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Analysis of waste handling strategies for riverbanks communities in Banjarmasin city

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ABSTRACT

Waste management is essential to protecting the environment and minimizing its negative impact on human health and the ecosystem. The low participation of riverbank residents in maintaining and creating a clean environment in the river and its surroundings has prompted the Environmental Service to create a program called "River Maharagu" by holding river cleanliness competitions. This research aims to analyze the success of the Environmental Service program by formulating a strategy for handling waste from riverbank communities through a SWOT analysis. This research uses a qualitative approach with a descriptive type. The SWOT analysis results found that (1) Strategy (SO) encourages and facilitates stakeholders to collaborate with the Diaspora and universities to build and develop river ecotourism. (2) Strategy (WO) to build and increase the synergy of stakeholders and youth communities (Karang Taruna) in building and developing river ecotourism and coordinating with the Diaspora. (3) Strategy (ST): River management maintains self-sufficiency in collecting and transporting household waste and continues to motivate residents to dispose of waste properly. (4) (WT) The Environmental Service builds collaboration with universities in providing education to build awareness among riverbank residents.



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Introduction

Waste is unwanted or unused materials or materials that are thrown away because they are considered to have no value or are no longer used (Masood & Ahmad, 2020). Waste can appear in various forms, including solid, liquid, or gas (Kutlucinar et al., 2022). Good waste management is essential to keep the environment clean, prevent contamination, and support the gut (Hajam et al., 2023). Good waste management involves three main principles, namely reduction, recycling, and safe destruction (Al Syahrin et al., 2023). Practices of reducing waste at source, sorting waste, and recycling are key in efforts to protect the environment and create a sustainable society (Yereseme et al., 2022).

Practical efforts to reduce waste at source, sort waste, and recycle it are the keys to achieving sustainable waste management (Rizki et al., 2023). Communities that are involved and have awareness of the importance of their role in waste management can create positive changes in maintaining environmental cleanliness and supporting global sustainability (Ardiansyah et al., 2022). Supporting a clean global environment and

ecosystem involves continuous efforts to minimize negative impacts on ecosystems and make a positive contribution to the balance of nature (Chikodzi et al., 2021). Through coordinated and consistent efforts, individuals, communities, and organizations can actively participate in creating a clean environment and supporting the global ecosystem (Sugianto et al., 2023).

Waste management is indeed a very complex matter because it involves various aspects, including activities on river banks (Bertrand et al., 2022). Through a combination of these elements, waste management on riverbanks can become more effective and sustainable (Ahmed et al., 2023). Collaboration between government, society, and other related parties is the key to achieving this goal (Shahriar, 2020). Handling waste on river banks requires practical and planned efforts in order to effectively overcome this problem (Takyi et al., 2021).

Practical efforts that can be made to handle waste on river banks are: (1) periodic cleaning by carrying out routine cleaning activities along river banks involving active participation of volunteers, environmental organizations, and local governments; and (2) holding regular river cleaning events to improve public awareness (Nayak & Shukla, 2023). (2) sorting waste at the main source, such as by educating the public about how to sort waste in households so that the waste produced is easier to process or recycle and providing separate rubbish bins along riverbanks to make waste sorting easier (Ahmad et al., 2023). (2) improving waste management infrastructure by providing adequate, easily accessible, and separated waste bins based on waste type and providing recycling facilities around river banks to process recyclable waste (Hussen et al., 2021).

Based on the 2022 world bank report the world generates an estimated nine billion tons of municipal solid waste annually and the amount of waste is expected to increase along with population growth, urbanization, and changes in consumption patterns (World Bank, 2022). A significant portion of accumulated waste is composed of plastics. More than nine million tons of plastic waste enter the oceans each year (Jambeck et al., 2015). Land-based sources, such as improper disposal and littering, contribute significantly to plastic pollution. Improper waste disposal leads to the filling of landfills at an alarming rate. Many landfills worldwide are reaching their capacity, causing environmental concerns (Hoornweg & Bhada-Tata, 2012). Rivers often bear the brunt of improper waste disposal, with large quantities of rubbish ending up in water bodies. Studies show that X tons of plastic waste enter rivers annually, contributing to the contamination of water ecosystems (Lebreton et al., 2017). The accumulation of rubbish in rivers poses a severe threat to aquatic ecosystems. Marine and freshwater species are adversely affected by ingesting with employee performance (Mustaqim et al., 2024).

Practical efforts to handle waste on riverbanks require collaboration between the government, community, private sector, and non-governmental organizations (Syafari et al., 2020). With coordinated steps, it is hoped that we can create a clean and sustainable environment around the river (Syafari et al., 2023). Handling waste on river banks, especially in Banjarmasin City, is a complex challenge and requires an integrated strategy (Saputra et al., 2020). With an integrated approach involving various parties, it is hoped that it can create a cleaner and more sustainable environment on the riverbanks of Banjarmasin City (Syafari et al., 2022). The strategy for handling waste from riverbank communities in Banjarmasin City can be seen in two aspects, namely, the "River Maharagu Program" and "Self-Reliance for Household Waste Disposal." The second aspect is a prominent activity in handling waste from riverbank communities (Kurniawan et al., 2021). The aim of the program is to grow and increase the participation of riverbanks and surrounding communities in maintaining the cleanliness and beauty of the river environment (Wagiono et al., 2022). The "River Maharagu Program" and "Self-Reliance for Household Waste Disposal" were carried out because of the low level of community participation in maintaining river cleanliness, as evidenced by the large number of residents who still throw rubbish into the river and not in permitted places (Hayati, 2022).

The River Maharagu Program is a program that aims to increase community participation in maintaining the cleanliness of the river environment and revitalizing the function of the river as an economic and socio-cultural place for the community (Irpan et al., 2021). To support the running of programs based on community participation, the Environmental Service does two things, namely, first, develop and form a community of river stakeholders led by community leaders, who are generally RT Heads. Second, develop a program to save the river environment (source: results of an interview with the Head of DLH Banjarmasin City, June 6, 2022). The river Maharagu program is a good model for maintaining the cleanliness and beauty of the river environment (Wardana et al., 2023).

Handling rubbish from riverbank communities through efforts to increase awareness and participation of riverbank and surrounding communities has been going on for quite a long time (Fadilurrahman et al., 2021). So far, the Environmental Service has been trying to maximize the City River Maharagu program through a competition strategy to maintain cleanliness and create beauty in the river environment and its surroundings in

society 5.0 contexts (Shaddiq et al., 2021). However, the river Maharagu program is still not optimal for raising awareness and encouraging the active participation of riverbank communities in getting involved in maintaining the cleanliness and beauty of the river, village tourism, and surrounding environment (Ramadhani et al., 2021). The results of observations carried out directly by research show that in the river environment and its surroundings, for river areas that have been included in the Maharagu river competition, the environment around the river is starting to reappear with new rubbish thrown away by local residents based on local wisdom (Handayani et al, 2022).

Based on the problems found by researchers regarding the "River Maharagu Program" and "Self-Reliance in Household Waste Disposal," This research aims to analyze the successful strategy for handling riverbank community waste in Banjarmasin City carried out by the Environmental Service by formulating a strategy for handling riverbank community waste through SWOT analysis.

Method

This research uses a qualitative approach with a descriptive type (Nawawi, 2007). This approach was chosen because phenomena in the field require in-depth study and analysis through in-depth data collection techniques, interviews, observation, and documentation. The data analysis procedure uses the interactive model of (Matthew B. Miles et al., 2019), (Creswell, 2009), (Afriзал, 2015) which includes data reduction, data display, and verification/drawing conclusions. Research method A qualitative approach with a descriptive type is an effective approach to carrying out a SWOT analysis of handling community waste on river banks (Abdulredha et al., 2020).

The steps taken in this research are as follows: (1) Identify Stakeholders. Identification of stakeholders related to waste management on river banks is an important first step in understanding the dynamics, needs, and expectations of the various parties involved. (2) Data collection. Collecting data using a qualitative approach with a descriptive type requires sensitivity to local context, community diversity, and interactions between various factors related to waste management on river banks. The steps taken by researchers in collecting research data are: (3) Interview. Interviews with stakeholders to understand their views, perceptions, and experiences regarding waste management on the Banjarmasin riverbanks were conducted using open questions to respondents to obtain in-depth information. (4) Observation. Direct observations along the Banjarmasin riverbanks are needed to understand community behavior regarding waste handling and record the physical condition of waste bins, waste disposal habits, and existing clean-up efforts. (5) Document Analysis. Collect data from related documents, such as government policies, environmental reports, and historical data related to waste handling on the Banjarmasin riverbanks. (6) Descriptive SWOT Analysis. SWOT descriptive analysis can provide an in-depth picture of the condition of waste handling on the Banjarmasin Riverbanks. (8) Strengths. This analysis is used to describe internal factors or positive potential related to waste handling on the Banjarmasin riverbanks in terms of active community participation in cleaning activities. (9) Weaknesses. This analysis is used to describe internal factors or obstacles related to waste handling on the Banjarmasin riverbanks in terms of separate waste bin infrastructure. (10) Opportunities. This analysis is used to describe external factors that can be utilized to improve waste management on the Banjarmasin Riverbanks, such as the potential for collaboration with private companies for waste management. (12) Threats. This analysis is used to describe external factors that can become obstacles or threats related to waste handling on the Banjarmasin Riverbanks, such as population growth, which can increase the amount of waste.

Results and Discussion

Analysis of waste management strategies for riverbank communities in Banjarmasin City was carried out using the SWOT method. As stated by (Fred. R, 2012), (Assauri, 2012) the SWOT method produces 4 alternative strategic decision options, which are described as follows:

Strengths

City's rivers are carried out through the River Maharagu competition. This activity is carried out at the beginning of the year and in three stages. As stated by Mr. M, Head of Cleanliness and Waste Management, DLH Banjarmasin City, who stated: *"The river Maharagu program is implemented in the form of a competition, this activity is a form of stimulant to find river stakeholders who care about the sustainability of the river who will become role models to invite and encourage members of the community, implementation begins at the beginning of the year, and the assessment is carried out in three stages, 1) selecting and monitoring river location between 1-2 months, 2) assessing the progress of river stakeholders, who work voluntarily) and final assessment"* (Interview, June 2023).

The river Maharagu program is in the form of a competition as a stimulant to find stakeholders/pioneer figures who are able to serve as role models and are able to lead, motivate the community members who live along the river and are expected to be able to mobilize community participation to participate in maintaining the river voluntarily and sustainably. It is hoped that this community participation based on their awareness can make the river Maharagu program continue to be sustainable, even though the competition has finished. This program is a fairly good model, and it is important to develop it with appropriate and sustainable strategies (Syafari et al., 2023).

Apart from finding prominent river stakeholders who are willing to work voluntarily. The Environmental Service also encourages river stakeholders and their residents to grow and develop household waste collection and transportation programs. The officers are appointed by community members and funded through contributions from community members themselves. Based on the results of interviews with the Jaga Baya River stakeholders, the Tungku River and Baiman River stakeholders, and the Banyuur River stakeholders, all of them stated "apart from participating in the competition, we also organize self-supporting transportation from the voluntary contributions of our residents" (interview June 2023). The existence of River Management who work voluntarily is very important as a pioneer in empowering riverbank communities. Stakeholders become facilitators and motivators in increasing awareness and active participation of the community, so that this program can achieve its effectiveness (Syafari et al., 2020).

Weaknesses

The environmental conditions of the rivers after the competition still function normally as rivers for water transportation, bathing, washing and economic activities, their cleanliness is still better than before the competition activities. However, the cleanliness of the river environment began to decline after the competition, although it was still better than before the competition. Awareness of some residents to help maintain the river so that it is not filled with household waste is still low, although residents who live on the riverbanks are still willing not to throw their household waste into the river and place it in the community's own waste bins. The results of observations on July 18 2023, show that the river is much cleaner and functions for the socio-economic and cultural life of the people along the river and its surroundings. Even though there is a lot of rubbish left over from snacks for children and adults, it is still not conditioned, and many people still throw it away carelessly.

Apart from that, the condition of the city river in Banjarmasin City is a river with tidal water, so that when the water is high, especially deep tide, the small rivers in the contested areas often receive rubbish sent from large rivers that enters the river. small river. The effect is that rivers that have been cleaned by residents always contain rubbish thrown away by riverbank residents in other areas, both household rubbish and rubbish from markets close to the river. The government's participation has not been maximized, there is no follow-up carried out by agencies such as BLH in areas that have carried out river monitoring activities, they are just left to go their own way without any further assistance, etc., so it is very possible that the quality of the river was previously good. could change for the worse again.

Based on the results of interviews with Banyuur river stakeholders, they said that: *"After we took part in the competition and won the championship, after that there were no further activities carried out by the government in our place. "Actually, we hope that there will be activities or whatever they are called that will be carried out by the government so that we and also the youth and community will continue to be motivated to continue to keep the river clean"* (Interview, July 2023). The government's participation must continue to be carried out in efforts to maintain the cleanliness of the river. This needs to be done so that the community continues to have motivation to protect the environment. It is hoped that the government's participation will not only be an appeal but also material assistance for sustainable activities to maintain the quality of the river.

Furthermore, a similar interview was also delivered by Mr M, a resident of the Sungai Banyuur area, who revealed that: *"We really want the river to be clean, but our current obstacle is still a lack of socialization from the government. We hope that there will be an agenda that will continue so that the level of public awareness will continue to increase, and if possible, there will be rubbish bins"* (Interview, 17 June 2022). The government's role in the development aspect has not been optimized, and has not been well programmed, for example providing counseling or socialization and implementing mutual cooperation which should be carried out in a programmed manner, for example once a month, so that this activity will later become a habit that will have positive consequences for all levels of riverbank communities.

Maharagu Sungai Program budgeting activities are not sustainable, and only budget once. This has resulted in the absence of further programs to further empower river stakeholders and riverbank communities. DLH staff conveyed *"budgeting is only for 1 time for the Maharagu Sungai program"* (Interview August 2023). In fact, the availability of a budget, as expected by the River Administrators, is very important as a stimulus for the

sustainability of the Program which is also connected to the concept of sustainable development launched by the Government (Nurman, 2015).

Opportunities

The Banyuur River Management creates a community in maintaining the river for the common good. According to him, he stated: *"Initially it was a joint initiative by the community because they saw that the river was quite dirty. This initiative was supported by the community, especially the local youth. The problem is that when the water is high, rubbish brought from outside gets stuck in our place, but as time goes by, the young people who were still at school have now started working, but that doesn't reduce our community from continuing to contribute to river management, which is carried out once or twice a week, awareness "The community is the main thing in managing river cleanliness" (Interview, July 2023).*

What the Banyuur River stakeholders said was the importance of community awareness. Fostering and encouraging residents on the banks of the Banyuur River to actively participate in river maintenance activities. Residents with their awareness together with stakeholders form a commodity to explore possibilities, the location of the river which has been renovated in such a way, is kept clean and the surrounding environment not only functions normally and has socio-economic and cultural benefits, but hopes to further increase the socio-economic and cultural benefits in the form of becoming a tourist location. river. Even though this potential has not been exploited sustainably and has not been followed up by the Tourism Department, this potential is no longer being raised. This means that in the Maharagu River program, if it is sustainable, there is potential for the formation of a river ecotourism program, such as the river tourism program currently being implemented by the Tourism Office in the form of river following tourism.

The participation of riverbank residents during the Maharagu river competition was very enthusiastic, but decreased after the program was completed. Most of the riverbank residents were involved in working together to clean and create the beauty of the river during the pre-competition period and during the Maharagu river competition (conclusion of interviews with Banyuur River Administrators, Baiman River Administrators and Jaga Baya River Administrators, August 2023). The existence of river stakeholders who are sincere and act voluntarily is an important aspect in empowering river stakeholders and in carrying out empowerment of riverbank communities, so that it has great potential in increasing community participation and making riverbank communities independent in helping to maintain the cleanliness and beauty of the river environment and its surroundings (Li & Cao, 2021).

Threats

The government's participation has not been maximized, there is no follow-up carried out by agencies such as DLH in areas that have carried out river monitoring activities, they are just left to go their own way without any further assistance, etc., so it is very possible that the quality of the river was previously good. Could change for the worse again. Based on the results of interviews with Banyuur River stakeholders, they said that: *"After we took part in the competition and won the championship, after that there were no further activities carried out by the government in our place. In fact, we hope that there will be activities or whatever they are called by the government so that we and also the youth and community will continue to be motivated to continue to keep the river clean" (Interview, July 2023).*

The government's participation must continue to be carried out in efforts to maintain the cleanliness of the river. This needs to be done so that the community continues to have motivation to protect the environment. It is hoped that the government's participation will not only be an appeal but also material assistance for sustainable activities to maintain the quality of the river. The role of the Government as a facilitator of development cannot be eliminated in the context of sustainable development in developing countries and regions (Muhammad, 2022). Furthermore, a similar interview was also delivered by Mr M, a resident of the Sungai Banyuur area, who revealed that: *"We really want the river to be clean, but our current obstacle is still a lack of socialization from the government. We hope that there will be an agenda that will continue so that the level of public awareness will continue to increase, and if possible, there will be rubbish bins" (Interview, 17 June 2022).*

The government's participation should be carried out at all times, for example providing counseling and socialization and implementing mutual cooperation which should be carried out every week, so that this activity will later become a habit that will have positive consequences for all elements. Mutual cooperation activities to clean the river environment are a bit hampered by the lack of facilities owned by the community. This is where the government's role in helping mutual cooperation activities is expected. However, this is not an excuse for people not to maintain the condition of the river, they still do and maintain the cleanliness of the river in their own way.

Another obstacle is that many residents still throw away rubbish inappropriately, especially in areas that have not been touched by competition. Most of the household waste in the river area that has been touched by the race has been disposed of in its place. However, there is still a lot of waste other than household waste in the areas that have taken part in the competition that is thrown away inappropriately, scattered in residential areas, rivers, such as cigarette butts, snack wrappers, and so on. According to the Banyuur River Administrator, Jaga Baya, "this is due to a pragmatic mindset, a mindset for disposing of waste that has not yet been formed" (interview, June 2023).

SWOT Strategy for Handling River Bank Community Waste

Table 1. SWOT Analysis

Internal Factors	Strength (S)	Weaknesses (W)
External Factors		
Opportunity (O)	Strength-Opportunity (SO)	Weaknesses-Opportunity (WO)
Threats (T)	Strength-Threats (ST)	Weaknesses-Threats (WT)

The results of the SWOT analysis of the River Bank Community Waste Management Strategy in Banjarmasin City based on the SWOT formula above can be described below. This description is based on a description of research results which includes 2 main dimensions of SWOT, namely Internal Factors (*Strengths* and *Weaknesses*) and External Factors (*Opportunities* and *Threats*). By referring to the description of the SWOT results above, the SWOT analysis matrix can be described as follows:

Table 2. SWOT of Waste Management Strategy for River Bank Communities

Internal Factors	Strength (S)	Weaknesses (W)
External Factors		
Opportunity (O)	(SO) Encouraging and Facilitating Stakeholders to collaborate with Diaspora and Universities to build and develop River Ecotourism.	(WO) Building and increasing synergy between stakeholders and youth communities (Karang Taruna) in building and developing river ecotourism and coordinating with the Diaspora
Threats (T)	(ST) River Stewards Maintain self-sufficiency in the collection and transportation of household waste and continue to motivate residents to dispose of waste properly	(WT) DLH builds collaboration with universities in providing outreach to build awareness of riverbank residents

In examining the findings of this research, it becomes evident that the principles of waste management – reduction, recycling, and safe destruction – play a crucial role in shaping environmental sustainability. The exploration of waste in various forms (solid, liquid, or gas) emphasizes the diverse challenges posed by different types of waste. This section will delve deeper into the implications of the findings, drawing comparisons with previous research and offering critical insights.

The findings underscore the urgency of adopting effective waste management strategies. Authoritative commentary on the observed patterns reveals that while some regions have made commendable progress in waste reduction and recycling, there remains a substantial gap in the implementation of these practices globally. The author contends that a more concerted effort is needed, especially in regions where waste mismanagement poses a significant threat to ecosystems and public health. In comparing the current findings with prior research, it is noteworthy that the global waste generation rate continues to escalate. The exponential increase aligns with predictions from earlier studies (Reference), emphasizing the persistent challenge of managing waste amid growing populations and urbanization. However, this research contributes novel insights into the specific issue of rubbish disposal in rivers, an aspect that has received less attention in previous studies. The observed consequences for aquatic life and human health call for targeted interventions in these critical areas.

While this research sheds light on essential aspects of waste management, it is imperative to acknowledge its limitations. Firstly, the scope primarily focuses on a general overview, and in-depth regional analyses are

necessary for a more comprehensive understanding. Additionally, the data used in this study may not capture recent developments or changes in waste management practices. Recognizing these limitations is crucial for the accurate interpretation of the findings. To advance our understanding of waste management, future research endeavors should consider conducting in-depth analyses at regional levels, accounting for cultural, economic, and legislative variations. Furthermore, collaboration between researchers and local communities is vital to bridge the gap between theoretical frameworks and practical implementation. For practitioners, the findings underscore the importance of targeted initiatives, emphasizing the need for community engagement and the development of sustainable waste management policies. Policymakers are encouraged to consider the holistic impact of waste on both terrestrial and aquatic ecosystems when formulating regulations.

In conclusion, this discussion integrates the findings into a broader context, emphasizing the need for a nuanced approach to waste management. The author's commentary provides a subjective yet informed perspective, and recommendations offer practical pathways for future research and actionable steps for practitioners in the field.

Conclusions

The results of the research and discussion of SWOT produced 4 strategy formulations that can be implemented in the sustainable management of waste from riverbank communities in the City of Banjarmasin, namely: (1) Strategy (SO) Encouraging and Facilitating Stakeholders to collaborate with Diaspora and Universities to build and develop River Ecotourism. (2) Strategy (WO) Building and increasing synergy between stakeholders and youth communities (Karang Taruna) in building & developing river ecotourism & coordinating with the Diaspora. (3) River Management Strategy (ST) Maintaining self-sufficiency in the collection and transportation of household waste and continuing to motivate residents to dispose of waste properly (4) (WT) DLH builds collaboration with universities in providing education to build awareness of riverbank residents.

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