

Analysis of Potential Organic Waste Management: Case Study Tarumanagara University I

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Abstract— Every day people carry out activities and activities that humans do usually produce waste. In Jakarta, itself is one of the problems that cause many things, one of which is the full volume of waste in landfills and floods. The use of organic waste into materials that are useful for humans and the environment will help reduce the volume of waste and improve the natural environment. Tarumanagara University is one university that has a large area and has many users in it so that the waste generated in this educational environment will also be significant. Within the university environment, there are several potentials found by the author and there are indicators to determine the right location based on Laws and Government Regulations. From that potential locations, one location was found suitable for waste management in the university environment. As for conclusion, author concludes that Tarumanagara University apparently still does not have waste management so it is expected that management considers waste management for better sustainability of nature and human life. And for finding, author finds that Tarumanagara is still ignorant with the environmental issues.

Keywords: *Human activity, potential sites, Tarumanagara University I, waste management*

I. INTRODUCTION

With the development of technology and education, humans began to develop a variety of foods and beverages to meet their daily needs. The United Nations Food and Agriculture Organization estimates that from 3.9 million tons of food production for human consumption, around one-third, 1.3 million tons ends up being garbage. The presentation of the waste produced is re 45% fruits and vegetables, 35% seafood, 30% cereal, 20% dairy product, and 20% meat.

Jakarta as the Capital of Republic of Indonesia also produces waste, it can either from household waste, office

waste, industrial waste, that can reach as much as 7.500 tons per day. If seen further, as much as 54% of the waste produced by the residents of Jakarta are organic waste, both in the form of food waste and food production waste and the remaining 46% are inorganic waste produced by the activities of Jakarta residents. The presentation of the largest waste producer in Jakarta is 56% organic waste, 19% paper waste, 13% plastic waste, 4% wood waste, 3% textile waste, 3% glass waste and the remaining 2% are a mixture of others.

The amount of garbage produced by Jakarta residents is caused by excessive consumption patterns and mostly leaves trash; waste management that does not run optimally and the lack of awareness from Jakarta residents about the environment and the surrounding environment. The result is air pollutions (where there will be a foul odor when there is an accumulation of garbage), pollution of water and land and lastly the thread of food crisis in the future. [1]

As an educational institution that has ranked 14th in the national region Tarumanagara University I, which has a land area of 32.051m² with the building area of 115.487 m², have the potential in managing organic and inorganic waste produced by student, lectures and employees activities inside university environment. [2]

Activities that carried out in the university environment by user producing organic and inorganic waste, which have large potential waste management and can help in reducing of the waste disposal volume that sent to waste station which will lead to a reduction of landfill waste.

This research was conducted to the management and users of Tarumanagara University I aware that this location has potential for waste management and the final result from waste management will be reducing landfill

II. MATERIAL AND METHOD

A. Theoretical Review

i. Potential

Potential is an ability, strength or power that has the possibility to be developed again into a larger form [3].

Potential can be also interpreted as the basic ability from something that is still hidden inside which is waiting to be manifested into realizing [4].

ii. Organic Waste

Waste is a part of something that is not used, not liked or something that discarded, which generally comes from activities carried out by humans (including industrial activities), but not biologically (because human waste is not included) and is generally solid [5].

Organic waste is garbage originating from living things, such as leaves, kitchen waste, restaurant waste, vegetable waste, leftover fruit, and many more. This type of garbage can rot or destroy naturally [6].

iii. Decomposition Process

The decomposition process is a process of decomposition of material using oxygen, where this process will occur naturally by increasing the temperature, that is by exchanging warm air that comes out and cold air from outside will enter.

In the decomposition process there will be an increase in temperature, this increase is the result of microbial activity, where the higher the temperature the more oxygen consumption and the faster the decomposition process. In general, the temperature is in the range of 30°-60°C. if the temperature in the container exceeds 60°C then some microbes will die and only thermophilic microbes will survive, also the high-temperature micro-pathogens of plant pathogens and weed seeds will be killed so this condition is not recommended. The temperature in the compost container must be maintained so it does not exceed over 60°C [7].

iv. Law No 18 Year 2008 Concerning Waste Management

In law the government of the Republic of Indonesia No. 18 of 2008 [8] concerning waste management, the government of Indonesia seeks to take active action along with the community in waste management. Some of the criteria contained in Law No. 18 of 2008 [8] are:

i. Waste reduction,

Activities that include it are:

- a. limitation of landfill;
- b. recycling of waste and
- c. waste utilization.

ii. Waste handling

Activities that included it are:

- a. sorting in the form of grouping and separation of waste according to the type, amount and nature of the waste;
- b. collection in the form of taking and transferring waste from the source to the polling station;
- c. transportation of waste from TPS to TPA;
- d. waste management by changing the characteristics, composition and amount of waste;
- e. the final process of waste: safely returning waste and residue from waste processing to environmental media.

- v. Government Regulation No. 81 of 2012 concerning Management of Household Waste and Some kind Household Waste

In Government Regulation No. 81 of 2012 [9], it is stated that waste management is a systematic, comprehensive and sustainable activity that includes reduction and handling of waste. This regulation also explains the criteria for waste management, namely:

- the waste management site uses the 3R (Reduce, Reuse and Recycle),
- has a masterplan: limitation of a landfill, waste recycling, waste reuse, waste sorting, garbage collection, garbage transportation, waste management, waste final processing,
- sorting of waste is carried out by area managers, sorting of waste is divided into 5, which is: hazardous and toxic waste, waste that is easily broken down, the garbage that can be reused, recyclable waste and other waste.

B. Analysis Indicators

From some of the theories above, the authors conclude a number of indicators that will be become a benchmark for assessing the potential of waste management in Tarumanagara University I.

Table 1 Indicators of assessment in the analysis of potential waste management

| NO | INDICATOR | POINT |
|----|--------------------|---|
| 1 | Source of garbage | There are human activities that produce organic waste |
| | | There are human activities that produce inorganic waste |
| 2 | Garbage bin | There is a trash can at the location of human activity |
| | | There is a garbage collection place per building |
| | | There is a temporary waste disposal site (TPS) |
| 3 | Garbage collection | Have a certain schedule in taking garbage from the trash can |
| | | Have a certain schedule in transporting waste to the temporary waste disposal site (TPS) |
| | | Have a specific schedule for transporting waste to the landfill |
| 4 | Waste separation | Has a garbage bin that are for a specific type of waste (cans, plastic, paper, and organic waste) |
| 5 | Waste Management | Having an organic waste management location that is protected from sunlight and rainwater and will not interfere with the activities of university users and easily accessible location |
| | | There is an organic waste management system |
| | | Having an inorganic waste management location that is |
| | | There is an inorganic waste management system |
| 6 | Results | There has been a reduction in waste volume |
| | | There is a result of organic waste management |
| | | There is a result of inorganic waste management |

C. Research Object

Tarumanagara University I is one of the private universities in Jakarta which is established in 1959, located at Jln. Letjen S. Parman No. 1, Grogol Petamburan, West Jakarta. This location was chosen because this is an educational location that has developed and has a large land area and building area, which allows human activities to produce waste

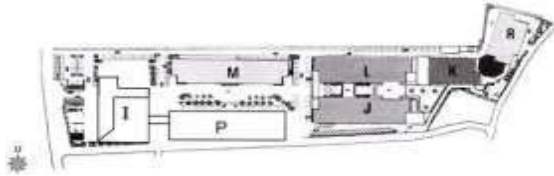


Figure 1 Plans Tarumanagara University I and entry point to the university

D. Location of Waste Management Potential

From theories, laws and government regulations, the authors study and examine several locations that have potential in waste management, these locations are:

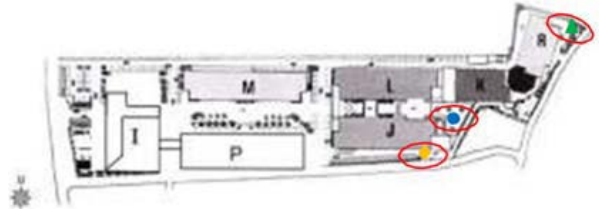


Figure 4 Several locations of waste management potential

III. RESULTS AND DISCUSION

A. Waste

In Tarumanagara University I environment, the waste generated by human activities in it varies, ranging from organic waste (where this waste is the result of food production from canteens, food waste, and various kind of leftover food), paper and cardboard waste, plastic waste, and various kinds other inorganic waste (broken floor tiles, glass and soon).

B. Garbage Bin

In Tarumanagara University I environment, each building, and floor have a small garbage bin that will be collected in a large-size trash can and has wheels, where these bins will be transported to the TPS.

The garbage bin provided by the university manager only has 1 form and does not have grouping, so that organic and inorganic waste mixes together, therefore the waste will accumulate and emit a foul odor and if the waste not transported for a certain period of time.



Figure 2 Various garbage bin in Tarumanagara University

C. TPS (Temporary Waste Disposal Site)

TPS within Tarumanagara University I is located at the back, which is at the back of Building R, where TPS is accessible to all university user but does not interfere with user visualization, because of its rather remote location where only some of the university users go through this location.

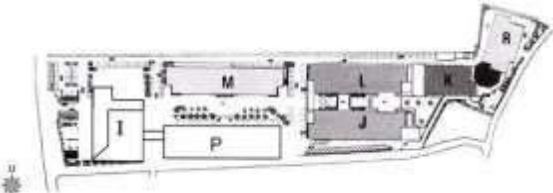


Figure 3 Locations of temporary waste disposal located at the back of building R

From theories, laws and government regulations, the author examines and map 3 locations that has the potential for waste management, along with the analysis of the three locations:

1. Location A

- (+) This location is located at the back of the university so it does not interfere with visualization or unpleasant odors,
- (+) This location is rarely travelled by Tarumanagara university users, only a small proportion of university users go through this location,
- (+) This location is close to the TPS provided (+) This location has shade from sunlight and rainwater, also have big opening that can be adjusted,
- (-) This location has no window so there no oxygen exchange.



Figure 5 Potential waste management site A

2. Location B

- (+) This Location has a barrier so that the location will not be disturbed by university users
- (+) This location is close to the water management facilities so students will not interfere with this location
- (-) The smell that might be caused will disrupt the activities for the university users
- (-) This location is temporarily used for building renovation waste dump so that in the near future it cannot be used.



Figure 6 Potential waste management site B

3. Location C

- (+) This location still does not have a limit so that this location can be enlarged or reduced according to needs
- (+) This location is in the middle of the university that the university users circulation is not too dense or not too rare,
- (-) This location is side by side to the parking area so that the temperature of the micro- location can be higher than other location,
- (-) This location has no shade,
- (-) Visualization and odor can affect the activities for university users,



Figure 7 Potential waste management site C

And based on the indicator, the assessment of the potential location of waste management is as follows:

Table 2 Analysis of potential waste management

| INDICATOR | POINT | NOT |
|--------------------|---|-----|
| Source of garbage | There are human activities that produce organic waste | √ |
| | There are human activities that produce inorganic waste | √ |
| Garbage bin | There is a trash can at the location of human activity | √ |
| | There is a garbage collection place per building | √ |
| | There is a temporary waste disposal site (TPS) | √ |
| Garbage collection | Have a certain schedule in taking garbage from the trash can | √ |
| | Have a certain schedule in transporting waste to the temporary waste disposal site (TPS) | √ |
| | Have a specific schedule for transporting waste to the landfill | √ |
| Waste separation | Has a garbage bin that are for a specific type of waste (cans, plastic, paper, and organic waste) | X |
| Waste Management | Having an organic waste management location that is protected from sunlight and rainwater and will not interfere with the activities of university users and easily accessible location | X |
| | There is an organic waste management system | X |

| | | |
|---------|---|---|
| | Having an inorganic waste management location that is protected from sunlight and rainwater and will not interfere with the activities of university users and easily accessible location | X |
| | There is an inorganic waste management system | X |
| | Results | |
| Results | There has been a reduction in waste volume | X |
| | There is a result of organic waste management | X |
| | There is a result of inorganic waste management | X |

IV. CONCLUSIONS

In the environment of Tarumanagara University I, the author concluded that there was no waste management carried out by university management. This situation is very unfortunate given that in the university environment the activities from university user will produce good to waste both organic and inorganic waste, which is appreciable in volume.

Also, the author examined 3 potential locations for managing university waste was from the 3 potential location the first location had great potential so that the location can become an area for waste organic management. For requirements and management so that the potential of this waste management location becomes better further research is needed.

As for finding, author finds that Tarumanagara University still ignorant of the environmental problem and hasn't had any program for waste management either for organic waste nor for inorganic waste.

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