

Toward the Resolution of Waste Management Crises of Guntur Traditional Market in Garut District

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Abstract. The traditional market in Indonesia still has challenges concerning the waste generated, both organic and inorganic waste. The aim of this study is to analyze the waste management system that is performed in Garut District especially Guntur Traditional Market. The qualitative method was used by conducting a number of in-depth interviews toward stakeholders, namely garbage managers, seller, environmentalist, environmental researchers and local community. The results showed that the types of activities, road conditions, sidewalk conditions, and aesthetics around the Guntur Traditional Market have declined after the expansion of the market and the rampant illegal traders' activity around it. The number of personnel, limited means and infrastructure, education, law enforcement, public participation, research and development, and the participation of important stakeholders that include academics, community, and private sector are important dimensions that must be involved in the improvement of Guntur Traditional Market management.

1. Introduction

Guntur Traditional Market is the largest traditional market in Garut District. It located in the middle of Tarogong Kidul sub district that act as the hub in Garut District. It provides a vast array of staples that made it visited by a lot of buyers that come from around Garut District. Unfortunately, the activities in Guntur Traditional Market has contribute massive waste in Garut District.

According to observation performed in this study, 70 percent of waste are vegetables and the rest consist of a mixture of various waste including plastic and paper. The amount of waste is increasing for 30 to 50 percent during the harvest season. The limited number of janitors makes it ineffective to handle overwhelming amount of waste. According to the interview, the janitors admit that they can only handle 80 percent of the waste. The rest of the waste are left in the traditional market. Some of the traditional market tenants are regularly dump the waste into the sewer that eventually cause puddles and even flood around Guntur Traditional Market.

The Natural Environment, Cleanliness, and Landscaping Agency (Dinas Lingkungan Hidup, Kebersihan, dan Pertamanan or DLHKP) of Garut District can only handle the waste that come from

6 sub districts including Tarogong Kidul. In those six sub districts, the waste is significantly increasing in volume. The trucking fleet of DLHKP frequently fail to collect and remove all waste. At least, around 100 ton of waste must be taken from those six sub districts and sent to landfills in Pasirbajing of Banyuresmi Sub District in Garut District. According to DLHKP of Garut District, the waste commonly consists of domestic waste and waste generated by Traditional Market.

So far, the waste in traditional market of Garut District is eliminated by using conventional technique through open dumping system, converted into compost, incinerated, or even dump the waste into the rivers. Those waste management methods are clearly environmentally harmful, unhealthy [1] and do not produce any commercial products [2]. Moreover, [2] stated that waste management is still a significant problem especially in developing countries that do not have the necessary infrastructure and sufficient size of land that are needed to process the waste.

Waste management system, especially in urban area, must be implemented systematically ([3], [4], [5]). The system should involve various means and infrastructure that consist of waste collecting, gathering, transferring, transporting, processing, and final disposal of waste [6]. The waste problems are highly related with the life style and cultural aspect of the society ([7], [8]). Therefore, the waste management is not solely the responsibility of municipal government but also require society cooperation ([9], [10]). The aim of this study is to analyse the waste management system that is performed in Garut District especially Guntur Traditional Market. This research contributes in exploring the general problems of traditional market waste management in Indonesia and provides feasible solutions to be implemented as well as the list of stakeholders who needs to be involved in the traditional market waste management.

2. Literature Review

The interaction between human, or society in general, with its surrounding natural environments always generate some form of waste [11]. The volume of waste produced by a city largely depends on the purchasing power of its citizen ([12], [13]). Reference [11] categorize waste into 3 types based on its physical form (solid, liquid, and gaseous waste), based on its source (household/ domestic, industrial, agricultural, commercial, demolition and construction waste) and based on its impact towards the environment (hazardous and non-hazardous waste. As comparison, [14] categorize waste generated by activities in traditional market into general waste, recyclable waste, and food waste.

General waste that commonly sent to final landfill (*Tempat Pembuangan Akhir*) can be classified into 10 physical categories and can be further divided into 77 sub-categories. In general, food waste is the largest part of waste that followed by plastic and agricultural waste (i.e. grass). Reference [15] identify five types of commonly found waste in Indonesia namely agricultural waste, slaughterhouse waste, plastic waste, food waste [16], and paper waste that each with the portion in that order.

Reference [17] discussed the importance of prioritizing the waste management that start from preparation to be reused and recycled. According to [17] recovery and disposal to the landfills is the final option. The hierarchy of priority of waste management is displayed in Figure 1.

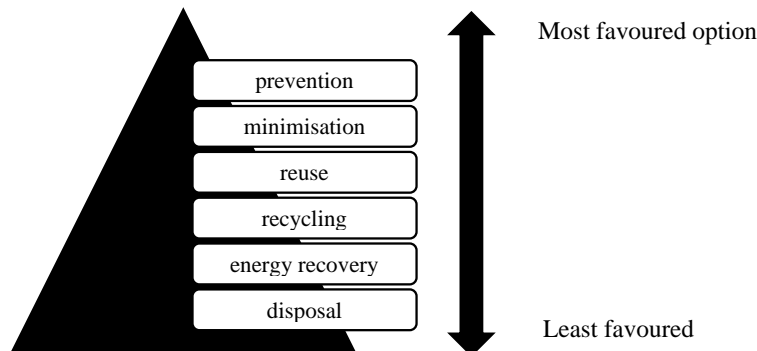


Figure 1. Priority Hierarchy of Waste Management [17]

The implementation of integrated solid waste management (*Pengelolaan Limbah Padat Terpadu*) assessed as being able to improve the efficiency and effectiveness of solid waste management [15]. For municipal solid waste (MSW), [2] proposed a solution that cover several steps:

- 1) Developing waste management policies that are relevant to local context and its action plan;
- 2) Reducing the volume of waste that is piled up in final landfills by developing waste classification system;
- 3) Developing waste gathering service that support waste classification such as garbage bank (bank sampah);
- 4) The need of support from waste producers and academics;
- 5) The need of training and education for janitors / cleaning service officers;
- 6) The need of financial resources;
- 7) The cultural consideration that involves the religious leader.

For organic waste that commonly emerges in food market, [1] suggest low-cost conversion into compost and natural biodegradable to reduce and diversify the stream of waste that come from urban area and produce quality organic fertilizer with economic value. Reference [15] suggest that in the process of conversion into compost (organic fertilizer), paper and leaves waste from plantation can be used to improve the carbon substance and eventually improving the quality of compost.

3. Methodology

Guntur Traditional Market is a traditional market that located in the urban area of Garut District. This market is the largest market that carries out a vast array of fresh product. It located 1 kilometre in the west of the downtown of Garut District. This traditional market also passed by all public transportation (i.e. minibus) route. Guntur Traditional Market is located near the terminal of public transportation. It can be easily identified that Guntur Traditional Market is the most influential traditional market in Garut District.

Guntur Traditional Market is built in 1983 with the name of Garut Traditional Market. The total width of the area is approximately 33.000 m² and around two third of the area is used to accommodate thousands of kiosks. Around 1.428 kiosk have the width of 3 x 3 meters and 122 kiosks have the width of 3 x 2 meters. Guntur Traditional Market also inhibit by more than a thousand los. Los is very similar to kiosks with one difference. Unlike kiosk, los has no partition between each merchant. In Guntur Traditional Market, there are 1332 los with the size of 1.8 x 1.8 meters, 600 los with the size of 1.5 x 1.5 meters, and 102 los with various size that range from 2 x 2 meters, 2 x 3 meters, and 3 x 3 meters, and 3 x 4 meters. However, although the management of Guntur Traditional Market provides kiosk and los, this market is still crowded by illegal merchants, i.e. street vendors, that swarm the main streets around the market. The street vendors mostly are operated between midnight to 06.00 AM. The rough sketch of how the total area of Guntur Traditional Market is allocated displayed in Figure 2.

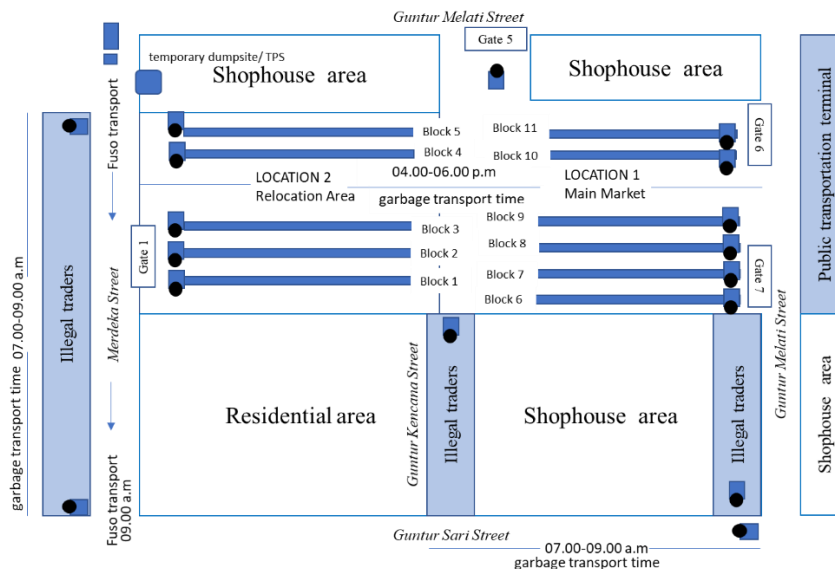


Figure 2. The Rough Sketch of Guntur Traditional Market

In this study, data are gathered by using observation and in-depth interview. Observations are conducted to provide initial data about the situation of waste management in Guntur Traditional Market. The objects of observation are the timing and method used to collecting and transporting the waste into the final landfill. The observations are conducted on 3 objects. Firstly, the traffic of consumers of the market. Secondly, the activities of the janitors throughout the day. Thirdly, the situation in the area of the market with the largest number of transactions or the highest density of merchants and consumers. The observations are conducted for 14 days continuously that started from 3 January to 17 January of 2020. The observations also conducted in 4 locations including Gate 1, Gate 5, Gate 6, and Gate 7.

In-depth interviews are also conducted several informants that came from different background or assume different roles such as consumers, janitors, merchants, and the representative of traditional market management. The sampling technique used is purposive sampling or MVS (Maximum Variation Sampling) to take the perspectives of all of stakeholders into account [18]. The profile of each informant is displayed in Table 1.

Table 1. List of participants of in-depth interviews

List of participants	Initial	The reasons for the selection
Local waste management service provider (UPTD)	D	The informant is responsible for the implementation of operational-technical activities (i.e. day to day operation) including the management of waste and cleanliness maintenance in Guntur Traditional Market
Chairman of the Market Traders Association (IWAPPA)	AN Citizens	The informant acts as the representative of all traditional merchants in Garut District that commonly involved in solving every problem that are related to traditional market and commerce in Garut District.

List of participants	Initial	The reasons for the selection
Environmental Service Agency (DLH)	S	The informant is responsible for collecting input, coordinate and carry out technical planning, waste management, prepare program plans and budget work plans in waste management.
A trader at Guntur Market	TU	The informant has been trading for more than 20 years and has 5 kiosks in Guntur Traditional Market
A Resident living in Merdeka Street	AK	The informant has been living at Merdeka Street for more than 30 years
<i>External agents and experts</i>		
Academician	IK	The informant is a researcher, the initiator and chair of Garut Free Garbage Movement FGD (focus group discussion)
Non-profit organization	CE	The informant has more than five years of experience as an agent of Waste Banks projects in West Java Province
Number of Informants	6	

4. Results and Discussion

The activities in Guntur Traditional Market, that located between 2 main roads namely Merdeka Street and Guntur Melati Street, influence the sanitation, health, and safety of residents and the street users. Among these two streets, Merdeka Street is the one that adversely affected. Merdeka Street span for 1.90 kilometres long and 7 meters wide. However, an official source states that the name of the street is Lingkungan Pasar Guntur Street that span for 1.18 kilometers and 6 meters wide [19]. The type of the surface is fall within “high severity” level (code: H) and in general the condition of the road is fall within “medium” level (code: S) [20].

According to 14 days of observation, there are several findings that can be extracted:

- 1) Street vendors start their activities between midnight to 6 AM;
- 2) The majority of street vendors come from Semarang Sub District that is located 10 kilometers away from Guntur Traditional Market. They bring the merchandise by using rented or their owned pick-up vehicles;
- 3) Some of the traditional merchants (i.e. the tenants of Guntur Traditional Market) also do their trading by using stalls in the sidewalk to compete with street vendor (i.e. illegal merchant) that block the traffic of buyers;
- 4) From the total width of the street, that is 7 meters, approximately 4 meters are being used to trade. To make thing even worse, this is a two ways street. Some public transportation vehicles (i.e. minibus) also stop to drop the passengers or to wait for potential passengers in front of the market. Therefore, the congestion in Merdeka street is so severe and commonly happen between 5 AM to 7 AM;
- 5) The street vendors do not bring any cleaning equipment. They rely on the janitors that start to work at 6 AM. They pay 2 thousand rupiah (around 14 cents) as cleaning fees;
- 6) Some of the street vendors dispose the liquid waste into the main street. It makes the street become slippery and therefore become more dangerous to be used by motorcycle riders;
- 7) The janitors are not always available every day. From 14 days of observation, there are 3 days that the waste does not being gathered and carried by the janitors. It causes piles of garbage and air pollution on Merdeka Street;

Based on the findings extracted from in-depth interviews, all informants agree that the volume of waste generated by trading activities around Guntur Traditional Market are extremely large. It is coming from 1.800 kiosk, 600 los, and 300 street vendors (i.e. illegal merchants) as admitted by AN from IWAPPA,

“Waste issues is a never-ending story. According to The Regent of Garut, one waste will cause a thousand problem especially when the waste is related to traditional market. Traditional market is identical with waste problem. Guntur Traditional Market accommodate 1.800 kiosks, 600 los, and 300 street merchants. It is difficult to imagine the sheer volume of waste produced by this traditional market...”

(AN, IWAPPA, 26 January 2020)

Vegetables is the dominant type of waste. Based on the observation and supported by the result of interview with The Head of UPTD, the type of waste produced are consist of vegetables by 70 percent and a mixture of waste that combine plastic bottles and others. The volume of the waste is increased by 30 to 50 percent in the harvest season.

Different opinion comes from other participants that observe the janitors are incapable to handle the entire volume of waste. This problem creates piles of waste in several points of trading activities. The merchants complained that the janitors often fail to collect the garbage from their kiosk even though they already pay the cleaning / retribution fee. This situation lasts for a long period of time that create piles of garbage in several kiosks.

“The condition of the traditional market has not been changed for years. The waste produced are piled up and scattered in kiosks that do not pay for cleaning fees. The janitors ignore the waste just like that...”

(TU, Trader, 21 January 2020)

However, the statement of UPTD is the opposite of the previous statement:

“Although the volume of waste in this market is extremely large, we are thankful that it can be handled and under controlled. So, every time the waste is piled up in garbage dump, it will be instantaneously transported to the final landfill in Pasirbajing. You can see for yourself that the pile of waste is not significant. Even the broken trucking fleet could delay the waste transportation, [another] trucking fleet of Fuso is prepared to carry the waste from this traditional market daily...”

(D, UPTD, 25 January 2020)

UPTD (local waste management service provider) states that the waste has accumulated due to labour strike by the officers of Environmental Service Agency (i.e. Dinas Lingkungan Hidup). However, UPTD prepares a backup plan by providing a trucking fleet of Fuso. This condition also provides some explanations about the piles of garbage inside the traditional market. Apparently, the trucking fleet of Fuso only collect the garbage in the sidewalk of the street. They do not collect the garbage inside the traditional market.

TU as the representative of traditional market merchants informs that the management of traditional market is poorly handled without any significant change in 20 years. Most of the problems are related to waste and sanitary issues. IWAPPA said that they are still focusing on the removal of non-organic waste and therefore they are not able to take care of organic waste yet. This confession makes it ironic considering the volume of organic waste is greater than the volume of non-organic waste. The lack of personnel is the main constraint in waste management. Fifty garbage carts are considered as not enough in collecting the daily waste in Guntur Traditional Market.

“Up to this moment, we continually keep our focus on cleanliness. By far, the organic waste handling is still constrained by the number of personnel. However, non-organic waste handling is already running well. To be honest, we already mobilize fifty garbage carts in order to handle the waste produced by all kiosks and still it is not enough. Nonetheless, it is our duty to keep the cleanliness of kiosk...”

(AN, IWAPPA, 26 January 2020)

IWAPPA is the party that provides personnel in waste management with the cooperation of DLH. The units under DLH include:

- 1) The unit of cleaning and waste transportation;
- 2) The unit of domestic waste management;

3) The unit of city park and fineness management.

IWAPPA collect retribution fee from each kiosk to collect and transport the garbage to the temporary garbage dump and to further transport the waste to the final landfill. The retribution fee for traditional market tenants is IDR 1.500 per kiosk per day and for street vendors is IDR 2.000 per merchant per day. The retribution fee paid by street vendors ants makes them feel they have the right to trade in sidewalk and make it difficult to relocate them from the site. The resistance of illegal merchants is also part of the problems.

“The waste management is part of the responsibility of IWAPPA. The personnel are also provided by IWAPPA. The retribution fee, as much as IDR 1.000, that must be paid by tenants per kiosk per day is being used to collect and transport the garbage from each kiosk to the garbage dump.

Furthermore, the transportation of the waste from the temporary garbage dump to final landfill is performed by a task force assembled by the tenants of Guntur Traditional Market under the supervision of IWAPPA. The transportation of waste from garbage dump to final landfill is also cost some money because it is part of regional income that must be paid to the government through DLH.

The amount of money to be paid for this activity is IDR 500 and therefore the total retribution fee is IDR. 1.500...”

(AN, IWAPPA, 26 January 2020)

The role of IWAPPA as the partner of DLH is to manage the cleanliness and security service. In the past, the collection and waste transportation are performed by UPTD. However, due to the change in district regulation, those tasks must be performed by DLH. According to Regional Regulation (i.e. Peraturan Daerah) of Garut District number 10/2016, UPTD is prohibited to manage the waste from temporary garbage dump to final landfill. These activities become the responsibility of DLH. However, DLH must assemble a task force (i.e. kelompok kerja). The payment of retribution fee must be paid to DLH because the Municipal Government assign a target to DLH as to the amount of regional income. UPTD do not have the right to interfere with retribution fee. The role of UPTD is to aid the waste management that technically handled by IWAPPA.

IWAPPA is still under the supervisory of UPTD Guntur Traditional Market and The Agency of Industrial Affairs, Energy, and Mineral Resources (i.e. Disperindag ESDM). Cleaning activities are performed in two areas. The first is performed in Guntur Traditional Market and the second is performed in relocation market that is located near the fire fighter office. Eighteen janitors and three back up janitors are responsible to collect the garbage every morning in those two areas. The first 11 janitors are responsible for garbage collection in eleven blocks of the market. Each block is consisted of 180 kiosks. Another 7 janitors are responsible for garbage collection in the area that are used by street vendors in Merdeka Street.

The cleaning activities are started in 06.30 AM until noon. The total volume of garbage that are collected from street vendors in average is 30 to 35 garbage cart per day. Therefore, the total volume of garbage collected from garbage dump (i.e. temporary landfill) in Guntur Traditional Market that further transported to final landfill in Pasir Bajing is between 48 to 60 garbage carts per day. The garbage is transported to final landfill by using Fuso Truck that has the capacity to carry 10 to 15 tons of garbage. IWAPPA admit that they don't have the exact number of garbage generated. They can only use the number of carts used as estimation.

“We never weigh the total volume of garbage. We can only calculate the capacity of the Fuso Truck to carry the garbage is between 10 to 15 tons...”

(AN, IWAPPA, 26 January 2020)

Furthermore, the time required to collect the garbage every day is explained by IWAPPA of Guntur Traditional Market as follows:

“The routine collection of garbage from Monday to Saturday could be mounted to 25 to 30 tons as also reflected in the capacity of Fuso Truck. In the past, we once used regular truck that has the capacity of 7 tons and that is why we must transport the garbage for 3 to 4 times a day. In the

present, we are able to collect and transport the garbage only once by using Fuso Truck between 09.00 to 10.00 o'clock in the morning. In Monday, the amount of garbage is pile up because the janitors are off in Sunday. Therefore, the transportation must be performed twice a day between 08.00 AM to 12.00 AM..."

(AN, IWAPPA, 26 January 2020)

The time of garbage collection from each kiosk and send to garbage dump is divided into 2 work shifts. The first work shift lasts from 07.00 AM to 09.00 AM. The second work shift lasts for 16.00 to 18.00 in the afternoon. The morning shift is dedicated to collect and transport the garbage produced by street vendors meanwhile the afternoon shift is dedicated for traditional market tenants (i.e. kiosks). The process of garbage collection is supported by heavy equipment, that are, loader truck and excavator. The garbage collection in Guntur Traditional Market is the most intensive compared to other traditional markets in Garut District. Other traditional markets only performed once every two days. Waste management in Guntur Traditional Market is as follow. As can be seen in Figure 3, Guntur Traditional Market are surrounded by shophouse (i.e. rumah toko), street vendors, and public transportation terminal that each has its own contribution toward the waste problem in Guntur Traditional Market.

In addition to investigate the process of waste management through observation and interview with IWAPPA, DLH, UPTD, and the merchants of Guntur Traditional Market, this study also attempt to explore the opinion and perspective of other stakeholders that include the residents that live around the market and external experts such as academics and non-profit organization. Apparently, negative sentiment tends to emerge regarding the waste management in Guntur Traditional Market. As stated by one of the residents that lived for more than 30 years in Merdeka street:

"In the past, Merdeka Street was clean and known as the center of education in Garut District. A lot of renowned schools and education institutions located in this street. Sadly, current situation of Merdeka Street is cause for concern. Especially in front of Fire Fighters Headquarter, the street is so dirty and smells very bad. There are a lot of waste produced by trading activities that are left. A lot of people close their nose every time they pass this street..."

(AK, local resident, 28 January 2020)

There are differences regarding the situation between "before" and "after" the street vendors relocated to relocation area (see Figure 3). The comparisons are displayed in Table 2.

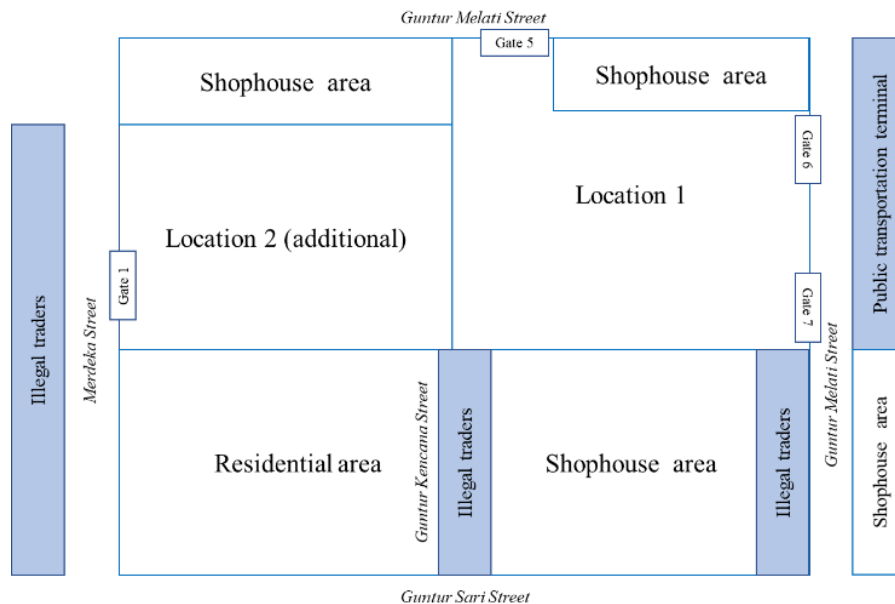


Figure 3. Waste Management of Guntur Traditional Market

Table 2. The comparison of situation before and after the relocation of street vendors

Dimensions	Before Relocation	After Relocation
Public Activities	<ul style="list-style-type: none"> - The street was used by a lot of public transportation route. - There was an open ground that used by residents for annual bazaar and other public activities. - The street vendors only trade at night 	<ul style="list-style-type: none"> - The public transportation (minibus) illegally stop to wait for the passengers. - The illegal market for street vendors trades from midnight to 6.30 AM. - There is a parking lot that crowded by big trucks and other vehicles.
Street Condition	The effective width of the street is 7 meters. Therefore, congestion was rarely happened.	The effective width is 4 meters because some portion of the street is used by street vendors to trade and in the noon that same part of the street is used as parking space. Therefore, the congestion takes place for a whole day.
Sidewalk Condition	The sidewalk is very clean and comfortable to be used by pedestrians.	The sidewalk is very dirty, slippery, and smells very bad. Pedestrians tend to avoid this area.
Aesthetic	A beautiful main street and was pleasing to the eyes.	A main street is “decorated” by piles of garbage in several points.

Based on that condition, a natural environment observer (with the initial of CE) that work for non-government organization (NGO) and an academics (with the initial of IK) initiated Garut Garbage Free (GGF) movement. The waste management in Guntur Traditional Market is part of their concern. The

results of the interviews with CE and IK provide new insights regarding the problem situation and options to resolve the garbage problem in Guntur Traditional Market especially the one that affect the situation of Merdeka Street. The problem situations, possible solutions, and the affected stakeholders are displayed in Table 3.

Table 3. The problem situation, possible solutions and affected stakeholders for waste management in Guntur Traditional Market

Dimension	Problem Situations	Possible Solutions	Stakeholders
Means	The volume of garbage is beyond the capacity of garbage dump.	Large garbage bin will be used to collect organic waste. Non-organic waste will be collected and managed at different location.	- DLH - IWAPPA - Tenants - Street vendors
Infrastructure	It is very difficult to find appropriate garbage bins in the location around Guntur Traditional Market.	Appropriate garbage bins must be provided at the end of each block and at the end of Merdeka Street. The janitors will collect the garbage from these bins at 6.30 AM.	- DLH - IWAPPA
Education	There is no knowledge transfer about the differences in nature and treatment, including means of removal, between organic and non-organic waste and of treatment.	A more intensive socialization will be introduced. Verbal encouragement by using loudspeaker are required to be performed several times in a day.	- UPTD Pasar Guntur - IWAPPA
Law enforcement	There are no regulation and consequences that can be used to reshape public attitude and behaviors towards garbage.	The regulation should be made in respect with what type of garbage that is collected by the janitors and what type of garbage that should be recycled by individuals.	- The Regent of Garut - DLH
Personnel (Human Resources)	The lack of personnel to handle the garbage in Guntur Traditional Market that consist of 18 janitors and 3 back up janitors.	There are supposed to be different type of personnel that is responsible for education and law enforcement. This job requires higher level of education and good communication skill.	- DLH - IWAPPA

Dimension	Problem Situations	Possible Solutions	Stakeholders
Public Participation	The surrounding society convey their criticism towards the street vendors that neglect the responsibility to preserve the cleanliness of the sidewalk. However, the street vendors claim that the responsibility has been transferred to the janitors.	The affected community should be cooperated with IWAPPA in monitoring the safety, security, and cleanliness around Guntur Traditional Market.	- Community - IWAPPA
Research and Development	Academics and ecopreneurs have not been involved in Garut Garbage Free movement.	Academics and ecopreneurs must be involved to create innovations in waste management. They supposed to provide trainings to merchants to manage their own garbage and even transform it into valuable products as a part of Garut Garbage Free movement.	- Academics - Ecopreneurs - DLH - Community
Cooperation between private sector, academics, and communities	The garbage collected from the garbage dump directly transported to final landfills by using Fuso Truck.	The garbage should be sorted based on their potential to be recycled. Only those that cannot be recycled that have to be sent to final landfill.	- Ecopreneurs - Academics - Community

5. Conclusions

In general, waste management in Guntur Traditional Market is still needed to be improved. The deteriorating condition of Guntur Traditional Market affected the residents around it. Several dimensions that have changed including the type of activities, street condition, sidewalk condition, and aesthetic around Guntur Traditional Market. The number of personnel, limited means and infrastructure, education, law enforcement, public participation, research and development, and the participation of important stakeholders that include academics, community, and private sector are important dimensions that must be involved in the improvement of Guntur Traditional Market Management.

The factors that inhibit the optimum waste management system in traditional market must be further explored especially in rural area with many traditional markets as found in Garut District. The composition of each type of waste, especially MSW, and its related technologies that can be adopted must be further reviewed based on their impact on the natural environment and economic values.

6. Recommendation

Waste management by using open dumping system is often give birth to a new problem namely pollutant gas. Other than that, creating compost from organic waste does not produce high economic value. Eliminating the waste by incineration will also cause air pollution and respiratory disorder.

Dumping the waste to the river also cause direct adverse impact such skin disease. In the long term, dumping the waste to the river will cause flood especially in rainy season.

Evaluation on various methods that can be used to reduce or even eliminate waste called for new method that is environmentally friendly and able to produce or transform the waste into high value products. To achieve this purpose, transform the waste into new source of alternative energy must be evaluated and implemented. The most potential method is by using anaerobic technology to produce biogas. More than that, Garut District also needs effective local regulation formulated to reduce the volume of garbage dumped into landfill. The support from all stakeholders, i.e. academics, business, local community, and media is needed to educate the merchants and residents to intensively sort the waste.

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