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IMPROVING ENVIRONMENT WASTE MANAGEMENT IN THE KELURAHAN GADINGKASRI AS SUSTAINABILITY RESOURCES AND ECONOMICS DRIVERS FOR SMES

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ABSTRACT

The purpose of this research is to describe the impact of waste management policies to improve the welfare of the community that has the potential to be developed and explored by integrating waste management technology in the Malang city community empowerment model. In this research using descriptive qualitative analysis to explain the relationship between variables based on the opinions of respondents and SEM analysis to get the results of the influence between the variables studied so that it can explore the potential of the region and make decisions for poverty reduction programs. In the observation phase, there was an institutional model in waste management that included the potential of the region, the characteristics of the community and its economy and the potential development of biomass-based power generation technology. This research is a preliminary model in the assessment stage in the management of waste into alternative energy and provides an overview of SMEs waste management strategies in Kelurahan Gadingkasri that can be reused as alternative energy and growth the community's economy.

Keywords : waste management, alternative resources, SMEs, economic growth

1. INTRODUCTION

Waste management system is a problem that is closely related to lifestyle and culture in the environment where the increasing amount of waste is produced. Waste management systems can be described as responsibilities, procedures, processes and resources for building systems that manage waste in accordance with environmental regulations. The Ministry of Life and Forestry (KLHK) of the Republic of Indonesia estimates that the amount of waste produced in Indonesia reaches 64 million tons per year, 44.5% is household waste which is mostly transported to the Final Processing Site (TPA). KHLK states that in 2015, 60% of the existing landfill will reach the maximum limit. According to Mediana and Gamse's research (2010), landfills in Indonesia are capable of producing 1,581.74 tons of methane gas per year(Zeng, Song, and Wang 2012)(Harinoto, Sanusi, and Bogetriatmanto 2018).

Waste can be generated from residential, commercial and institutional areas covering households, offices, schools, shops, etc. Differences in waste management systems can be influenced by social, financial, cultural, psychological, education and technology. Based on data from the Department of Environment and Cleanliness of the City of Malang, waste generation reached 661.12 tons per day, with a composition consisting of 70.5% organic waste and 29.5% inorganic waste. Of this amount, 202.96 tons per day is managed by the people of Malang City. The remaining 458.16 tons per day is transported to the TPA Supiturang with methane gas potential based on GIZ

calculation of 4521 tons per year(Yuniarti, Chandrarin, and Subiyantoro 2018)(Plastic Waste Management Institute 2013).

Based on these data, if the waste is managed properly it will be a solution to overcome the thin Indonesian oil reserves. In addition, it can be seen the potential and business opportunities of the waste recycling industry products such as plastic pulp, metal pulp, and waste recycling handicraft products. Exploration of the potential and business opportunities is expected to be able to synergize with efforts to treat waste into an electric energy source.

Synergy between the energy industry and community empowerment efforts must support each other, so that an appropriate partnership model can be formed. In order to support these efforts, this research is directed at the drafting of a waste management management role mode by empowering local communities and developing small-scale waste-based electricity. Apart from the potential for waste generation to be used to overcome energy needs, it also drives the economy of Gadingkasri village(Garner et al. 1972)(Vera 2012).

The main objective of this research is to integrate several themes in community empowerment, waste management strategies and energy security. Existing policies such as block grants in Malang will be developed by incorporating environmental, technology, community empowerment and regional core competency variables.

2. LITERATURE REVIEW

2.1 Entrepreneurship

An entrepreneur is someone who has sufficient skills in various fields needed to start a business (Lazear: 2005). Entrepreneurship is a combination of innovation, initiative and opportunity to have a significant economic impact on the development of a country (Pahuju: 2016.2) with a conducive environment to support its growth(Agyapong 2010)(Irene, Charles, and Japhet 2015). The elements needed to encourage entrepreneurial success according to Isenberg (2010) include government policies, regulatory and infrastructure frameworks, culture, guidance systems, universities as catalysts, education and training, human resources and local and global markets. Referring to this opinion, it is necessary to study further about the strategic factors that play a role in encouraging entrepreneurial programs especially those engaged in waste management(Agyapong 2010)(Mujahidin and Arinda 2019).

2.2 Concepts of Regional Core Competition

Regional core competencies are unique regional advantages including skills, natural resources, environment, culture and market prospects. Regional core competencies can be in the form of primary products such as human, natural

resources, environment, culture and market prospects or processed products such as ecotourism, culture, technology, infrastructure and market products. The stages of determining regional core competencies as directed in Presidential Regulation number 28 of 2008 are as follows:

1. Analysis of the potential of the region's resources
2. Selection of superior commodities to be developed
3. Determination and preparation of regional core competency strategies
4. Development of centers of industrial excellence that are the core competencies of regional industries
5. Increasing the skills and expertise of human resources
6. Increasing the effectiveness of the development of SMIs in the center with the One Village One Product (OVOP) approach

The OVOP concept that was developed in Japan in 1979 is an approach to developing regional potential to produce a product that has unique regional characteristics by utilizing local resources. The objective is to set regional core competencies and OVOP to explore and focus all local resources to develop products that are regionally distinctive, have high added value, have a high image and competitiveness, and have no potential to damage the environment(Irene, Charles, and Japhet 2015)(Anwar et al. 2017).

2.3 Waste Management as an Alternative Energy Source

The Final Processing Site (TPA) is a waste collection place from several Temporary Shelter Sites (TPS). In Indonesia, the waste management at the landfill is currently conducted using the open dumping and sanitary landfill methods. The open dumping method has been banned through Law number 10 of 2008 concerning Waste Management. With the issuance of the Act and in the context of overcoming the increasingly urgent problem of waste, some research has been carried out to design environmentally friendly waste management technologies. In the beginning, many countries used incinerator technology or heating, but the incinerator technology turned out to have an impact in the form of dioxin and furan compounds as a result of emissions that are very dangerous for the human body In an effort to overcome the impact of incinerators, experts have now discovered a new waste treatment technology, namely methane or biomass fermentation technology. Biomass technology is a clean energy technology that has been agreed by several countries in the Kyoto Protocol for the development of a clean development mechanism (Ministry of Energy and Mineral Resources: 2010). Biomass is an organic material that is produced through photosynthetic processes, both in the form of products and waste(Sanusi and Manan 2014)(Mohanty and Gahan 2012).

One technology that uses biomass to produce energy is gassification technology. The supply of biomass raw materials in Indonesia is more than other alternative energy sources. The only challenge currently facing is cost efficiency of material collection and material mobilization so that production costs are not too high. For this technology to be of great benefit to society and development in the regions, the development of biomass and gassification technology must be accompanied by an accurate economic calculation(Lahiri 2012)(Ministry of MSME 2006).

Data from the Ministry of Energy and Mineral Resources states that the potential energy generated from municipal waste throughout Indonesia reaches 49,810 MW. The current installed capacity of biomass technology has only reached 0.89%. The installed capacity and potential of biomass PLT in Indonesia are shown in the following tables 1 and 2:

Table 1: Potential of New and Renewable Energy Sources in Indonesia

NO	SUMBER	POTENSI
1	Hydro	75.000 MW
2	Geothermal	29.164 MW
3	Biomass	49.810 MW
4	Solar	4.80 kWh/m2/day
5	Wind	3-6 m'/s
6	Ocean	49 GW
7	Uranium	3000 MW

Source: EBTKE Statistics, Director General of EBTKE Ministry of Energy and Mineral Resources, 2011

Table 2: Installed Capacity of Biomass Power Plants in Indonesia

NO	PULAU	KAPASITAS PER TAHUN (MW)					
		2005	2006	2007	2008	2009	2010
1	Sumatera	924,61	924,61	924,61	924,61	1607,5	1687,48
2	Jawa	10,9	10,9	10,9	10,9	10,9	11,44
3	Kalimantan	N/A	N/A	N/A	N/A	N/A	N/A
4	Sulawesi	N/A	N/A	N/A	N/A	N/A	N/A
5	Bali dan Nusa Tenggara	N/A	N/A	N/A	N/A	9,6	10,08
6	Maluku dan Papua	N/A	N/A	N/A	N/A	N/A	N/A
	Total	935,51	935,51	935,51	935,51	1628	1709

Source: EBTKE Statistics, Director General of EBTKE Ministry of Energy and Mineral Resources, 2011

In Government Regulation number 81 of 2012 concerning Management of Household Waste and Household Trash, the Provincial and Regency / City Governments compile and determine policies and strategies as well as the master plan for waste management. In the Waste Management Master Plan it also regulates the final processing of waste by using the controlled urug method, the sanitary ware method and environmentally friendly technology. Meanwhile, in the Minister of Energy and Mineral Resources Regulation No. 12 of 2017 concerning the Utilization of Renewable Energy Sources for Electric Power Supply, it is stated that renewable energy includes sunlight, wind, hydropower, biomass, biogas, municipal waste and geothermal energy(Tchobanoglous, Theisen, and Vigil 1993)(Jewalikar and Shelke 2017). The regulation also states that PLN must purchase electricity from PLTSa to help local governments deal with municipal waste. If compared with the data in table 2 above, it can be concluded that not many regions have policies on processing waste into alternative energy sources.

2.4 track record of developed research

Some previous studies mentioned that biomass is very potential as a substitute for fossil energy. Apart from the forestry sector, Indonesia's biomass potential comes from agriculture, plantations and urban settlement waste Sustainable waste

management is a waste management solution that can also generate value-added output such as recycled products, compost, electricity, job creation and income distribution. Benefits (positive externalities) of waste management can be obtained if the government is able to exercise control, if not, there will be market failures that can have an impact on the environment, increasing health costs and other social problems. One important control is control of the main resource, namely waste. Control over resources can be done by establishing an institutional model or granting property rights(Agyeman and Ponniah 2014).

3. METHODOLOGY

This research uses quantitative developmental policy methods. The variables to be explored are government policies related to the achievement of Waste Management Strategies as Alternative Energy Sources and Community Economic Drivers, regional core competencies and waste management. The entrepreneurship variable is a new variable that will be integrated into the model.

In research to examine and explore institutional models in waste management (regional potential, community and economic characteristics) to produce a formulation of the most appropriate institutional model of waste management (determination of potential and core competencies of the region, entrepreneurship development models and waste processing technology) in accordance with regional characteristics and potential development of biomass-based power generation technology(Katyal and Xaviour 2015)(Brunner and Rechberger 2015).

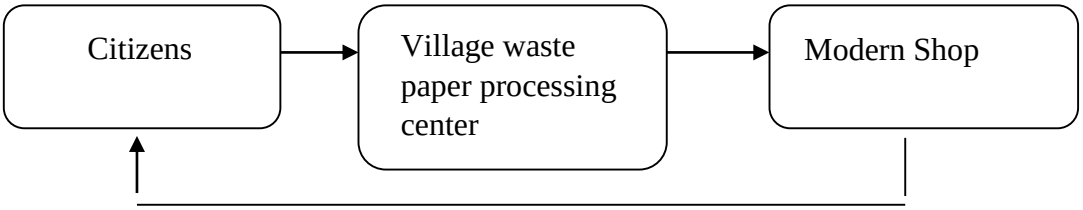
The population in this study is the Regional Apparatus Organization (OPD) associated with entrepreneurship development, waste management and energy security in the city of Malang. The population in the government in Malang City is 5 Subdistricts with 57 Subdistricts in Malang City. The sampling technique uses purposive sampling and documentation techniques according to the needs of the analysis(Dahlén and Lagerkvist 2008).

4. RESULT

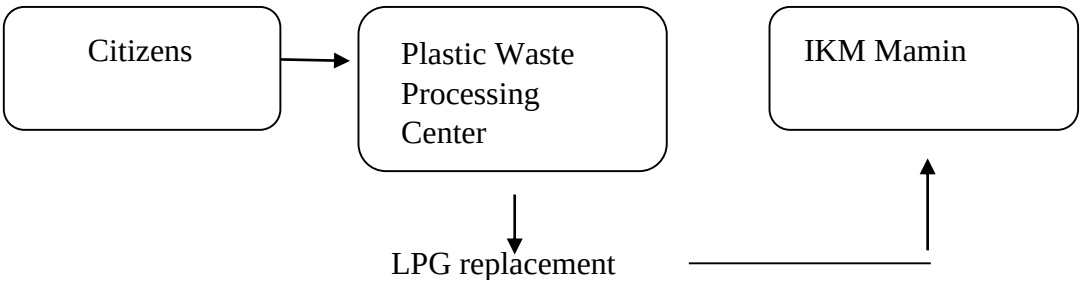
To design a policy, a mapping of regional and regional potentials must first be carried out. This is necessary so that the policy to be determined later is truly in accordance with the conditions of the community so that at the time of implementation it is not necessary to make many adjustments. Therefore, the expected output can be achieved. Based on the results of data collection in the Ivory Kasri District. During the data collection and survey stages, several small group discussions (focus group discussions) had also been held with stakeholders including Gading Kasri Kelurahan officials, RW and RT heads, environmental cadres and cleaning staff throughout the Gading Kasri Kelurahan. This discussion was held to accommodate

and map various problems and constraints in waste management in the Kasri Kelurahan. From this discussion the following policy models can be designed:

1. Paper Waste Processing Flow



2. Plastic Waste Processing Flow



To implement a research model in a sustainable manner requires synergy and coordination with local governments. In the first year, as a pilot project, coordination had been carried out with officials from the Kasri Kelurahan in Malang District Klojen. The results of the coordination were realized in the Memorandum of Understanding between the Higher Education and Kelurahan Gading Kasri to implement the research model in the kelurahan area. The results of evaluating the implementation of the model in each region are used as the basis for making model maps by the core competencies of each region. The preparation of the model will be accompanied by studies related to the uniqueness and regional characteristics that have the potential to influence the waste management policy model. This will be noted in the preparation of recommendations to the government(Glob. Waste Manag. Outlook 2016)(Dababneh et al. 2015). If seen from the point of view of ivory village Kasri has great potential in the form of plastic waste from MSMEs as a source of burning gas substitutes, then besides that in the village of Gading Kasri has another dominance of waste in the form of paper waste because the ivory village Kasri is a campus area that routinely manufactures trash in addition to MSMEs in the future, the results of the processing are to increase the per capita production of the MSMEs managers. The model that was compiled based on the core competencies of each region became a recommendation for the government with a pilot project, namely the ivory kasri

village in Malang. Alternatives to the waste management model based on core competencies, especially the ivory kasri village. Producing recommendations for waste management regulations can subsequently become a blueprint for government policy in managing waste throughout the city in an integrated manner to support MSMEs revenue and productivity.

5. DISCUSSION

The analytical method uses a mix method that combines descriptive qualitative analysis and quantitative analysis. Descriptive qualitative analysis is used to explain the interrelationships between variables based on the opinions or ideas of respondents to explore the potential of the region and society. Another analysis uses SEM analysis to produce influence among the variables studied, so that it is expected to be a part of decision making for regulators to produce effective policies to increase MSME productivity by optimizing the waste produced by MSMEs(Kusi, Narh Opata, and John Narh 2015).

Statistical analysis using inferential statistics to test the strength of each indicator in forming variables that affect the productivity of MSMEs, so that it can be known which indicators are dominant in forming the supporting variables of MSME waste management to increase the per capita income of MSME managers, by knowing the value of loading factors respectively -each indicator to variables(Zeng, Song, and Wang 2012)(Sugiarto, Mujahidin, and Setiawan 2019). In addition, it will also be known the influence between the independent variables and the dependent variable in the MSME area. The analysis used in this study uses the Structure Equation Model (Structure Equation Model or SEM) using the AMOS 21 and SPSS Version 11.5 program packages(Putra 2016)(Enoch 2013).

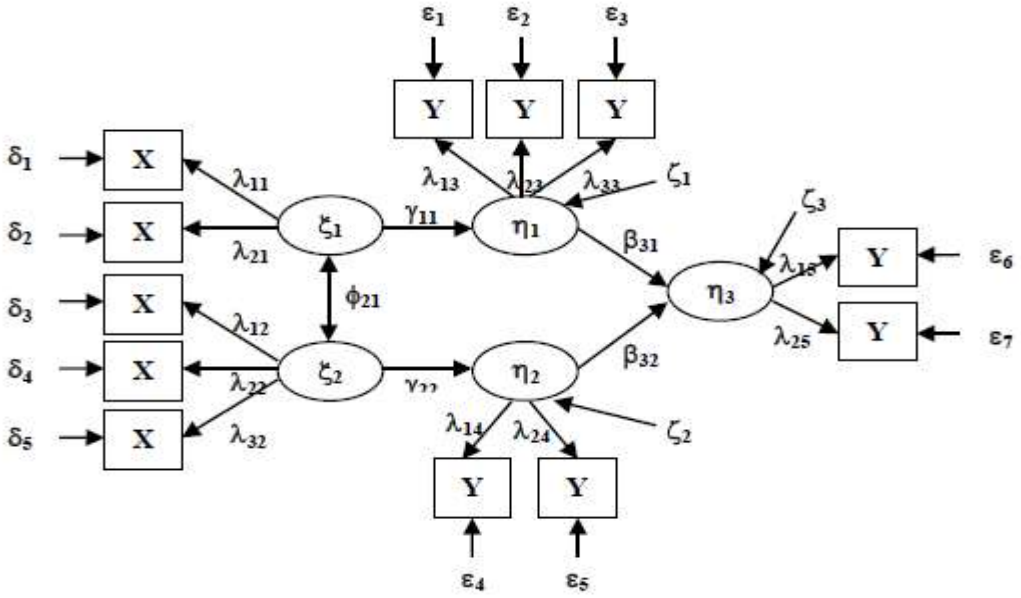


Figure 1. SEM Modeling for MSME improvement

From the variables on increasing the productivity of SMEs, they have a significant effect on income per capita through the productivity of SMEs as follows:

Table 1. Predictors: (Constant), SME prod, RG, Ac Part, INFR, CC

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	47.221	5	9.342	102.132	.000[a]
Residual	13.321	142	.092		
Total	60.444	146			
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	47.420	5	9.484	102.894	.000[a]

From processing with integrated SEM analysis, the waste that is managed with an effective and optimal system by considering various variables capable of increasing the productivity of MSMEs by optimizing the system in the form of management of plastic and organic waste as an alternative energy source(Baumann and Kritikos 2016).

6. CONCLUSION

MSMEs productivity can be predicted using SEM analysis by adding various supporting variables to increase MSME productivity by utilizing MSME waste as an energy source by using descriptive qualitative analysis to explain the relationship between variables based on the opinions of respondents and SEM analysis to get the results of the influence between the variables studied so that can explore the potential

of the region and take the decision of the regulator very effectively with input variables analysis of institutional models in waste management that includes the potential of the region, the characteristics of the community and its economy as well as the potential development of biomass-based power generation technology as an alternative energy with the main focus of the urban unfortunate area as the MSME sample area namely the village of Gading kasri.

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