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Environmental Knowledge, Environmental Attitude, Environmental Motivation, Local Government Commitment, and Zero Waste Behaviour of Perumnas Society of Makassar City

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Abstract: Waste problem has become a serious problem in the world including a housing which is the location of the settlement for society. At least, there are three problems resulting from the waste problem, namely global warming, natural resources crisis, and ecosystem crisis. Zero waste is a concept that is used to overcome the waste problem. In order to zero waste can be realized, behaviour from every society is needed. Zero waste behaviour can be influenced by several factors, such as knowledge, attitude, motivation, and commitment. This study aimed to describe environmental knowledge (EK), environmental attitude (EA), environmental motivation (EM), local government commitment (LGC) and zero waste behaviour (ZWB) of Perumnas society of Makassar City, and to describe the influence of EK, EA, EM, and LGCindividually and together toward ZWB of Perumnas society of Makassar City. Data collecting were gathered by questionnaire deployment to 60 societies of PerumnasBumiTamalanreaPermai and PerumnasAntang. After did statistic examine, the research result showed that EK is in high category (38.33%), EA is in high category (33.33%), EM is in medium category (33.33%), LGC is in medium category (35%), and ZWB is in medium category (36.67%). EK, EA, EM, and LGC influenced toward ZWB individually and together. Based on the result, (1) EK affects toward ZWB, with significance value was $0.000 <$ alpha 0.050, (2) EA affects toward ZWB, with significance value was $0.000 <$ alpha 0.050, (3) EM affects toward ZWB, with significance value was $0.000 <$ alpha 0.050, (4) LGC affects toward ZWB, with significance value was $0.000 <$ alpha 0.050, (5) EK, EA, EM, and LGC together affect toward ZWB, with $F_{calculate}$ was $7197.198 > F_{Table}2.400$.
Keywords: Knowledge, attitude, motivation, commitment, behaviour, zero waste, environmental.

I. INTRODUCTION

Waste problem has been becoming a serious problem in the world. Increasing population and consumption behaviour which are not controlled have caused the number of waste increases. A waste problem closely related to environmental pollution, the pressure of land area, energy, water, waste management costs, and natural resources problems. Each year there are around 120 – 130 billion tons of natural resources which areconsumed by humans and that thing haveresulted in waste around 3.4 – 4 billion tonswaste[1].This waste problem has resulted in uncertainty future indirectly.

Peraturan Pemerintah Republik Indonesia Nomor 81 Tahun 2012 Tentang Pengelolaan Sampah Rumah Tangga dan Sampah Sejenis Sampah Rumah Tangga Pasal 10 stated that there are two types of waste management effort, namely waste reduction and waste management, and obliged each person to do it [2]. *Peraturan Pemerintah Republik Indonesia Nomor 81 Tahun 2012* obliged each person to do waste management effort because the increasing waste amount is resulting from increasing human population. In 1988 the number of waste which was resulted by Banglore City was 650 tons/day, and 1450 tons/day in 2000, 3000 – 3600 tons/day in 2012 [3]. Increasing the number of waste that is occurred in Banglore City corresponded to the increase of the population that is occurred in that city, in 2001 5.7 million people become 9.6 million people in 2016.

Management waste effort is a thing that is really important to do right now for decreasing the impact of the waste problem. At least, there are three problems resulting from the waste problem, namely global warming, natural resources crisis, and ecosystem crisis [4]. A good solution to reduce waste increasing is zero waste [5]. ThenSong et al. [5] revealed in their research that the city which adopted zero waste concept has the ability of

waste collecting system that is better, because doing recycling and waste avoiding in the house, office, and industry.

A research that was done by Zaman [6] in Adelaide City showed that through the implementation of zero waste concept, the number of compost should be bigger than waste that is brought to landfill and the researchers projected that Adelaide City will be able to divert 82% waste from landfill in 2020. The number of waste that is brought to landfill can be reduced because waste composting is carried out as stated by [6].

Zero waste had started to be introduced in Indonesia through 3R (Reduce, Reuse, and Recycle) program that is one of implementation from zero waste concept and the government supports the implementation of the concept [7]. In order to zero waste can be implemented in a region is needed behaviour from every society that supports it. Behaviour every society can be influenced by several factors, such as knowledge, attitude, motivation, and commitment [8]–[13].

Makassar city that is one of the cities in a developing country namely Indonesia faces the waste problem as well. Everyday waste that is resulted in a society of Makassar city in the 2017-2018 period is 6308.89 tons, and 63% of the waste is resulted in by household in Makassar city [14]. Perumnas Bumi Tamalanrea Permai and Perumnas Antang are housing that quite large in Makassar city and there is still a lot of waste on the roadside at the housing area. Based on the data which have been revealed, this research aimed to describe EK, EA, EM, LGC, and ZWB, and analyzing:

H_1 : The influence of EK toward ZWB of Perumnas Society of Makassar city.

H_2 : The influence of EA toward ZWB of Perumnas Society of Makassar city.

H_3: The influence of EM toward ZWB of Perumnas Society of Makassar city.

H_4 : The influence of LGC toward ZWB of Perumnas Society of Makassar city.

H_5 : The influence of EK, EA, EM, and LGC together toward ZWB of Perumnas Society of Makassar city.

II.   RESEARCH METHODS

This research is survey research and the methods that areused are descriptivestatistical analysis, simple regression analysis, multiple regression analysis. The populations of this research aresociety of PerumnasBumiTamalnreaPermai and PerumnasAntang of Makassar city. From the total of the population is taken 60 samples according toRoscoe[15] suggestion inSugiyono[16] about the number sample in research that will conduct multiple regression analysis is the amount of sample that is chosen at least 10 times the number of variables that are examined. Sampling technique that is used is purposive random sampling.

Selected society will be given a paper test of EK as many as 10 question items, and EA, EM, LGC, and ZWB questioner as many as 47 statement items that have been validated. The data that is obtained will be analyzed by using SPSS 20.00 software with simple and multiple regression analysisstatistics.

III.   RESULTS
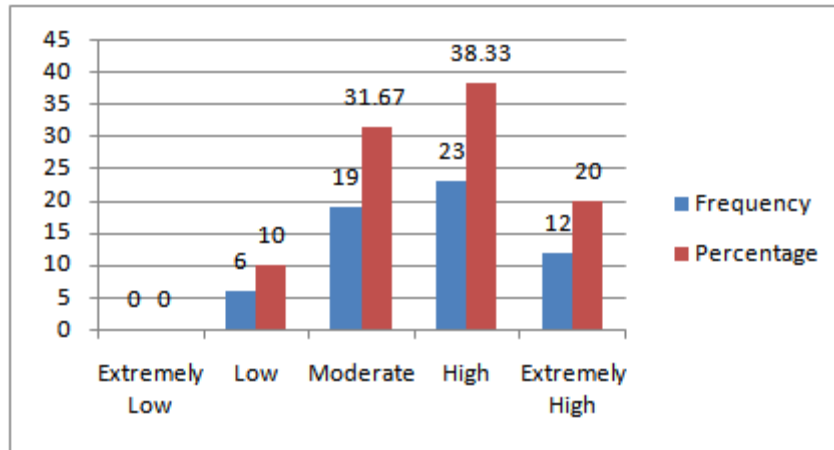
3.1.   Descriptive Statistical Analysis

Based on descriptive statistical analysis results showed that EK range was in 4 to 10, mean was 6.90, and standard deviation (SD) was 1.74. EA range was in 22 to 63, mean was 44.03, and SD was 11.09. EM range was in 20 to 59, mean was 40.37, and SD was 10.34. LGC range was in 18 to 48, mean was 33.68, and SD was 8.47. ZWB range was in 21 to 59, mean was 40.48, and SD was 10.21. The summary of descriptive statistical analysis can be seen in Table 1.

Table 1. The Summary OfDescriptive Statistical Analysis

| No	Description	EK	EA	EM	LGC	ZWB
1	Mean	6.90	44.03	40.37	33.68	40.48
2	SD	1.74	11.09	10.34	8.47	10.21
3	Minimum	4.00	22.00	20.00	18.00	21.00
4	Maximum	10.00	63.00	59.00	48.00	59.00
Source: Primary Data						

To find out which category mean value is, the further results of frequency distribution analysis are shown in Figure 1.
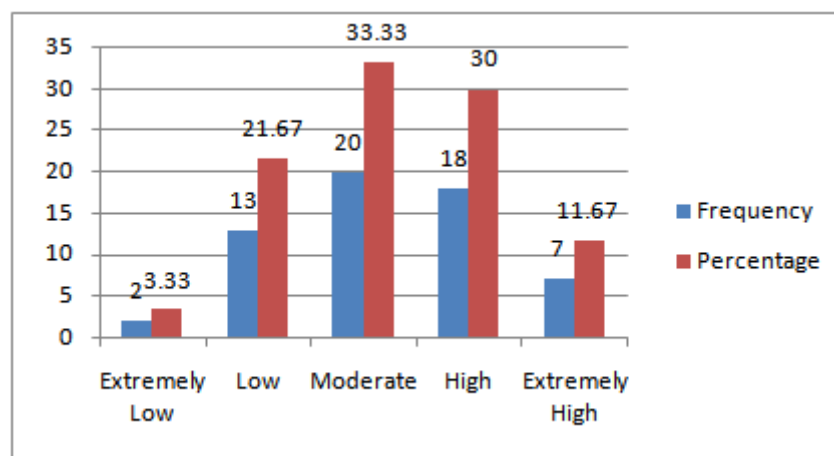
Figure 1. Frequecy Distribution of EK

Based on Table 1 and Figure 1,it can be concluded that EK was in high category. In other words, generally,EK that is had by Perumnas society Of Makassar City is in a good category.
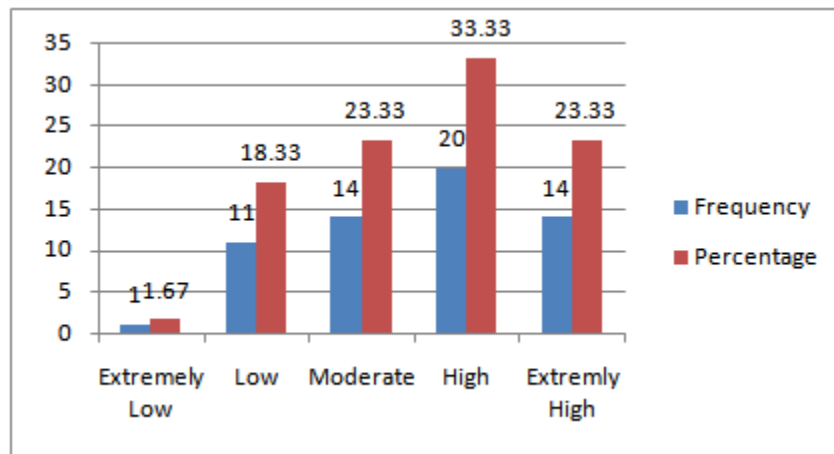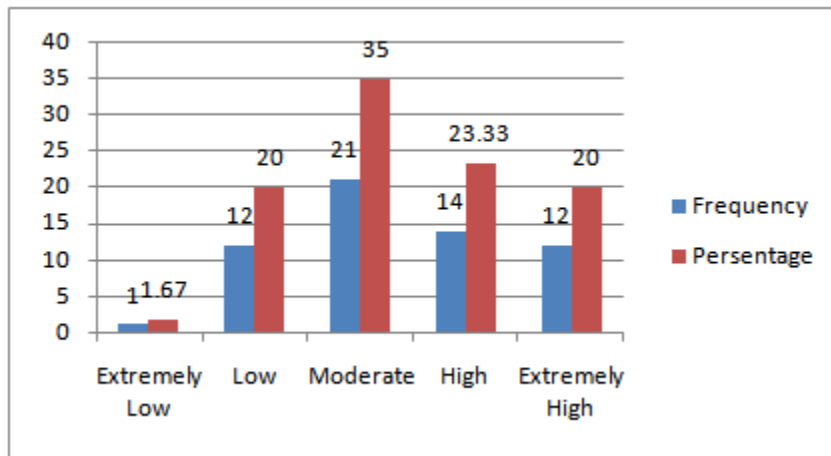

Figure 1. Frequency Distribution of EA

Based on Table 1 and Figure 2, it can be concluded that EA was in high category. In other words, generally, EA that is had by Perumnas society Of Makassar City is in a good category.
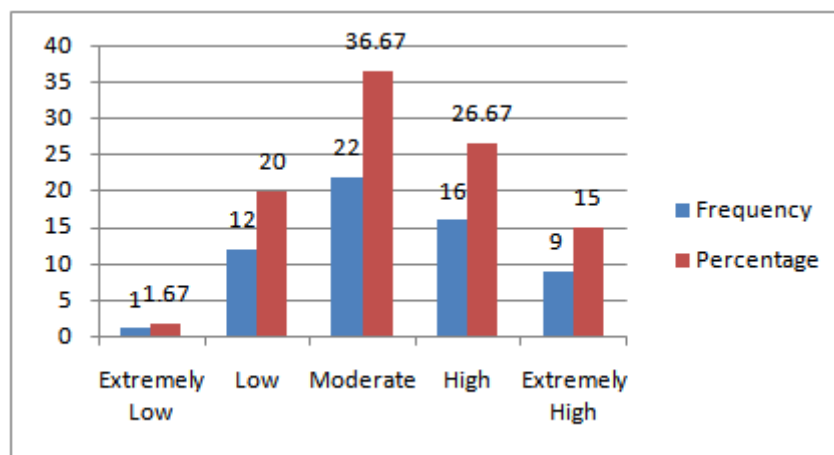

Figure 2. Frequency Distribution of EM

Based on Table 1 and Figure 3, it can be concluded that EM was in moderate category. In other words, generally, EM that is had by Perumnas society Of Makassar City is in a good category.

Figure 4. Frequency Distribution of LGC

Based on Table 1 and Figure 4, it can be concluded that LGC was in moderate category. In other words, generally, LGC in Perumnas society Of Makassar City is in a good category.

Figure 3. Frequency Distribution of ZWB

Based on Table 1 and Figure 5, it can be concluded that ZWB was in moderate category. In other words, generally, ZWB in Perumnas society Of Makassar City is in a good category.

3.2. Test Analysis Requirements

Normality test was carried out to the data of EK, EA, EM, LGC, and ZWB using Kolmogorov-Smirnov method, as shown in Table 2.

Table 2. Normality Test

	Kolmogorov-Smirnov[a]	Description
EK	0.51	Normal
EA	0.200	Normal
EM	0.200	Normal
LGC	0.200	Normal
ZWB	0.200	Normal
Source: Output SPSS 20.00		

Table 2 shows that EK, EA, EM, LGC, and ZWB data distribute normally.
Homogeneity test was carried out to the data of EK, EA, EM, LGC, and ZWB using Chi-Square method, as shown in Table 3.

Table 3. Homogeneity Test

	Asymp. Sig.	Description
EK	0.446	Homogenous
EA	0.418	Homogenous
EM	0.859	Homogenous
LGC	0.330	Homogenous
ZWB	0.829	Homogenous
Source: Output SPSS 20.00		

Table 3 shows that EK, EA, EM, LGC, and ZWB data are homogenous data.
Test of linearity was carried out to the data of EK, EA, EM, and LGC to ZWB, as shown in Table 4.

Table 4. Test of Linearity

	F	Description
EK * ZWB	0.737	Linear
EA * ZWB	1.820	Linear
EM * ZWB	1.073	Linear
LGC * ZWB	0.511	Linear
Source: Output SPSS 20.00		

Table 4 shows that there is a correlation between EK to ZWB, EA to ZWB, EM to ZWB, and LGC to ZWB. Heteroscedasticity Test was carried out to the data of EK, EA, EM, and LGC to ZWB, as shown in Table 5.

Table 5. Heteroscedasticity Test

	Sig.	Description
EK * ZWB	0.424	There is no heteroscedasticity problem
EA * ZWB	0.288	There is no heteroscedasticity problem
EM * ZWB	0.466	There is no heteroscedasticity problem
LGC * ZWB	0.331	There is no heteroscedasticity problem
Source: Output SPSS 20.00		

Table 5 shows that there is no heteroscedasticity problem between the data of EK, EA, EM, and LGC to ZWB. Thus, Test Analysis Requirements has been fulfilled, and then simple linear regression analysis and multiple linear regression analysis can be continued.

3.3.   The influence of EK, EA, EM, and LGC toward ZWB of Perumnas Society of Makassar city.
Simple linear regression analysis was carried out to find out whether EK, EA, EM, and LGC have the influence to ZWB. Data were analyzed using a simple linear regression method, as shown in Table 6.

Table 6. Simple Linear Regression Test

	Sig.	R Square	Beta	Description
EK * ZWB	0.000	0.967	5.758	Influencing
EA * ZWB	0.000	0.950	0.897	Influencing
EM * ZWB	0.000	0.991	0.983	Influencing
LGC * ZWB	0.000	0.996	1.203	Influencing
Source: Output SPSS 20.00				

Table 6 shows that significance value of EK*ZWB is $0.000 <$ alpha 0.050, EA*ZWB is $0.000 <$ alpha 0.050, EM*ZWB is $0.000 <$ alpha 0.050, LGC*ZWB is $0.000 <$ alpha 0.050, then statistically EK, EA, EM, and LGC have the influence toward ZWB. R Square value show that EK*ZWB is 0.967, EA*ZWB is 0.950, EM*ZWB is 0.991, and LGC*ZWB is 0.996, thus it can be seen that the amount of influence of EK*ZWB is 96%, EA*ZWB is 95%, EM*ZWB is 99%, and LGC*ZWB is 99%. The Beta value of EK*ZWB is 5.758, EA*ZWB is 0.897, EM*ZWB is 0.983 and LGC*ZWB is 1.203, thus it can be seen that if EK, EA, EM, and LGC are increased then ZWB will increase as 5.758 (EK), 0.897 (EA), 0.983 (EM), and 1.203 (LGC). Based on the statistical analysis, it can be concluded that H_1, H_2, H_3, and H_4 are accepted.

According to the statistical analysis which shows that EK, EA, EM, and LGC effect on ZWB, it can be concluded that if EK, EA, EM, and LGC which are owned by Perumnas society of Makassar city is better, then

ZWB of Perumnassociety of Makassar city will be better as well. Otherwise, if EK, EA, EM, and LGC which are owned by Perumnas society of Makassar city are worse, then ZWB of Perumnas society of Makassar city will be worse as well. If this ZWB increases, then the environment of Perumnas society of Makassar city will be free from waste.

Results of this study relate to the study that had been conducted byZareie& Jafari Navimipour[13], showed that knowledge about environmental has influence toward someone's environmental behaviour. The study that had been carried out byPalupi&Sawitri[11] claimed that positive attitude toward environmental directly can effect pro environmentalbehaviour. The study that had been conducted byAffandy et al.[8] on the study about "Community Participation In Comprehensive Management Waste Toward Zero Waste" exposed that successfull from waste management do not separate from motivation that is given by local government to residents. Then, the results of this study relate to the study that had been carried out byTerrier &Marfaing[12], this study showed that someone's commitment will help behaviour development.

3.4. The influence of EK, EA, EM, and LGC together toward ZWB Perumnas society of Makassar city

The data were analyzed using multiple linear regression method, then it was obtained a result as shown in Table 7.

Table 7. Multiple Linear Regression Test

	Fcount	R Square	Description
EK, EA, EM, LGS * ZWB	7197.198	0.998	Influencing
Source: Output SPSS 20.00			

Table 7 shows F_{count} is 7197.198 >$F_{table}$is 2.400, then statistically EK, EA, EM, and LGC together have influence toward ZWB. R Square value is 0.998, that it can be known that EK, EA, EM, and LGC together effect toward ZWB as many as 99%.

To find out the contribution of EK, EA, EM, and LGC toward ZWB, then presented the continued analysis results as shown in Table 8.

Table 8. Continued Results Of Multiple Linear Regression Analysis

	Beta	Sig.	Description
EK * ZWB	0.071	0.100	Do not contirbute
EA * ZWB	-0.010	0.754	Do not contribute
EM * ZWB	0.255	0.000	Contribute
LGC * ZWB	0.685	0.000	Contribute
Source: Output SPSS 20.00			

Table 8 shows that EM contributes toward ZWB 0.255, LGC contributes toward ZWB 0.685, whereas EK and EA have not contributed toward ZWB. According to Table 7 and Table 8, it can be concluded that H_5 is accepted.

Based on the results of the statistical analysis which show that EK, EA, EM, and LGC together effect on ZWB, it can be concluded that if EK, EA, EM, and LGC together on Perumnas society of Makassar city are better, then ZWB of the society will be better as well. Otherwise, if EK, EA, EM, and LGC together on Perumnas society of Makassar city are worse then ZWB of the society will be worse as well. If this ZWB is more increased then The environment of Perumnas society of Makassar city will be free from waste.

IV. CONCLUSION

Based on the results of the study the influence of EK, EA, EM, and LGC toward ZWB, then it can be concluded that:
- EK of Perumnas society of Makassar city is high category, it means that EK of Perumnas society of Makassar city is good. EA of a perumnas society of Makassar city is high category, it means that EA of Perumnas society of Makassar city is good. EM of perumnas society of Makassar city is moderate category, it means that EM of Perumnas society of Makassar city is quite good. LGC of a perumnas society of Makassar city is moderate category, it means that LGC of Perumnassociety of Makassar city is quite good. ZWB of Perumnas Society of Makassar city is moderate category, it means that ZWB of Perumnassociety of Makassar city is quite good.
- EK effects on ZWB Perumnas society of Makassar city (0.000 < 0.050), it means that getting better the EK then The ZWB will be getting better.

- EA effects on ZWB Perumnas society of Makassar city (0.000 < 0.050), it means that getting better the EA then the ZWB will be getting better.
- EM effects on ZWB Perumnas society of Makassar city (0.000 < 0.050), it means that getting better the EM, then the ZWB will be getting better.
- LGC effects on ZWB Perumnas society of Makassar city (0.000 < 0.050), it means that getting better the EM, then the ZWB will be getting better.
- EK, EA, EM, and LGC together effect on ZWB Perumnas society of Makassar city (F_{count} 7197.198 >F_{table}2.40), it means that getting better the EK, EA, EM, and LGC together, then the ZWB will be getting better.

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