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Regional Model Development of Plastic Waste Monitoring: Basic Framework from Population and Public Market in Central Java-Indonesia

Regional Model Development of Plastic Waste Monitoring: Basic Framework from Population and Public Market in Central Java-Indonesia

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Abstract. Recently, Intention to accelerate SGDs achievement and also mitigate climate change impact concerning to regional health, increasing significantly. One of the regional health issues for those is concerning to impcat of plastic waste. Event though plastic is one of the principal materials in the regional market and industry, but then plastic waste arise to be principal problem for regional environmental health indicators since they linked living from land to coastal and to oceans. Many tons of plastic from land accounted enter to costal and or ocean then attack to all living thinks. Moreover they may be able to return to the land as microplastic consumed by fish. Today, quick respond to manage plastic waste have a high assosiation with effort to manage green food cycle as of covering basic regional food and cereal cycle. This study goal is to provide basic model for regional plastic waste degree monitoring. The model is developed by using "online" population data from regional statistical data and number of public market. GIS tools is used to degree of plastic waste in spatial map. For detail, Central Java Provice was then selected for model assessment. To monitor the plastic waste generation in spatial pattern, online data population for year 1990, 2000, 2010, 2018 and number of traditional market was utilized. The study calculated that the highest degree of plastic waste generation with population-base approach for year 2018 is located in Brebes Regency with estimated 161.53 Ton per day. Semarang city contributed 160.04 Ton per day and total plastic waste generation in Central Java is estimated 3,090.38. According to the public market location, this study founded that Surakarta, Semarang, Pekalongan and Tegal clasify as high degree of plastic waste ggeneration.

1. Introduction

Plastic industry and the consumption degree for global and regional economic development take a significant role. Plastic was recorded since 1950 with global production for 2 Million tons (Mt) then increae to 380 Mt for year 2015 [1]. In 2015 global economic feature, plastic comodity share 8.4 CAGR while for Indonesia share CAGR 6.23%, estimated for year 2018-2023 [1,2]. Plastic is a simple material for general purposes in rural and urban living. For Indonesia, plastic demand estimated 4.3 million tons, supply for domestic industry estimated 3.6 million tons [3]. Depending on the activity of economic and geographical feature, consumption of plastic were difers. Data consumption founded such as comsuption of plastic europe country (Belgium is 167 kg/capita/year), in asian developed countries (Korea is 126 kg/capita/ year). In south east asia region, (Thailand 126 kg/capita/day, Indonesia 17 kg/capita/year)

[3]. For the economic contribution perspective,in europe for example, estimated 1.6 Million people work in plastic industry, at which hold estimated 360 Billion Euros for their omset [4]. Plastic fabrication and manufacture cost is very low compare to other material [5]. Plastic can be found such as for furniture, home appliances, packaging industry, packaging such as food, vegetable, fruit, snack, cereal. China estimated produced 30% of total plastic in the world, europa estimated 17 %, at which total plastic production in the world 859 Mt for year 2018 [4]. Plastic production increase from 15 MT for year 1964 to be 311 Mt for year 2014 [5]. Other data administered that plastic production predicted increase drastically become more than 25,000 Mt for year 2050 by usual procuction-consumption in economic feature behaviour [1,2]. Plastic ultization data in europe shown that 39.9% is for packaging, 19.8% for building and construction, automotive 9.9%, household, liesure, sport 4.1 % [1,4]. Packaging sector also dominated for plastic market in Indonesia [2]

Plastic consumption is mostly just for singgle purposes, and then disposed as waste. Plastic was dominant in urban rural live started since 1930s and 1940s [1]. Plastic waste in associated as of special intention to marine polluiton start to reported in 1970s [6]. In europe, plastic waste generation estimated 29.1 Mt [4]. United Enviroment state that 79 % of plastic waste generate will be accumulated in landfills, dumps and nature environment, and only estimated 21 % plastic waste recycled and treated [1,7]. China is the country with the most high rate of mismanaged plastic waste with estimated 27.7%, while Indonesia is the second with estimated of 10.1% [6]. Plastic waste generation in Indonesia estimated increase 4 %, from 11% for year 2005 to be 15 % for year 2015 [8]. Indonesia plastic waste generation estimated 7.17 Mt. It is calculated base on total waste generation in Indoensia 62.5 Mt for year 2018 [9]. Mismanage plastic waste is very dengerous for human and environmental live. Plastic waste can be harmful and or toxic for human live. Its can reach to the lives such as from the seafood, terrestrial sea food, and drinking water by particle toxicity, chemical toxicity, pathogen and parasite vector [10,11]

Effort to manage plastic waste by government, policy maker, as of to foster and increasing environmentally sound has been run. in line with the increasing of municipal solid waste management. Latest big effort conducted by UN, the UN, accounted “beat with plastic waste”as a principal theme for world environmental day for year 2018. It is weak up call for countries and citizen to avoid, reduce and mitigate the accident and disaster from plastic waste. Mitigation impat of plastic waste should be conduct comprehensively from the global to the national and sub national policy for manucacture, utility, colleting and reproducing [12,13]. It is also importance to increase environmental protention act, waste management strategy , fostering education and awarness, and involving economic factor such as sircular economic implemetation [14,15,16].

Plastic waste issues has been arised from land-base continues to the river, costal then to the ocean [6,17,18]. One of the principal issues toward plastic waste management is about the system to monitor degree of plastic waste flow from land to the ocean, including how to quantify it in each region [1,16]. This study goal is to develop basic model to monitoring plastic waste degree at which cover developing region.

2. Basic framework of regional model for plastic waste monitoring.

Recently, research toward plastic waste and health issue become increase. It is just not only about plastic waste at source, but also and more intention to the plastic flow- cycle, from land to the river and finally to the ocean, tracer of impact of macro plastic, micro plastic on land, river, coastal and marine environment [6,10,11]. Data for year 2010, of plastic waste flow shown, 275 million metric tons (Mt) of plastic waste was generated from in 192 coastal countries, estimated 4.8 to 12.7 million Mt entering the ocean, through river, waterways or any land-coastal rural urban activities [6]. It is predicted with usual economic behaviour of plastic utilization running and no reduction program intervention, ratio of plastic to fish in the oceans (in weigh) will be decrease dramatically from 1:5 in year 2014 to become 1>:1 for year 2050 [5]. As of geographical feature, plastic waste generated from rural urban activities, estimated 10-20 percent of plastic from land end up in the ocean [6,17]. Plastic waste share for estimated 14 % of total waste generation in Indonesia and for some coastal cities, plastic waste have been founded

especially for microplastic on the food chain through such as fish [8,9,19]. To avoid more dangerous impact, day to day monitoring plastic waste flow should be setup.

Figure 1 describe the basic framework for regional model of plastic waste monitoring system in Indonesia region. This study develop model for monitoring comprehensive geographical feature at which assess any possibility of plastic waste founded. Figure 1.a describe horizontal geographical future while figure 1.b describe vertical geographical feature. This study proposed a model at which plastic waste were monitor "by tools" as of describe with node and red line at which cover from high land, land, low land, coastal then to the oceans. It a basic framework of "line system" of plastic waste monitoring system to account plastic consumption, plastic waste generation for human activities in the context of geographical future.

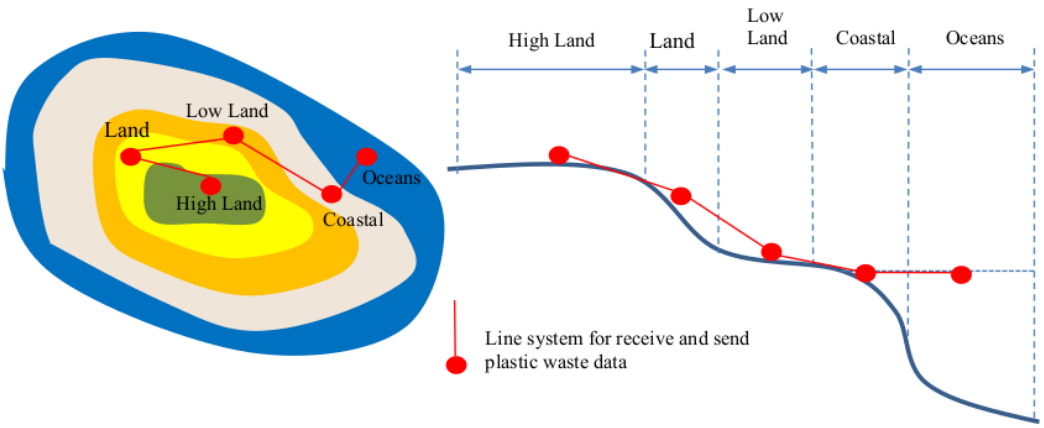

Figure 1.a. Geographycal Feature consideration in Horisontal Perspective

Figure 1.b. Geographycal Feature concideration in Vertical Perspective

Figure 1. Geographical consideration for development regional model of plastic waste monitoring

3. Data and methods

3.1. Study area

Degree of plastic waste generation depend on econimic feature and citizen behaviour. Central Java is one of the potential Indonesia's region in Indonesia. Data concerning economic growth is 5.28% year of year in fourth quarter, it is more than national growth 5.21 year of year [20]. Infrastructure development as of geographical data shown that North Easth of province is rural urban area, while west area of province is dominated by rural [21]. Both economic and geographical feature lead this study to selec this Province for examined and perform model. Moreover, Central Java has coastal zone in North and South, as of North Java Sea region and South Java Sea Region. Data related plastic waste in coastal zone inundation, founded in north Semarang area [22], however extended information such as for monitoring related to plastic waste and climate change should be run to mitigate more dengerous impact[19]. Plastic waste waste also related to climate change action[23], as of data founded, that waste management has on second priority [24].

3.2. Method

This research was condudted with by using flowchart as describe in figure 2. This study is a model wich combined numeric and data spatial. At the first step, this study defined that estimation of plastic waste generation by using population level for regional assemsement as of fundamental and basic issues as of for extended waste management scenario within geospatial database[25,26]. Second step then following by development of draf model design for calculating plastic waste generation as of numerical model and spatial model development by using GIS tools. Since the economic growth of central Java lower then other Java island as of 5,82%, for third step of developing model, this study used 15 kg/capita/year as the basis for numerical plastic waste assessment [3,8,20]. At fourth step, then this study utilized google map for estimating public market location for spatial data acqusition to extend of spatial model of plastic waste distribution in Central Java. It is a basic step for remote sensing and GIS method in plastic waste assessment event [25]. For assessing per kapita, this study utilized data source from Statistic Central Java Agency for four decade year 1990, 2000, 2010, and 2018 [27]

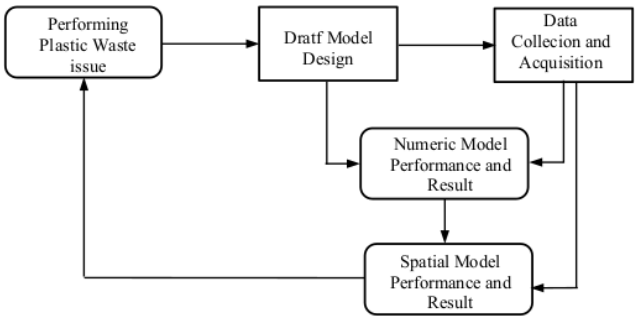

Figure 2. Fowchart for Development Regional Model of Plastic Waste Monitoring

Estimation of plastic waste generation calculated by using national population data from BPS [27] multiply by Indonesia's waste generation 0.52 kg/capita/day (kg/ppd) for plastic waste estimation [6], percentage of waste generation [6,19], and refers to the economic feature in general in Central Java and [20,27]. With those assumption, numerical model for estimate plastic waste generation in Central Java Region formulated as follow;

$$Q_{1990} = 0.31 \text{ kg/ppd} * 11\% * P_{1990c,r} \quad (1)$$
$$Q_{2000} = 0.43 \text{ kg/ppd} * 12\% * P_{2000c,r} \quad (2)$$
$$Q_{2010} = 0.52 \text{ kg/ppd} * 13\% * P_{2010c,r} \quad (3)$$
$$Q_{2018} = 0.64 \text{ kg/ppd} * 14\% * P_{2018c,r} \quad (4)$$

Where:

Q_{1990} : Plastic waste generation in regency/city for Central Java year1990 kg/person per day
Q_{2000} : Plastic waste generation in regency/city for Central Java year 2000 kg/person per day
$Q_{2010c,r}$: Plastic waste generation in regency/city for Central Java year 2010 kg/person per day
$Q_{2018c,r}$: Plastic waste generation in regency/city for Central Java year 2000 kg/person per day
$P_{1990c,r}$: Population in city/regency in Central Java year 1990
$P_{2000c,r}$: Population in city/regency in Central Java year 2000
$P_{2010c,r}$: Population in city/regency in Central Java year 2010
$P_{2018c,r}$: Population in city/regency in Central Java year 2018

To estimate share of plastic waste generation in each region of Java to National level for year 2018, the numerical model is design by using formula, as follow:

$$\frac{P2018c,r}{0.014.\ X\ 65.2\ Mt}\ x\ 100\ \% \qquad (5)$$

Where:
$P_{2018c,r}$: Plastic waste generation at regency/city in Central Java Province for year 2018
0.014 : Pproportional of plastic waste in National previous study Lestari & Trihadiningrum [19]
65.2 Mt : National Waste Generation from Enviromental Data Statistic [9]

To design basic spatial model, this study utilized weights approach. It is a percetage of plastic waste generation in each cities and regency divided by total cumulation of plastic waste generation in Central Java. Numerical model result and calculation then tranfer to GIS map. The spatial model design base on mumerical model by using formula as follow:

$$Wqi = \frac{Q_{icr}}{Qicj}\ x\ 100\ \% \qquad (6)$$

Where:
Wqi : Percentage of plastic waste generation in city and regency compare to Central Java
Qicr : Plastic waste generation in city and regencyfor year i
Qicj : Plastic waste generation in Central Java for year i

4. Result and discussion

4.1 Regional model development for plastic waste monitoring in Central Java-population based.

With ppopulation base, this study estimated 3,090.38 ton/perday plastic waste generated in in Central Java. It is contributed 12.36 % to National for year 2018. The highest Plastic waste generation is Semarang City with estimated 160.04 ton/ perday for year 2018. The lowest plastic waste generation is Magelang city with estimated 10.92 ton/ perday. Table 1 describe result of numerical model of plastic waste generation in Central Java for each city and region in four decade 1990, 2000,2010 and 2018.

Table 1. Plastic Waste Generation (Ton/Capita/Year), National Share (%) And Average Growth rate decade to decade in Central Java Province

No.	Regency/ City	Estimation Plastic Waste Generation in Four Decade in Central Java Province (average of population base) 1000 kg/perday				Share to National year 2018 (%)	Average Growth rate (decade to decade)
		1990	2000	2010	2018		
1	Banjarnegara	26.32	43.02	58.74	82.27	0.33	0.47
2	Banyumas	45.99	74.91	105.09	150.45	0.60	0.49
3	Batang	20.17	34.11	47.78	68.31	0.27	0.51
4	Blora	26.16	41.94	56.09	77.25	0.31	0.44
5	Boyolali	28.79	46.27	62.90	87.79	0.35	0.45
6	Brebes	51.89	87.55	117.21	161.53	0.65	0.47
7	Cilacap	50.72	83.00	111.01	154.07	0.62	0.45
8	Demak	28.06	50.24	71.36	103.20	0.41	0.55
9	Grobogan	39.15	65.44	88.47	122.90	0.49	0.47

No.	Regency/ City	Estimation Plastic Waste Generation in Four Decade in Central Java Province (average of population base) 1000 kg/perday				Share to National year 2018 (%)	Average Growth rate (decade to decade)
		1990	2000	2010	2018		
10	Jepara	28.22	50.00	74.18	111.16	0.44	0.58
11	Karanganyar	23.80	39.15	54.97	78.77	0.31	0.49
12	Kebumen	38.22	60.11	78.41	107.08	0.43	0.41
13	Kendal	27.25	43.85	60.86	86.38	0.35	0.47
14	Klaten	37.04	57.28	76.39	104.96	0.42	0.42
15	Kudus	21.52	36.31	52.55	77.18	0.31	0.53
16	Magelang	34.64	56.77	79.88	114.65	0.46	0.49
17	Magelang City	4.20	6.06	7.99	10.92	0.04	0.38
18	Pati	36.28	59.26	80.51	112.30	0.45	0.46
19	Pekalongan	23.86	41.19	56.69	79.91	0.32	0.50
20	Pekalongan City	8.28	13.53	19.02	27.28	0.11	0.49
21	Pemalang	37.99	65.09	85.27	116.46	0.47	0.46
22	Purbalingga	24.97	40.46	57.39	82.90	0.33	0.49
23	Purworejo	23.89	36.36	47.01	64.20	0.26	0.39
24	Rembang	17.48	28.78	39.98	56.77	0.23	0.49
25	Salatiga City	3.34	7.81	11.51	17.16	0.07	0.77
26	Semarang	26.80	42.99	62.92	93.24	0.37	0.52
27	Semarang City	42.60	69.60	105.18	160.04	0.64	0.56
28	Sragen	28.14	43.61	58.02	79.55	0.32	0.42
29	Sukoharjo	22.94	40.00	55.72	79.31	0.32	0.52
30	Surakarta City	17.18	25.30	33.76	46.40	0.19	0.39
31	Tegal	42.26	71.33	94.29	128.78	0.51	0.46
32	Tegal City	7.83	12.22	16.20	22.31	0.09	0.42
33	Temanggung	21.03	34.13	47.90	68.60	0.27	0.49
34	Wonogiri	32.70	50.02	62.79	85.76	0.34	0.38
35	Wonosobo	22.69	38.02	51.03	70.55	0.28	0.47
Central Java Province		**972.39**	**1,595.74**	**2,189.07**	**3,090.38**	**12.36**	**0.47**

Brebes regency is the highest of plastic waste generation in Central Java, with estimated generation of 51.89 ton/ppd for year 1990 then increase to be 161.53ton/perday. As of population, economic feature, plastic waste generation in Central Java is increasing. In avarage plastic waste generation incrase 0.47 decade to decade in four period. The growth rate of plastic waste generation estimated 0.56 decade to decade in four periode in Semarang. While as lowest generator, average growth of plastic waste in Magelang City is 0.38 decade to decade in four periode in Magelang City. The highest growth rate of plastic waste generate in Salatiga City with avagare 0.77. the lowest of plastic waste growht is in Mageleng City with 0.38.

To develop regional plastic waste map for monitoring, folowing step is performing data for spatial model purposes. Several study has been run, such as plastic waste assessment in Afrika[28], Agriculture plastic waste analysis in Italy [29]. Previous study concerning to GIS as of plastic waste assessment It is proses to making tabular of numerical and statistic descriptive data then making a link with GIS program for design spatial model [25], at which calcuating by using formula *(6)*. Table 2 describe the data as a proportion plastic waste generation in (%), from each regency/city to Central Java Province plastic waste generation. Table 2 describe the proportion of plastic waste generation in (%) for each regency and cities compare to plastic waste generation in Central Java. Contribution for each regency and cities are difers, for example, Banjarnegera one of the regency in central Java, contribute 2.71% for year 1990, always decrease in four decade tobe 2.70 % in year 2000, 2.68% in year 2010 then 2.66 % in

year 2018. Jepara regency always increase in the four decade, start with 2.90% in year 1990 then increase tobe 3.31% in year 2000, tobe 3.39 % in year 2010 then 3.60% in year 2018.

Table 2. Proportion Plastic Waste Generation), from Each Regency/City To Central Java Province Plastic Waste Generation

No.	Regency/ City	Proportion of Plastic Waste Generation for each Regency/City to Plastic Waste Generation in Central Java Province (average of population base)				No.	Regency/ City	Proportion of Plastic Waste Generation for each Regency/City to Plastic Waste Generation in Central Java Province (average of population base)			
		1990	2000	2010	2018			1990	2000	2010	2018
1	Banjarnegara	2.71	2.70	2.68	2.66	19	Pekalongan	2.45	2.58	2.59	2.59
2	Banyumas	4.73	4.69	4.80	4.87	20	Pekalongan City	0.85	0.85	0.87	0.88
3	Batang	2.07	2.14	2.18	2.21	21	Pemalang	3.91	4.08	3.90	3.77
4	Blora	2.69	2.63	2.56	2.50	22	Purbalingga	2.57	2.54	2.62	2.68
5	Boyolali	2.96	2.90	2.87	2.84	23	Purworejo	2.46	2.28	2.15	2.08
6	Brebes	5.34	5.49	5.35	5.23	24	Rembang	1.80	1.80	1.83	1.84
7	Cilacap	5.22	5.20	5.07	4.99	25	Salatiga City	0.34	0.49	0.53	0.56
8	Demak	2.89	3.15	3.26	3.34	26	Semarang	2.76	2.69	2.87	3.02
9	Grobogan	4.03	4.10	4.04	3.98	27	Semarang City	4.38	4.36	4.80	5.18
10	Jepara	2.90	3.13	3.39	3.60	28	Sragen	2.89	2.73	2.65	2.57
11	Karanganyar	2.45	2.45	2.51	2.55	29	Sukoharjo	2.36	2.51	2.55	2.57
12	Kebumen	3.93	3.77	3.58	3.46	30	Surakarta City	1.77	1.59	1.54	1.50
13	Kendal	2.80	2.75	2.78	2.80	31	Tegal	4.35	4.47	4.31	4.17
14	Klaten	3.81	3.59	3.49	3.40	32	Tegal City	0.81	0.77	0.74	0.72
15	Kudus	2.21	2.28	2.40	2.50	33	Temanggung	2.16	2.14	2.19	2.22
16	Magelang	3.56	3.56	3.65	3.71	34	Wonogiri	3.36	3.13	2.87	2.77
17	Magelang City	0.43	0.38	0.37	0.35	35	Wonosobo	2.33	2.38	2.33	2.28
18	Pati	3.73	3.71	3.68	3.63	Central Java Province		100.00	100.00	100.00	100.00

Spatial model of plastic waste monitoring resul for year 1990 and for year 2000 describe in figure 3 and figure 4. This spatial model develop according to the number of population. It is asumed that per capita consumpt plastic with certain number as of numerical model development in formalu *(1) – (4)*

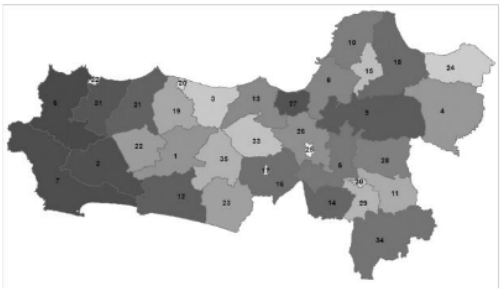

Figure 3. Basic model of plastic waste monitoring in central java 1990-population based

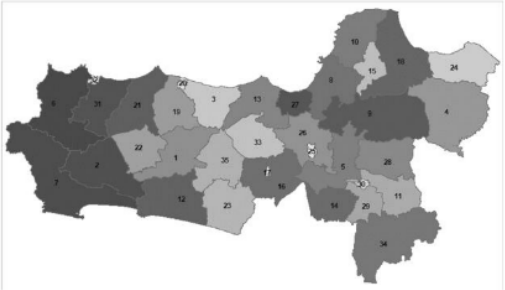

Figure 4. Basic model of plastic waste monitoring in central java 2000-population based

As the same acquisition with numerical data, Spatial model of plastic waste monitoring resul for year 2010 and for year 2018 describe in figure 5 and figure 6. Refers to the spatial model and data, there is no different color change in each regency and city. For example regency of Cilacap with number code is 7. For decade 1990, this regency model is described by dark color on the GIS map. It is also with dark color on the GIS map for decade 2000, 2010 and 2018. Moreover, regency with number code is 3 batang for decade 1990 this regency describe with slightly bright color. Then for decade 2000, 2010 and 2018 described with the same color such as slightly bright. Refers to the spatial model, this study calculated that there is no significant change of percentage of contribution of plastic waste generation from each city and regency toward total plastic waste generation to Central Java Region in four decade.

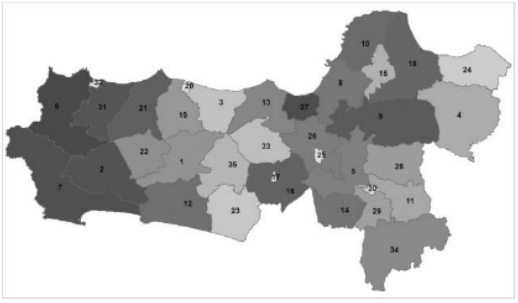

Figure 5. Basic model of plastic waste monitoring in central java 2010-population based

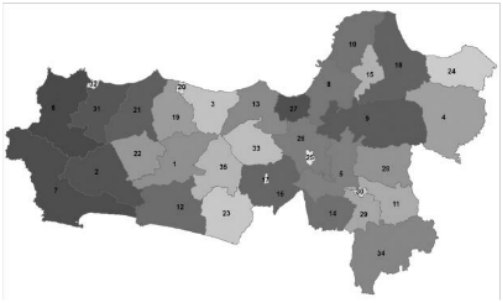

Figure 6. Basic model of plastic waste monitoring in central java 2018-population based

Refers to the spatial model, this study calculated that there is no significant change of percentage of contribution of plastic waste generation from each city and regency toward total plastic waste generation to Central Java Region in four decade. Regency with code number 2 clasified as group dark color, at which the group is cover the contribution range from 3,40 – 5,49. Table 3 then describe for detail classification of the proportion of plastic waste from each regency and cities to province.

Table 3. Classification of color on GIS map for the proportion of plastic waste generation (%), from Each Regency/City to Central Java Province

Classification color in GIS map-based)	Code Number in spatial model map	Description of contribution range (%)
Dark	2,6,7,9,12, 14, 16,18,21,27,31	3,40 – 5,49
Slightly Dark	1,4,5,8,10,11,13, 19,22,26,,28,29, 34	2.45–3.36
Slightly Bright	3,15,23,24,33,35	1.80–2.40
Bright	17, 20,25,30,32	0.37–1.57

Refers to table 2, characteristic of regency and cities concerning to contribution of plastic waste generation degree at which based on population to Central Java then classify a high contribution, slightly high contribution, moderate contribution and low contribution. Detail of classification describe in Table 4 as follow:

Table 4. Classification for Proportion of Plastic Waste Generation (%), from Each Regency/City to Central Java Province

Classification for Contribution of each regency and cities for plastic waste generation to Province	Description of Classification
• High Contribution	It is a regency and cities with contribution of plastic waste generation to Central Java at range for 3,40 – 5,49 There were 11 regency and cities such as; Banyumas, Brebes, Cilacap, Grobogan, Kebumen, Klaten, Magelang, Pati, Pemalang, Semarang City, Tegal
• Slightly High Contribution	It is a regency and cities with contribution of plastic waste generation to Central Java at range for 2.45–3.36 There were 13 regency and cities such as; Banjarnegara, Blora, Boyolali, Demak, Jepara, Karanganyar, Kendal, Pekalongan, Purbalingga, Semarang, Sragen, Sukoharjo, Wonogiri
• Moderate Contribution	It is a regency and cities with contribution of plastic waste generation to Central Java at range for 1.80–2.40 There were 6 regency and cities such as; Batang, Kudus, Purworejo, Rembang, Temanggung, Wonosobo
• Low Contribution	It is a regency and cities with contribution of plastic waste generation to Central Java at range for 0.37–1.57 There were 5 regency and cities such as; Magelang City, Pekalongan City, Salatiga City, Surakarta City, Tegal City

4.2 Regional model development for plastic waste monitoring-public market based.
To examined that plastic waste generation mosly from the packaging, this study utilized google map to address location of public market in Central Java. Result of spatial model describe in figure 7. Refers to number of recident and cities in table 1 and 2, and refers to model result in figure 7, three classification of regency/cities as of plastic waste generation has been assessed with in table 5. Moslty the Regency and cities clasify as low while as moderate are 13. There were 4 region classify as high contribution such as Pekalongan City (20), Semarang City (27), Surakarta City (30), Tegal City (32).,

Table 5. Classification of plastic waste generation -public market based, 2019

Contribution to plastic waste generation- public market based	Code Number in Spatial Model
High	20, 27,30,32
Moderate	2,6,9,10,12,13,14,15,22,23, 25, 26, 29,30
Low	1,3,4,5,7,8,11,16,17,18,19,21,24,28,31,33,34,35

The high form is represented on only in the city as of administration boundary but also nearly location as of urban areas such as Semarang City and Semarang Regency, Surakarta City, Klaten Regency, Sragen, Pekalongan City and Pekalongan Regency, and Tegal City and Tegal Regency.

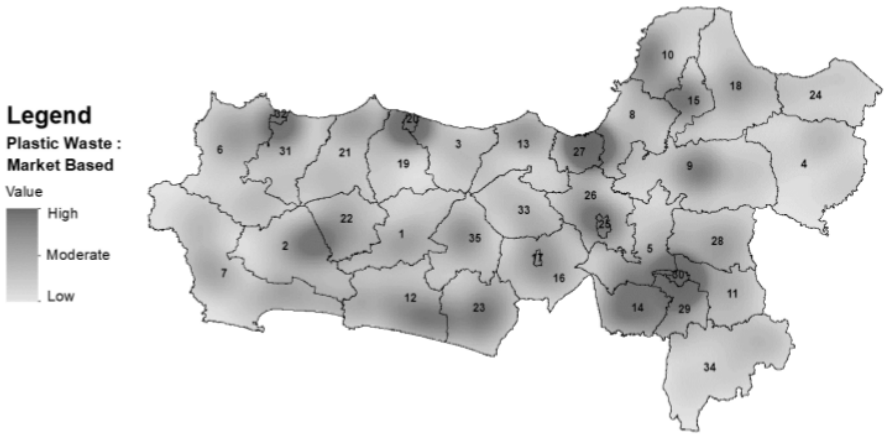

Figure 7. Basic model of plastic waste monitoring, public market-based in Central Java 2019

5. Conclusion

Plastic waste generation as increase as of pupolation. The study calculated that the highest degree of plastic waste generation with population-based approach is founded in Brebes regency in every decade of four assessment. For year 2018, plastic waste generation in brebes regency is estimated 161.53 Ton per day. In the same year, Semarang city contributed of 160.04 Ton per day for Central Java at which is estimated 3,090.38 Ton per day. This study clasify 4 region as High Contribution, Slightly High Contribution, Moderate Contribution, Low Contribution according to their contribution to plastic waste generation in Central Java Province. According to the public market location, this study founded that Surakarta, Semarang, Pekalongan and Tegal clasify as high degree of plastic waste ggeneration compare to other city and regency.

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