3Rs (Radityaningrum et al., 2017; Cahyani et al. 2021). The 3R principles are in

line with the application of the circular economy concept which is an alternative to the traditional economic model that has been practiced so far. In traditional or linear economic models, remaining items deemed useless are immediately discarded without further investigation into their reuse potential. Therefore, currently various elements of society are adopting the latest circular economy concept by maximizing the economic value of waste, and waste brings blessings and benefits to human life.

This study aims to determine performance in understanding waste development and management towards developing an efficient city waste management system that can become a circular economy. This study focuses on waste management through a waste bank approach in overcoming the problem of increasing waste generation in urban areas of Maros Regency, Indonesia. The contribution of this study can provide insight into implementing sustainable development goals related to responsible and sustainable consumption and production levels that can support the community's economy through a waste bank approach.

Research Methods

This research uses an interpretative qualitative-descriptive method with a phenomenological approach. Creswell & Poth (2018). as an exploration of performance problems in waste management in Maros Regency as a support for the community's circular economy. This study focuses on waste management through a waste bank approach in overcoming the problem of increasing waste generation in urban areas of Maros Regency, Indonesia. The data and facts used were obtained through library research by reviewing, reading, studying books, journals, official documents and other relevant data sources to produce qualified research. Once obtained, the data is then analyzed and interpreted as developed by Miles and Huberman (2014) with stages of data reduction, data presentation, data verification, to produce conclusions in the form of new findings that will be useful for readers.

Results and Discussion

Identification of Waste Management Problems in Maros Regency, Indonesia

Based on the vision and mission of the Maros Regency Government, it is to encourage its city to become a clean and beautiful city, as well as increase the economic benefits of the community through waste management from waste banks. Waste bank management in Maros has great potential because waste banks have increasingly good economic value. Where the waste bank is a waste management technique by adopting banking management. Waste bank management has a director and tellers who will receive and weigh the waste. Every waste saved is valued at a certain amount of money per kilo. Then sold back to the central waste bank. Currently, the central waste bank in Maros is the Turikale waste bank. In 2023, the Regent of Maros Regency inaugurated the Main Garbage Bank for Marusu District, Nisombalio Village, as a building created to be used as a waste collection place and managed by local village residents. With this waste bank, waste can be processed to bring economic value to local residents (Fitriani, 2023).

Waste management performance can be seen as a comparison between the results achieved by the organization and the targets previously planned in the waste management system. Assessing organizational performance in waste management is very closely related to the quality of service and satisfaction received by the community (Usman, 2017). One example of performance in waste bank management that can support the people's economy is the Turikale Main Waste Bank (BSI) in Maros Regency, for example, which can generate an average turnover of Rp. 50 million/month. They have 18 employees, with an average income of Rp. 1.5 million – 2.5 million/person. Currently, BSI Turikale

has 578 customers from offices, schools, and individual customers. The waste managed by BSI Turikale is 1-2 tons/day. There are 4 types of waste managed at BSI Turikale, namely paper waste (57%), plastic (31%), metal (7%), and bottles (5%) (Ratnawati, 2021).

An overview of research conducted by Di Foggia & Beccarello (2021) suggests that waste management capacity in Italy plays an important role in meeting circular economy goals, such as reducing municipal waste disposal by landfill by up to 10%. Landfill use of 11.5%, 13% reduction in mechanical-biological treatment. The waste-to-energy capacity was 4.6%, then the organic processing capacity increased by 8.3%. This means that success in waste management certainly requires concrete steps that do not only look at one side but also need another side that can reduce the production of useless waste.

Based on a report from the Central Statistics Agency (*Badan Pusat Statistik*, BPS) (Nur, 2021), the Indonesian economy in the third quarter of 2020 on November 5, 2020, this sector experienced positive growth. The water supply, waste, and waste management sector is a sector that is growing very high, namely 6.04%. Good waste processing will produce useful and economically valuable output, this is the goal of a circular economy, so that the remaining consumption does not end up in landfill. Because its production, use, and management can become more resource intensive. Because of these attributes, plastic is considered to have an important role in promoting sustainability as part of the circular economy (Hahladakis et al. 2020).

Reporting to SINDOnews (Limonu, 2021) the efforts made by the Maros Regency government to control waste are expanding the final waste disposal site (*Tempat Pembuangan Akhir*, TPA) located in Mandai sub-district which is currently unable to accommodate residents' waste production. Even though the existing landfill area is currently 10 hectares, it is not yet able to accommodate waste production for at least the next 2 years. This means that the Maros Regency government considers that currently, waste is something that needs special attention, so various methods are being taken so that the waste problem in Maros can be managed well. That's why he is also inviting the public to carry out waste processing.

Another method used by the Maros Regency government is to change the way the community thinks, previously the community principle was to collect it and throw it away, now we will socialize it so that the waste can be processed or recycled. It is known that some time ago the Maros Regency Government had indeed entered into a Memorandum of Understanding (MoU) with PT Parametrik Pilar Utama regarding waste management. In the future, waste management in Maros will take a new path. Not everything is sent to landfill. Most of it will be distributed to the district capital only. Processed into electrical energy. Moreover, currently, there will be a regional regulation regarding waste management (Limonu, 2021).

Then research conducted by Marlena et al. (2020) stated that one of the efforts made by the Sidoarjo Regency government to reduce the amount of waste generated entering the landfill is by building waste management infrastructure in the form of an Integrated Waste Processing Site (*Tempat Pengolahan Sampah Terpadu*, TPST). The TPST that has been built needs to implement appropriate asset management so that it can run effectively and sustainably. Currently, there are still TPST that are not functioning optimally, one of which is because the facilities and infrastructure are not yet met.

The research results of Prayoga (2014) and Fitriani (2023) state that the physical characteristics are the average total household waste generation in Maros City is 276 m 3 /day, the average generation of municipal waste transported to the landfill is 62 m 3 /day, the composition of waste The landfill contains 80.7% organic waste and 19.3% inorganic waste, the landfill waste

density is 0.25 kg/ltr, the water content is 76.92%, the volatile content is 18.325%, the ash content is 81.765%, and the calorific value is 859.825 Kcal/Kg, while The results of chemical characteristics are carbon content 1.105%, nitrogen content 0.705%, phosphorus 902.645 ppm, and sulfur 0.145%. Based on the characteristics of the waste in the landfill, the processes of composting, recycling, animal feed, or controlled landfill can be alternative considerations in terms of processing waste in the Bontoramba landfill but the process of burning the waste (incineration) is not appropriate.

Waste Management Performance Towards A Circular Economy

The top sustainability-related performance indicators for different circular economy strategies are categorized into three categories, according to research by Kravchenko et al. (2019): sustainability dimensions, business process, and circular economy strategies. This classification makes it possible to assess the potential sustainability performance of circular strategies before their implementation. The specificity of the primary indicators that are now available for each classification category is then discussed, some gaps are noted, and potential future study directions are determined. In response to this, the government has an important role to always provide education to the public as an important part of preventing litter and turning waste into a product that can help improve the community's economy.

A new perspective on garbage sees it as an economic, social, and environmental issue in addition to an environmental one, making the problems facing city waste management more complicated and many (Singh et al., 2014; Zhang et al., 2010). It has been demonstrated that the waste bank reduced recyclable waste by up to 99.3 tons per day, or 6.7% of garbage generated overall (Satori et al. 2020). To maintain sustainability, water banks need to be incorporated into economic activities that support the circular economy as well as municipal waste management. Additionally, the government needs to focus on funding (incentives), building infrastructure and facilities, and training human resources (Satori et al. 2020; Ribić et al., 2017; Siman et al., 2020). Supporting a circular economy through this partnership is, of course, a win-win as plastic waste can create new jobs and lessen garbage accumulation, both of which can ultimately benefit the environment (Satori et al. 2020; Ribić et al., 2017; Siman et al., 2020).

Reporting to the Indonesian media (McGinty, 2020) suggests three ways to move towards a circular economy, including those in Table 2 below:

Table 2. Ways to a Circular Economy

No	The Way	Explain
1	Reduce consumption	- The focus of a circular economy is to make better use of natural resources and increase consumption. - The topic of consumption is still rarely discussed, because selling as many products as possible is still the main principle of most business models. - Behavior change campaigns and political incentives play a key role in shifting behavior in the right direction around fast fashion, plastic, food waste and more.
2	A better way to consume	- Choose products that are produced in a sustainable way or can be recycled. - Changing what you consume is like switching to a plant-based diet, which has many advantages

			over meat in terms of emissions and other natural resources. - Consumer pressure plays a major role in pushing businesses to change the way they do things and prompting governments to take supportive steps.
3	Create systemic change	-	Considering that our economic system uses a take-make-waste method, consumers cannot do much. - The circular economy is based on the principle that products made from reusable components or materials should be made to last. - It also requires huge investment and recycling to develop.

Source: Processed from McGinty (2020). 2022

Based on Table 2 above, it can be explained that there are 3 ways to achieve a circular economy, namely reducing consumption, namely the focus of a circular economy is to make better use of natural resources, and the level of consumption is too high, so consumption issues are still rarely discussed, considering Selling Products, as far as possible remains being a central tenet of most business models, plus the importance of promoting behavior change campaigns and policy incentives to shift behavior in the right direction has to do with things like fast fashion, plastic and food waste. The second way is a better way of consuming, meaning that when choosing sustainably produced or recyclable products, you can replace the products you consume, such as switching to a plant-based diet, which has various impacts on emissions. Like other benefits and natural resources compared to other foods. with meat, Additionally, consumers need to apply pressure and play an important role in encouraging companies to change the way they do business and encourage governments to introduce supportive policies. The third way is to make system changes, meaning that as consumers we cannot do much, considering that our economic system is used to create waste, a product-based circular economy must be designed in principle. of success. Use durable components or reusable materials, then require significant investment to expand or even require recycling. Meanwhile, the circular economy concept is to use as much material as possible from the goods produced (Bucknall, 2020), in order to maintain economic value and protect the environment (Kasztelan, 2017).

Measuring the service performance of the Environmental Service (JDIH Marves, 2021) includes government affairs consisting of environmental affairs. In implementing these matters, there are performance indicators used to measure the success or achievement of implementation results, including the following:

Table 3. Achievement of Garbage service performance for the Maros Regency Environmental Service, Indonesia

No	Performance Indicators according to Duties and Functions	SKPD Strategic Plan Targets for the 20th Year			Realization of Achievements 20th Year			Achievement Ratio in the 20th Year		
		2016	2017	2018	2016	2017	2018	2016	2017	2018
1	Handled piles of waste	25	30	35	25	30	35	35	100	100

2	Percentage of Waste Amount reduced through 3R	2,87	3,27	4,61	2,87	3,27	4,61	1,765	100	100
3	Percentage of service area coverage	25,02	30,02	42,03	25,02	30,02	42,03	42,03	100	100
4	Percentage of Amount of Waste handled	25	30	42	25	30	42	42	100	100
5	Operationalization of TPA/TPST/SPA in Regency-City	78,71	89,79	89,79	78,71	89,79	89,79	89,79	100	100

Source: Processed from various sources, 2022

Based on Table 3 above, the waste management performance achievements of the Maros Regency Environmental Service are based on performance indicators by their duties and functions, the achievements of the waste pile indicators handled between 2016, 2017, and 2018 from strategic plan targets, then from the realization of achievements and The achievement ratio is quite successful because the final result shows a ratio of 100. Likewise, the indicator of the percentage of the amount of waste reduced through 3R in the 2016, 2017, and 2018 timeframes of the achievement ratio for each year is by the achievements. Then the indicator of the percentage of service area adequacy between 2016, 2017, and 2018 each year reached an increase so that the achievement ratio was met with a value of 100. Furthermore, from the achievement indicator, the percentage of the amount of waste handled in 2016, 2017, and 2018, each year the handling increased consistently. significantly from the target of 25% then, 42% was achieved so that when we look at the achievement ratio it is of course at 100, and the final indicator of achievement is the operationalization of TPA/TPST/SPA in the Regency in three years, namely 2016, 2017 and 2018 from target to realization Achievements are very well met because the target figures and actual achievement figures match so that when looking at the ratio, they are certainly at the 100 level of achievement. Based on the available data, the potential for waste reduction through the creation of waste banks within the next ten years can be predicted by the government's efforts to reduce the amount of inorganic waste that ends up in landfills by including the community in garbage sorting (Kesauliya et al., 2020).

The realization of a circular economy can certainly produce great economic opportunities not only now but also in the long term, considering that waste production will continue to increase with the amount of consumption also increasing, with the conditions that occur showing that society can sort and process waste and change waste. The public's view of waste which was previously disgusting has become promising to increase understanding of the importance of waste banks to increase public environmental awareness which is reflected in the role of management and customers, namely knowledge, concrete attitudes, and consistent behavior (Putra et al. 2020). With the role of all stakeholders, the desired performance in developing waste management into a circular economy will certainly be achieved because of the actors' awareness and creativity so that they can produce and help the community's economy. By integrating policies and practices across and within economic blocs, this approach can lead to increased levels of sustainability

for citizens, innovative business models, and harmonized laws (Xavier et al., 2021; Ciasullo et al., 2020).

Development of A Waste Bank Management System In Maros Regency, Indonesia

Waste management efforts still need to be worked on, improved, and developed, starting from recycling waste into new, renewable energy sources, generating electricity, and recycling into economically valuable products, to the national slimming plastic campaign (Pasande et al., 2021). In this context, waste can change its function, from waste products to raw materials that can add economic value in a socio-economic movement. This potential is supported by abundant waste production sources, as much as 60% of national waste production comes from household waste.

Research conducted by Wulandari et al. (2017). Suggesting that the waste bank management model is not only useful in creating a clean environment but also has an impact on the local economy by increasing the income of housewives around the waste bank. The community expects more support from the government to improve waste banking mechanisms and better pricing models for waste. Seeing the current conditions, the role of the government is very necessary to be able to make regulations so that people have awareness and make use of existing household waste to be useful so that it can become economic value for the collecting community. The implementation of waste collection sites as a waste management system has been effective, but there are still several problems, namely the allocation of funds for the provision of facilities and infrastructure, waste transportation schedules, errors by transport officers, and lack of outreach by the city government (Ridha et al. 2021).

As one of the most important parts, the existence of waste banks can influence behavioral patterns and the community's economy. To achieve this goal, the waste bank business model in Indonesia was analyzed by synthesizing secondary data related to waste bank strategy and its impact in Indonesia (Kurniawan et al., 2023). Waste banks in Indonesia in terms of their business models are classified into four groups: savings, health, community entrepreneurship, and energy (Dwanto et al. 2018; Kurniawan et al., 2023).

Utilizing leftover materials presents a chance to generate new value streams for the development of a circular economy. The concepts of the circular economy extend beyond conventional methods of waste management. These guidelines place a strong emphasis on enhancing design and manufacturing procedures in order to do away with outdated notions of waste and repurpose product resources as raw materials for future product creation at the end of their useful lives (Romero-Hernández & Romero, 2018).

The circular economy model aims, apart from extending the useful life of waste, into something useful, is also a program and technological innovation as well as assistance to customers or assisted groups, which is expected to be able to increase the quantity of waste managed at the Waste Bank down to the household level so that it can provide a higher contribution. in reducing GHG emissions in Bandung Regency (Nurani et al. 2020). This means that something efficient can be reused so that it can save production costs or can become a new product that sells well so that joint efforts, starting from individuals,

households, communities, organizations, producers, and the government in managing and recycling plastic waste will be great power in maintaining environmental preservation.

Then in the development of a circular economy research from Van Fan et al. (2020) revealed that developing an integrated design of a waste management system in supporting the Circular Economy with a P-graph (a bipartite graphical optimization tool) as an effective decision support tool to show that the framework developed by a P-graph is an effective tool for planning. system. Furthermore, research conducted by Soegoto et al. (2018) stated that the development of an integrated and computerized desktop-based information system for the waste bank management business. The results help waste bank owners to manage the waste bank business and make it easier for everyone involved in it to get the information they need regarding the buying and selling prices of these waste bins. System design is an advanced stage of ongoing system analysis. So in planning as a reference in updating or improving the performance of existing systems, adequate system design is required.

In the future, to manage resources and waste sustainably, waste management requires a more systems-oriented approach that addresses the root causes of problems. A specific issue that must be addressed is the development of better feedback information (statistics) on how waste generation is related to consumption (Singh et al. 2014). This means that there needs to be a strategy implemented by the government so that waste management can be affordable and results are obtained.

Another way that can be done as a solution in optimizing waste management according to research conducted by Pardini et al. (2020), namely an IoT-based approach where waste disposed of from the smart bin can be monitored by sensors that inform the filling level of each compartment at a specified time. Its goal is to precisely track waste collection to community services and resource management. Information regarding public trash cans is readily available to the public through mobile applications or the Internet. The suggested system can effectively change how people handle their waste and optimize financial and material resources, as evidenced by the development of waste management applications, real-scale trial use cases for evaluation, demonstration, and validation, and the creation of actual initial examples of smart containers.

To be able to minimize waste management, Purwendah & Wahyono (2021) stated that the waste management system is a waste management process that includes 5 (five) aspects, namely institutional aspects, financing aspects, regulatory aspects, community participation aspects, and operational technical aspects. So the existence of a waste bank becomes an alternative solution for the government and society to reduce the increasing amount of waste. Community-based waste management as a waste management approach based on active community participation. Environmental stewardship requires the promotion and implementation of community-based efforts as a strategy to empower them and increase their access to environmental resources. Environmental considerations also need to be taken into account when implementing a circular economy in plastic waste management. Not all plastic waste is treated the same and can be reused. In addition, when using recycled plastic products as food and beverage packaging, they must pass tests and meet appropriate use standards (Balwada et al., 2021). Waste Management system sustainability is a broad concept and must be defined at the local level, with the most

pressing environmental problems addressed by each country (Ikhlayel, 2018). According to Fitriani (2023), currently waste management in Maros Regency through waste banks has factors inhibiting waste management, namely the lack of infrastructure and the level of community participation which is still low so this is considered an obstacle to the management process that will be implemented.

Regulatory interventions are essential to support the development of a circular economy (Morseletto, 2020). In Indonesia, currently, there are no regulations that specifically regulate the development of a circular economy in waste management. However, several regulations already exist that indirectly regulate programs and regulations related to waste management. At the smallest level, households, according to Law Number 18 of 2008 concerning Waste Management, one way to manage household waste is to reduce it.

Conclusion

The existence of a Waste Bank not only encourages people to care more about waste but can also grow people's economic potential and job opportunities. The Turikale Main Waste Bank (*Bank Sampah Induk*, BSI) in Maros Regency, for example, can generate an average turnover of IDR. 50 million/month. They employ 18 employees, with an average income of Rp. 1.5 million.

The circular economic system has sustainable production because it can reduce environmental damage and improve the quality of the environment. Apart from being more environmentally friendly, a circular economy is also able to provide added economic value, provide employment opportunities, contribute to development, as well as efforts to overcome climate change that has occurred to date. The circular economy model aims to extend the useful life of waste into something that is useful for reuse and can also be used as an alternative raw material or recycled into new products so that it can save production costs or become new products that have high selling value. The involvement of stakeholders in the development of waste management has an important role, apart from being actors, but also as production which can provide enormous benefits to support the government's performance in waste management and of course can reduce the impacts that occur so that cleanliness and waste management are better. Waste management in Maros has become an economic good, getting better from year to year. Because the community is also directly involved in waste management. However, currently waste management in Maros Regency through waste banks has factors inhibiting waste management, namely the lack of infrastructure and the low level of community participation, so this is considered to be hampering the management process that will be implemented.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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