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Research Paper

Strategy for Increasing Solid Waste Levy Revenue in Ogan Ilir Regency, South Sumatera Province

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Abstract
Solid waste management (SWM) is still a big challenge for cities around the world, especially in rapidly developing metropolitan cities in developing countries, one of which is in South Sumatera Province. This province consists of several regencies and cities that already have their own waste management systems. Ogan Ilir Regency is one of the districts that has its own waste management system, but it has not run effectively because the waste retribution has not been optimally implemented. This writing paper aims to analyze potential sources of waste retribution, analyze aspects of willingness to pay and recommend new amounts of waste retribution in accordance with existing circumstances. The research method used is in the form of surveys, observations and interviews with the intended respondents. The new levy analysis is based on Regulation Number 7 of the Indonesian Minister of Home Affairs (Permendagri) for 2021. The findings revealed that there were various possible waste retributions emanating from the market sector of IDR 437,635,000, however only IDR 85,144,500 were realized. The willingness to pay study results suggest that education level and income have a large influence on the readiness to pay for waste retribution. The newly obtained levy is IDR 237,922 per ton for the recommended outcomes. The new levy analysis is based on Regulation Number 7 of the Indonesian Minister of Home Affairs (Permendagri) for 2021. The findings revealed that there were various possible waste retributions emanating from the market sector of IDR 437,635,000, however only IDR 85,144,500 were realized. The availability to contribute study results suggests that education level and income have a large influence on the readiness to spend money on waste retribution. The newly obtained levy is IDR 237,922 per ton for the recommended outcomes.

Keywords
Solid Waste, Waste Fee, Willingness to Pay, Waste Facilities

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1. INTRODUCTION

Urban waste management is one of several major sustainable development problems that arise along with rapid economic growth and urbanization processes. Every year, more than 1.3 billion tons of urban waste are generated worldwide, causing major problems in urban waste disposal (Wang et al., 2018). In particular, in fast-growing cities in developing countries, solid waste management (SWM) continues to be a major concern for cities around the world. The amount of waste produced has increased, outpacing the capacity of cities in developing countries due to increased population and increased per capita income (Kayamo, 2022; Han et al., 2019). Food waste is one example of organic waste that can be decomposed naturally, while plastic, paper, glass, metal, and food waste are examples of inorganic waste that cannot be decomposed naturally (Jimmyanto et al., 2017; Miezah et al., 2015; Putri et al., 2020).

The benefit the fact that waste management accounts for a larger portion of municipal spending, waste management in developing countries is characterized by inefficient waste disposal and collection systems that pollute the air, water, and soil (Kayamo, 2022; Vassanadumrongdee and Kittipongvises, 2018; Ayeleru et al., 2023). Low-income countries (LCs) can solve this issue by implementing sustainable solid waste management (SSWM) policies through solid waste recycling. Recycling activities convert waste products or resources into secondary materials for new applications, hence contributing to sustainability (Ayeleru et al., 2023). In general, waste collected from residential areas is carried out by officers using garbage carts as part of the implementation of a waste management system. The garbage collection point receives waste that has been collected at the garbage collection point (TPS). This TPS is usually an open area that serves as a

temporary storage area for waste before being disposed of in the landfill and is located at a certain location point. In Indonesia, most waste management systems experience difficulties, especially in terms of providing waste facilities and infrastructure, including waste collection and transportation (Murialti et al., 2018). According to research by Martawi et al. (2019), in South Sumatra Province, especially Palembang City, the availability of waste transportation can have an impact on environmental quality. TPS has enough garbage trucks to transport garbage without any buildup, so it can have a negative impact on health and reduce aesthetics (Lubis and Umari, 2019; Jimmyanto et al., 2018; Ramadhani et al., 2020).

Ogan Ilir Regency is an area in the province of South Sumatra that has problems regarding waste transportation. Due to inadequate garbage transportation, this region experiences garbage accumulation at various road points. The lack of waste services that can be managed thoroughly is caused by the budget and costs owned by Ogan Ilir Regency. By collecting waste retribution from each waste-producing community, the budget for the construction of waste management facilities and infrastructure can be supported. The existence of this waste levy can help the Ogan Ilir district government in developing waste handling and reduction programs. Based on research on waste retribution regulations conducted by Lathif et al. (2021), local governments must reform regulations, especially related to waste service levies, to support the regional economy. These reforms must have philosophical, sociological, and legal foundations. Technical and non-technical support is required to support this plan. Non-technical support takes the form of cost and involvement, while technical support takes the form of providing appropriate infrastructure.

Murialti et al. (2018) used a combination of quantitative and qualitative methodologies to conduct a study on waste transportation retribution in Pekanbaru City, Indonesia. The amount of demand, transportation, differences in people's economic levels, and social status all have an influence on determining the value of waste retribution based on demand surveys in pricing. The final findings of the study were separated into two zones depending on collaboration services and priority zones. Zones 1 and 2 resulted in cost calculations of Rp 202,232.68 and Rp 213,587.94 per ton, respectively. The investment cost hypothesis is used as a reference in the output of the waste levy calculation. Based on the background of research and literature review, it is clear that an effective waste management system needs to be supported by adequate facilities and infrastructure, and this requires funding. The establishment of a waste levy for the community can support this budget.

There are countless studies that highlight the importance of waste management knowledge, practices, attitudes, and retribution. The viability of the overall management system and the relationship between behavioral and economic factors influencing recycling decisions are other research topics (Song et al., 2016; Jimmyanto et al., 2017; Ismail et al., 2022; Almazán-Casali et al., 2019; Ayeleru et al., 2023; Chung and Yeung, 2019; Murialti et al., 2018; Lathif et al., 2021; Ismail, 2021), but several previous studies have not explained how the amount of retribution is in accordance with the current situation. Therefore, in this paper we will discuss the potential for waste retribution in the Ogan Ilir Regency area, analyze the willingness to pay and recommend a new levy in accordance with the existing state of waste transportation.

2. RESEARCH METHODS

The research locations are in Tanjung Raja District and Indralaya District, Ogan Ilir Regency. The research method used is survey, observation and interview. Respondents who were interviewed were 40 people with the topic of questions regarding willingness to pay. the form of the willingness to pay question refers to previous researchers (Almazán-Casali et al., 2019; Kayamo, 2022; Ayeleru et al., 2023; Jimmyanto et al., 2017). Furthermore, the results of the respondents' answers were made in descriptive form and also analyzed the correlation between variables with Pearson Correlation and Spearman Correlation. The purpose of this correlation analysis is to obtain a relationship between the level of income and education of respondents with the willingness to pay respondents. In determining the amount of the new levy, refer to the Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 7 of 2021. Figure 1 is the pattern of analysis carried out in this study.

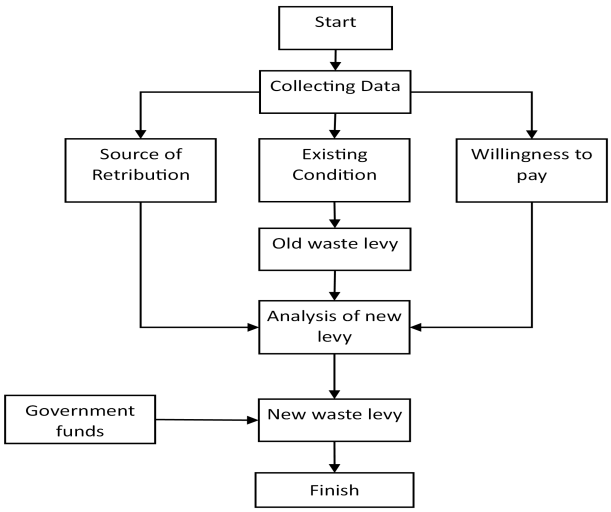

Figure 1. Research Flow

3. RESULT AND DISCUSSION

3.1 Existing Waste Retribution Sources

Office waste, market waste, and household waste are all covered in the waste services offered in Ogan Ilir District. Users in Ogan Ilir District must contribute to the waste

Table 1. Shows the Report on Regional Income Realization for the Ogan Ilir Regency as of December 2021

Year	Target	Realization	%
2021	IDR 358,560,000	IDR 85,144,500	23.75%

system in the form of waste retribution. Waste retribution is one way for regions to generate revenue as well as compensation for waste management services provided by the government. To provide flexibility to regions in seeking funding for the implementation of regional autonomy as a manifestation of the principle of decentralization, what is meant by regional original revenue is revenue obtained from regional taxes, regional levies, the results of segregated regional wealth management, and others that are legitimate from the regions original income.

The potential for waste retribution that currently exists comes from three markets, namely Tanjung Raja Market, Cinta Manis Market, and Indralaya Market (Figure 2–Figure 4). This waste levy is used to improve cleaning services so that the comfort of buyers is maintained. Based on the data obtained, the potential levy in the market sector amounted to Rp 358,560,000.00, but only 23.75% could be collected (see Table 1). Table 1 shows that the provisions of the levy are not in accordance with their realization. The realization of this levy receipt compared to the previous year has not been able to significantly increase local original revenue. Table 1 also shows the report on the realization of regional revenue of Ogan Ilir Regency as of December 2021.

The waste collection rate used refers to the Regional Regulation of Ogan Ilir Regency Number 19 of 2011, where the market waste cleaning service levy rate is Rp 1,000 per day, and Table 2 shows the potential of existing waste levies that only focus on the market sector. Based on calculations, the market sector has the potential to collect waste retribution of Rp 437,635,000, but only realized Rp 85,144,500 or around 19.46% of that amount.

Figure 2. Activity at the Indralaya Market

Figure 3. Activity at the Cinta Manis Market

3.2 Analysis of Potential Retribution in Waste

Based on the research findings, the market sector in Ogan Ilir Regency has the greatest potential for waste retribution, but the industrial sector, restaurants/restaurants, schools, and restaurants have not been included in the source of the levy, even though the household sector has great potential. Other sector levies are set at a cost of Rp 2,000 to Rp 9,000 per month according to the Regional Regulation of Ogan Ilir Regency Number 19 of 2011. Table 3 presents research findings on the potential levy of waste services from various sectors. When compared to other sectors, the household sector has the greatest potential for retribution because it is able to increase regional income.

Waste services in the household sector need to be improved through the provision of waste transportation services and waste officers. According to the findings of research by Sumbodo et al. (2021), the provision of waste officers, the provision of waste information through the availability and responsiveness of officers in responding to complaints, and the provision of waste officers are ways to increase the satisfaction of waste services in the household sector. In addition, the readiness of waste transportation infrastructure, including the suitability of vehicles used for transportation, appropriate collection schedules, completeness of waste fee payment administration, and completeness of waste officer characteristics. If every sector is served, the potential waste levy collected by all sectors will probably approach Rp 1,412,659,000.

There are several obstacles in optimizing the potential for waste retribution, namely internal obstacles and exter-

Table 2. Shows the Potential for Current Waste Levies

No.	Source of Retribution	Amount	Retribution Fee for Waste	Annual Total Revenue
1	Tanjung Raja Market			
	a. Shophouse	97	IDR 1,000/day	IDR 35,405,000
	b. Stall	379	IDR 1,000/ day	IDR 138,335,000
	c. Stand Market	120	IDR 1,000/ day	IDR 43,800,000
2	Cinta Manis Market			
	a. Stall	120	IDR 1,000/ day	IDR 43,800,000
3	Indralaya Market			
	a. Stand Market	250	IDR 1,000/ day	IDR 91,250,000
	b. Stall	233	IDR 1,000/ day	IDR 85,045,000
			TOTAL	IDR 437,635,000
	Retribution for realization as of December 2021			IDR 85,144,500
	Realization percentage			19,46%

Table 3. Potential Waste Fees for Various Sectors

No.	Source of Retribution	Amount	Retribution Fee for Waste	Unit Tariff	Annual Total Revenue
Non-Commercial Group					
A.	Household (defined as a resident's house on a side street or apartment building)				
1	Tanjung Raja District	14,288	3,000	per month	IDR 514,368,000
2	Indralaya District	12,475	3,000	per month	IDR 449,100,000
Commercial Group					
A.	Market				
1	Tanjung Raja Market				
	a. Shophouse	97	1,000	Per day	IDR 35,405,000
	b. Stall	379	1,000	Per day	IDR 138,335,000
	c. Stand Market	120	1,000	Per day	IDR 43,800,000
2	Cinta Manis Market				
	a. Stall	120	1,000	Per day	IDR 43,800,000
3	Indralaya Market				
	a. Stand Market	250	1,000	Per day	IDR 91,250,000
	b. Stall	233	1,000	Per day	IDR 85,045,000
B.	Industry				
1	Tanjung Raja District	22	9,000	per month	IDR 2,376,000
2	Indralaya District	9	9,000	per month	IDR 972,000
C.	Diner/Restaurant				
1	Tanjung Raja District	9	9,000	per month	IDR 972,000
2	Indralaya District	11	9,000	per month	IDR 1,188,000
D.	School				
1	Tanjung Raja District	30	9,000	per month	IDR 3,240,000
2	Indralaya District	26	9,000	per month	IDR 2,808,000
			TOTAL		IDR 1,412,659,000

nal obstacles. Internal factors originate from government organizations, namely: (1) The relevant organization fails to communicate rules and obligations to the general public regarding the need to pay fees and the things that need to

Table 4. Pearson's Correlation Analysis of WTPs

Variable	Pearson Correlation					
	Paying Attitude	Objection to Pay	Retribution	Attitude when Retribution Changes	Waste Service	Retribution is Appropriate
Education	0.137	-0.036	-0.169	0.086	-0.01	0.081
Income	-0.054	0.007	0.157	0.05	0.073	-0.217

Table 5. Spearman's Correlation Analysis of WTPs

Variable	Spearman Correlation					
	Paying Attitude	Objection to Pay	Retribution	Attitude when Retribution Changes	Waste Service	Retribution is Appropriate
Education	0.141	-0.022	-0.189	0.022	0.007	0.0389
Income	0.00	0.077	0.2106	0.064	0.065	-0.117

Table 6. General Information About the Waste Service Areas in Tanjung Raja and Indralaya Districts

No.	Parameter	Notation	Unit	Result
a	Total population	A	Person	85024
b	Total number of households	B	Family	26763
c	Per capita waste generation rate	C	kg/person/days	0.7
d	The number of populations in the family	D=A/B	Person	3.177
e	Total Tonnes of Waste Generation per Day	E = A*C	ton/days	59.5
f	Total Tonnes of Waste Generation per Year	F = E*365	ton/year	21723.632
g	Source of waste in the service area			
	1) Households	G1	%	75.02
	2) business (market, restaurant, trade)	G2	%	19.99
	3) private community facilities (schools, hospitals)	G3	%	0.68
	4) industry (other)	G4	%	2.50
	5) public (office)	G5	%	1.81
h	Total Percentage of Waste Sources		%	100

Table 7. Waste Source Data from SIPSN

Source of waste in the service area	Waste generation (ton)	Percentage of Waste (%)
1) Households	219.50	75.02
2) business (market, restaurant, trade)	58.50	19.99
3) private community facilities (schools, hospitals)	2.0	0.68
4) industry (other)	7.30	2.49
5) public (office)	5.30	1.81

be paid for. People will become more aware of payments to relevant parties as a result of this socialization, and they will be less afraid of these parties, because this shows that they already know and can trust these parties. (2) Human resources in charge of collection lack direction on how to collect levy items if there are questions or differences of opinion. (3) The employee in charge of collecting the levy has not or has smoothly received the reward.

External problems that hinder the optimization of waste retribution include: (1) Public ignorance about the importance of paying for waste disposal services to maintain a clean and healthy environment. It is also a result of the government's failure to inform the public about mandatory penalties. (2) Lack of order in the compulsory payment of levies in markets that do not follow established processes. (3) The lack of safeguards for levy collecting agents necessitates the use of secure and effective payment solutions.

3.3 Analysis of Willingness to Pay

Consumer willingness to pay, or willingness to pay (WTP), can be seen from how much individuals are willing to spend

Table 8. Calculation of Cart Costs

Cart Cost Parameters	Cost Amount	Information	Notation
1) Investment cost of 1 cart	IDR 3,000,000	Price for 1 cart	A
2) Cart operator fee	IDR 319,800,000	IDR/year	B
Number of operators	1	Person	
Number of carts	13	Unit	
Insurance	IDR 50,000	/ Person/month	
Monthly salary	IDR 2,000,000	/ Person/month	
3) Maintenance cost	IDR 3,900,000	IDR/year	C
Investment price	IDR 3,000,000	A	
Percentage of maintenance costs	0.1	per year	
Number of carts	13	Unit	
4) Operator personal protective equipment costs	IDR 6,500,000	IDR/year	D
Personal protective equipment costs	IDR 500,000	IDR/year	
Number of operators	1	Person	
Number of carts	13	Unit	
Total cart fee (IDR/year)	IDR 333,200,000	A+B+C+D	E
Total cart fee (IDR/ton)	IDR 15,338		E/waste generation (tonnes/year)
5) Retribution for waste carts			
Total cart fee	IDR 15,338	IDR/ton	F
Waste generation rate	0.7	kg/person/day	G
Number of people per house	3.177	people/family	H
Waste cart retribution	IDR 1,023	IDR/family/month	F*G*H*30 days / 1000

Figure 4. Tanjung Raja Market Activity

money to restore damaged environments, such as garbage cleaning services. Although there are many variables that can affect WTP, this study only considered three variables, namely income and education. Income, especially income earned by society through employment or the sale of products or services, has several objectives, one of which is to improve the quality of society and help people understand their common social duties. To get an overview of WTP to support the levy analysis, 40 respondents were randomly placed in the Market Sector. Next, a quantitative analysis of the questionnaire answers is carried out with the help of graphs or diagrams.

As many as 52.5% of respondents have a high school education, and as many as 35.0% of respondents have an income between Rp 250,000 to Rp 500,000 per day, according to Figures 5 and 6. Figure 7 through Figure 11 show the answer to the question of willingness to pay. Based on Figure 7, respondents in the market sector pay an average waste fee of Rp 3,000/day, with Rp 1,000 for waste costs and the rest for market operations such as security and market regulations. When asked whether the current levy rate is feasible, most respondents answered in the affirmative (Figure 8). This can also be seen from the answer to the question in Figure 11 which shows that as many as 50% of respondents want a fixed daily rate of Rp 3,000.

Based on the respondent's answer in Figure 9, the waste levy payment process is always carried out in cash, and because they are accustomed to using cash, the respondent is unable to make non-cash payments using e-money. Figure 10 shows respondents' opinions on the quality of waste management services provided by local governments. However, waste services in this market sector still need to be improved to increase willingness to pay and increase the possibility of waste retribution. As many as 52.5% of respondents gave quite satisfactory answers.

The findings of the correlation analysis of the variables on the WTP questionnaire questions are shown in Tables 4 and 5. With a correlation value higher than 0.1, the findings show that WTP is significantly influenced by Attitude to Pay, Amount of Waste, and Amount of Waste. Retribution, and

Table 9. Calculation of Waste Collection Site (TPS) Costs

TPS Cost Parameters	Cost Amount	Information	Notation
1) Number of TPS	25	Unit	A
2) Total Serviceable Waste Generation with TPS per Year	21723.632	tonnes/year	
3) TPS investment costs	IDR 767,820,000	IDR/year	B
Container investment price	IDR 30,000,000	The price of 1 container of 6 m^3	
Investment price per container platform	IDR 712,800	Platform size 3.3×1.8 plate thickness 12 cm. concrete quality fc 15 MPa	
4) Operator fee	IDR 2,295,000,000		C
Number of operators	3	Person	
Number of TPS	25	Unit	
Operator salary	IDR 2,500,000	/person/month	
Insurance	IDR 50,000	/person/month	
5) Operator personal protective equipment costs	IDR 37,500,000	IDR/year	D
Personal protective equipment costs	IDR 500,000	IDR/year	
Number of operators	3	Person	
Number of TPS	25	Unit	
6) Maintenance cost	IDR 76,782,000	IDR/year	E
Investment price	IDR 30,712,800		
Percentage of maintenance costs	0.1	Per year	
Number of TPS	25	Unit	
7) Electricity cost	IDR 171,377,538		F
Power	1300	Watt for 1 TPS	
Price per kWh	1444.7	IDR/kWh	
TPS operational time	10	Hours for 1 working day	
Number of TPS	25	Unit	
Total TPS fee	IDR 3,348,479,537	IDR/year	G = A+B+C+D+E+F
Total TPS fee	IDR 154,139	IDR/ton	G / waste generation (tonnes/year)
8) Retribution for TPS			
Total TPS fee	IDR 154,139	IDR/ton	H
Waste generation rate	0.7	kg/person/day	I
Number of people per house	3.177	people/family	J
TPS retribution	IDR 10,283	IDR/family/month	H*I*J*30 days /1000

Levy Adjustment. Adjustment of Levy and Amount of Levy to the level of education and income of respondents has the highest correlation value. This shows how much influence the amount of assessed waste costs has on respondents' willingness to pay, demonstrating the importance of setting costs at acceptable levels to ensure efficient and orderly management.

3.4 Analysis of a New Levy

It is also necessary to conduct a study on the new waste levy considering that the findings of the study of the existing waste levy show that the tariff is based on the Regional Regulation of Ogan Ilir Regency. The method of calculating the levy for this new study is explained in Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 7 of 2021. This regulation targets domestic waste and similar household waste, with targets such as: (1) collection of waste from the source to temporary disposal sites;

Table 10. Calculation of the Cost of a Waste Truck

Waste Truck Cost Parameters	Cost Amount	Information	Notation
Number of trucks	12	Unit	
Total Serviceable Waste Generation with TPS per Year	21723.632	tonnes/year	
Investment for 1 Truck	IDR 0.	The truck is already there	
1) Total truck investment	IDR 0.		A
Number of trucks	12	Unit	
2) Operator fee	IDR 1,101,600,000	IDR/year	B
Number of operators	3	Person	
Number of trucks	12	Unit	
Operators' salary	IDR 2,500,000	/person/month	
Insurance	IDR 50,000	/person/month	
3) Truck maintenance costs	IDR 480,000,000	IDR/year	C
Percentage of maintenance costs	10%	Per year	
Investment price	IDR 400,000,000	The price of 1 waste truck	
Number of trucks	12	Unit	
4) Tire replacement fee	IDR 164,250,000	IDR/year	D
Mileage (km/miles/tyres)	50	For 1 truck	
Number of cycles (cycles/day)	2	For 1 truck	
Truck tire prices (IDR/tire)	IDR 3,000,000	For 1 truck	
Number of tires per truck (tyres/unit)	5	For 1 truck	
Ideal number of trucks for waste service	12	Unit	
Technical age of truck tires (km/tire)	40000	For 1 truck	
5) Truck fuel costs	IDR 657,000,000	IDR/year	E
Mileage (km/miles/tyres)	50	For 1 truck	
Number of cycles (cycles/day)	2	For 1 truck	
Fuel consumption (liters/km)	0.1	For 1 truck	
Fuel price	IDR 15,000	IDR/liter	
Number of trucks for waste service	12	Unit	
7) Annual truck tax	IDR 60,000,000	IDR/year	F
Tax price per truck	IDR 5,000,000	IDR/year/unit	
Number of trucks	12	Unit	
8) Shipping costs and truck admin	IDR 6,000,000	IDR/year	G
Shipping costs and truck admin price per truck	IDR 500,000	IDR/year/unit	
Number of trucks	12	Unit	
9) Operator personal protective equipment costs	IDR 18,000,000	IDR/year	H
Personal protective equipment costs	IDR 500,000	per year	
Number of operators	3	Person	
Number of trucks	12	Unit	
Total Truck cost	IDR 2,486,850,000	IDR/year	J = A+B+C+D+E+F +G+H
Total Truck cost	IDR 114,476	IDR/ton	J/ waste generation (tonnes/year)
10) Retribution for truck			
Total Truck cost	IDR 114,476	IDR/ton	K
Waste generation rate	0.7	kg/person/day	L
Number of people per house	3.177	people/family	M
Truck retribution	IDR 7,637	IDR/family/month	K*L*M*30 days / 1000

Table 11. Recap of Waste Handling Cost Calculations

Waste Management Charge	IDR/year	IDR/ton
a. Cost of a cart	IDR 333,200,000	IDR 15,338
b. Cost of TPS	IDR 3,348,479,537	IDR 154,139
c. Cost of a waste truck	IDR 2,486,850,000	IDR 114,476
Total cost	IDR 6,168,529,537	IDR 283,954

Table 12. Total Need for Retribution Each Year

No.	Parameter	Unit	Result
a	Ideal waste management cost	IDR/ton	IDR 283,955
		IDR/year	IDR 6,168,529,538
b	Cost for managing non-retribution waste	IDR/ton	IDR 46,032
		IDR/year	IDR 1,000,000,000
c	Total Rupiah Retribution Need per Ton = Cost of Ideal Waste Management - Cost of Non-Retribution Waste Management	IDR/ton	IDR 237,922
		IDR/year	IDR 5,168,529,538

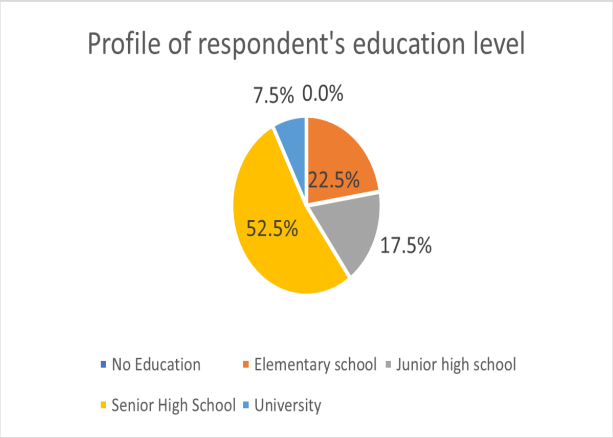

Figure 5. Profile of Respondent's Education Level

(2) transportation of waste from the source and/or temporary disposal site to the destination of waste disposal/final disposal; (3) the availability of waste disposal facilities or total destruction; (4) General statistics of the service area, including the number of inhabitants, number of houses, rate of waste generation per capita, and type of waste produced, are parameters of the quantity required in this calculation

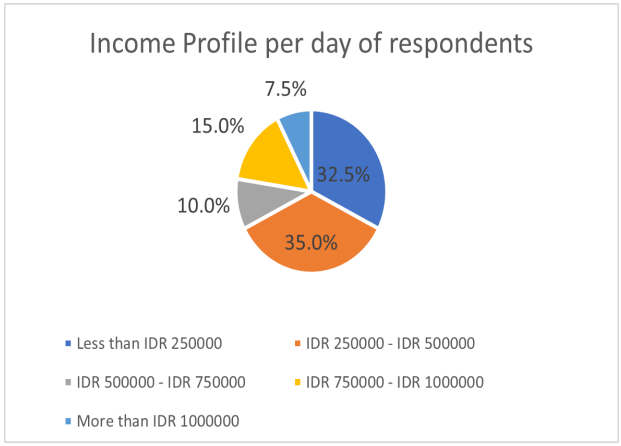

Figure 6. Income Profile per Day of Respondents

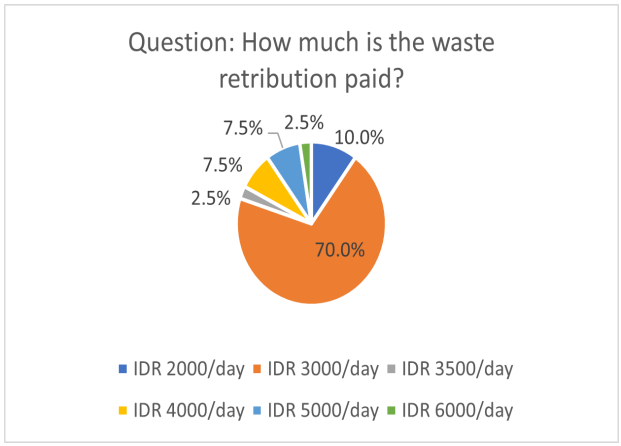

Figure 7. Payment for Waste Retribution

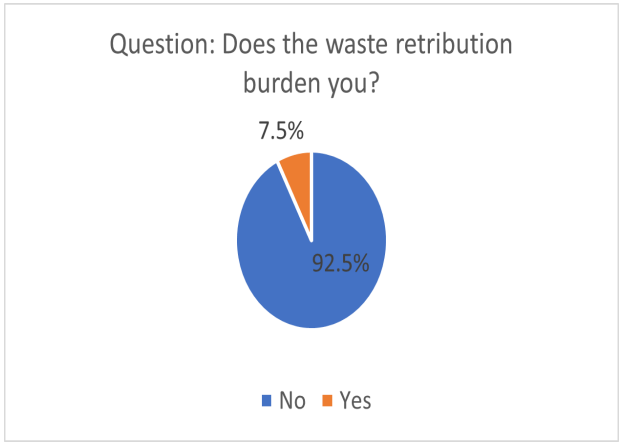

Figure 8. Views of Respondents on the Severity of the Retribution

(Table 6). This study was limited to Indralaya and Tanjung Raja sub-districts so that information on the number of populations, number of households, and other factors came

Table 13. The Need for Retribution per Category per Month

No.	Source of Waste in the Service Area	% Payment of Retribution	Total of Waste Retribution (IDR/year)	Number of Objects	Total of Waste Retribution (IDR/object/month)
a	Households	75.02	IDR 4,627,445,803	26763	IDR 14,409
b	Business (market, restaurant, trade)	19.99	IDR 1,233,274,110	1219	IDR 84,309
c	Private community facilities (schools, hospitals)	0.68	IDR 42,192,742	75	IDR 46,881
d	Industry (other)	2.50	IDR 153,904,812	31	IDR 413,723
e	Public (office)	1.81	IDR 111,712,070	50	IDR 186,187
	Total	100	IDR 5,168,529,538	-	-

Table 14. The Need for Retribution per Category per Ton

No.	Source of Waste in the Service Area	% Payment of Retribution	Total of Waste Retribution (IDR/year)	Number of Objects	Total of Waste Retribution (IDR/ton)
a	Households	75.02	IDR 4,627,445,803	26763	
b	Business (market, restaurant, trade)	19.99	IDR 1,233,274,110	1219	
c	Private community facilities (schools, hospitals)	0.68	IDR 42,192,742	75	IDR 237,922
d	Industry (other)	2.50	IDR 153,904,812	31	
e	Public (office)	1.81	IDR 111,712,070	50	

Table 15. Comparison of Retribution Results with Previous Studies

No.	Researcher	Method	Research Result	Objects
1	Current research	Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 7 of 2021	IDR 237,922 per tons	Households, Business, Private community facilities, Industry, Public
2	Murialti et al. (2018)	SNI 3242:2008	IDR 202,232.68 – IDR 231,587.94	Households

from both sub-districts. The rate of waste generation per capita is 0.7 kg / person / day according to SNI 3242-2008. Data from the National Waste Management Information System (SIPSN) of Ogan Ilir Regency on the Waste Source subject is used to determine the parameters of waste sources in the service area. This data is shown in Table 7.

Determine waste handling costs which include optimal waste handling costs and non-retribution borne waste costs, after completing Table 6. While the cost of waste management borne by non-retribution is the allocation of regional expenditures for waste handling costs, waste handling costs that are adjusted to the conditions and demands of waste management are ideal waste handling costs. In this study, waste collection and collection methods are the main topic of calculating ideal waste management costs. Toxic hazardous materials waste and other types of waste are not taken into account in this estimate. The amount of infrastructure owned is not a data input but a variable that is calculated to determine the ideal amount of infrastructure needs based on the generation of existing waste. This calculation is used to produce the ideal waste handling cost according to the waste generation in the study area. What is meant by a

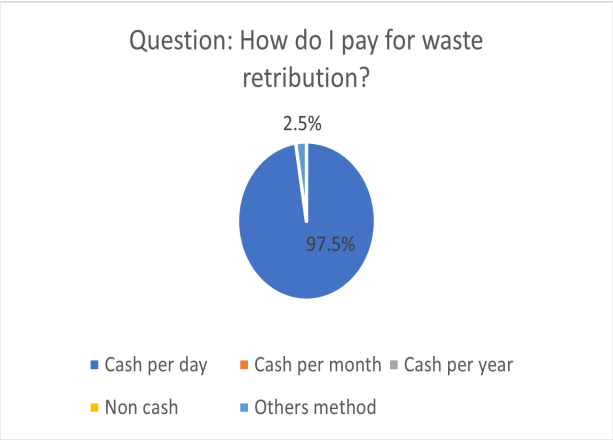

Figure 9. Procedure for Payment of Waste Retribution

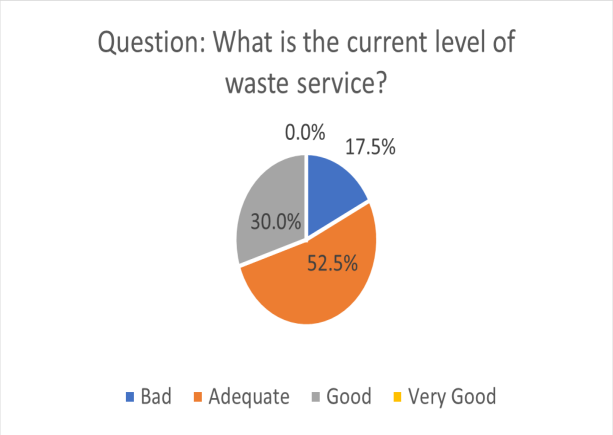

Figure 10. Service Level for Waste Currently Provided

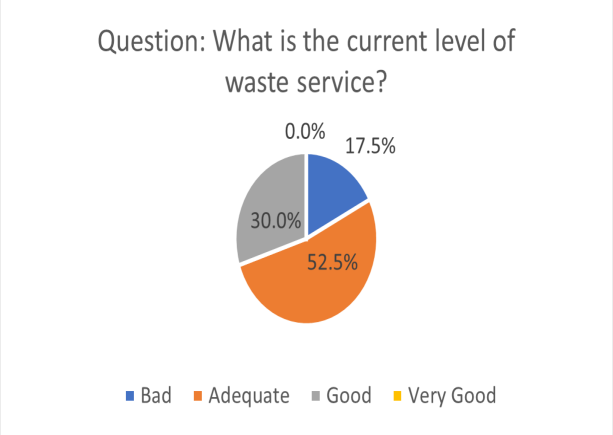

Figure 11. Opinions of Respondents Regarding the Proper Level of Retribution

waste handling plan that starts with the use of garbage carts, TPS funding, and waste vehicle financing in checking waste handling calculations. The calculation of basic food costs is presented in Table 8, Table 9, and Table 10 which will then be converted into retribution every month.

In this study, the cost of the cart was incorporated into the overall cost of waste processing. The total cost of TPS and garbage trucks per year is Rp 6,168,529,537 or Rp 283,954 per tons. The total amount of waste retribution is Rp5,168,529,538 if the handling costs are subsidized by non-levy costs such as financial support from the goverment budget (APBD) of Rp1,000,000,000 in the regions. The levy requirements per category determined based on the calculation results are shown in Table 14. Depending on the ability and urgency of using funds, the sanctions for each object will be smaller the greater the financial support of the APBD (Regional Revenue and Expenditure Budget). provide in the processing of garbage. In order for the amount of waste retribution to change appropriately if a waste projection database is created, the calculation of the results of Tables 13 and 14 is based on the latest data on waste in the Ogan Ilir Regency area. In this study there are two options that can be used to determine the new waste levy rate: the rate per object/month or the rate per weight (ton)/month. Table 15 compares the outcomes of the latest levy calculation with earlier studies. According to the table, there is a difference between the calculation results of the current study and those of Murialti et al. (2018) of IDR 6,334.06 to IDR 35,689.32. This is based on variations in computation techniques and locations for study.

4. CONCLUSION

Survey, observation, and interview methodologies were used to conduct research on the potential for solid waste retribution in Ogan Ilir District, South Sumatra Province. The market sector has the potential to cause waste retribution of Rp437,635,000, but this potential has only been realized by 19.46%. Based on the findings of the analysis, there is a potential waste levy worth Rp 1,412,659,000 generated by industries outside the market. The results of the identification of variables inhibiting levy collection show a lack of socialization of regulations to the public, lack of public awareness, and lack of training in levy collection. Based on the results of the willingness to pay survey, the amount of fees and cost adjustments have a correlation with income and education level, so that any change in costs has an impact on people's ability to pay. The new waste levy is reviewed using the Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 7 of 2021 which produces IDR 237,922 per ton. The implementation of this new waste levy may assist the government improve funding to cover costs for the development of waste facilities.

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