

# Waste management based on indigenous communities in Jatiluwih Village

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**Abstract.** The population in Jatiluwih Village continues to increase with an average rate of population increase of 1.03 percent starting from 2014 until 2018. Waste management consists of short-term, medium-term, and long-term plan. Based on Regional Regulation of Tabanan Regency number 11 year 2012 about facilities and infrastructure of Integrated Waste Management Site (TPST), it is developed as a place to carry out collection, sorting, reuse, recycling, processing and final processing garbage. It is divided into several service areas. So that it can improve the quality and coverage of waste management services and reduce the volume of waste that must be sent to landfill. Composition waste on Jatiluwih Village is 71 percent organic and 29 percent an-organic. Wet organic domination by waste from house is vegetable and food, dry organic is waste from temple and backyard, an-organic domination by bottle drinking and plastic bag. Media for waste in the house not in good condition. Jatiluwih Village have potency to treatment the waste from organic using reducing, and an-organic partnership with collected waste.

## 1. Introduction

The average amount of waste produced in Jatiluwih Village began in 2014 with 9.348 liter per day of garbage. The current condition in 2018 results increase of 9.704 liter per year. Based on the data above, it can be calculated that the average waste disposal per day from residents in Jatiluwih Village is 2.8 liter per day. Damanhuri conducted research in the city of Bandung getting the average discharge per person per day is 2 liters per person per day [1].

Based on Regional Regulation Number 11 year 2012 concerning Tabanan Regency Spatial Planning has entered a short term phase, which based on data from the Sanitation and Landscaping Service of Tabanan district waste that is served is 12,775 liter per year so that if it is processes 30.72 %, where is the Standard Drinking Water (SPM) only fulfilled 30 % and this condition entered in the medium term stage.

## 2. Methodology

### 2.1. Preliminary research

Jatiluwih Village has Integrated Waste Management Site. Waste that cannot be processed and piled up will be sent directly to the integrated waste in Mandung Village, where it is subject to contributions for a single waste is IDR 35,000. The facilities owned by management are one pick up vehicle with capacity of 1,000 liter. Jatiluwih Village consists of 2 traditional villages, i.e., Jatiluwih and Gunungsari. Jatiluwih Traditional Village consist of North Kesambi, Kesambahan, South Kesambahan, Jatiluwih



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Kawan, East Jatiluwih and Gunungsari. Gunungsari traditional village consist of two district administration: Gunungsari Umakayu and South Gunungsari. For household waste, the destination of tourism free the transportation system. However, for public facilities such as restaurants, hotels, food stalls and mini markets, it costs between IDR 50,000 until IDR 200,000 per month. For transportation services, serve all Jatiluwih Customary Villages, while Gunungsari Traditional Village only serves district Gunungsari Umakayu, because the area is hilly and steep. It is not possible for transportation facilities to transport the waste.

### 2.2. Assessment of waste generation resources

According to Standard National of Indonesia number 19.3964 year 1995, if field observations are not carried out, then to calculate the system quantity, the waste generation rate can be used as follows:

Small town waste generation unit is 2.5 until 2.75 liter per person

$$S = Cd \times \sqrt{Ps} \quad (1)$$

Where:

$S$  = number of souls being sampled

$Ps$  = total population

$Cd$  = density coefficient

$Cd = 1$  when density is normal

$Cd < 1$  when population density is rare

$Cd > 1$  when densely populated density

### 2.3. Assessment of sampling on Jatiluwih Community

Based on the sources of waste above, the implementation of sampling for household waste sources is based on the results of the calculation of sample requirements as explained in Standard National of Indonesia number 19.3964 year 1994

$$K = S/N \quad (2)$$

Where:

$K$  = number of family samples

$N$  = number of people in family (four people)

### 2.4. Prediction of amount of waste generation

The formula used in predicting waste following on Standard National of Indonesia number 36.199.03.03

$$Qn = Qt \times (1 + Cs)^n \quad (3)$$

Where:

$Qn$  = waste generation in the next  $n$  years

$Qt$  = waste generation in the initial year of calculation

$Cs$  = rate of population growth

$n$  = period of predicting

### 2.5. Minimum service standards

Standard of minimum service (SPM) in urban waste reduction is the percentage of the population served through a reduction in waste volume recycle, reuse, reduce to the total population in urban areas.

$$SPM = (A / B) \times 100\% \quad (4)$$

Where:

$A$  = the population is served through the reduction of waste volume per person

$B$  = total number of urban populations per person

$$A = C \times D \quad (5)$$

Where:

$C$  = number of 3R (Recycle, Reuse, Reduce), facilities in the city per unit

$D$  = underserved population per facility recycle, reuse, reduce (person per unit)

### 3. Results and discussion

#### 3.1. Demographic conditions

Jatiluwih Village is one of the villages that became a tourist attraction in Penebel District, Tabanan Regency. With an area of 22.23 kilometers square with divided into eight districts, namely: district of Kesambi, Kesambahan, North Kesambahan, East Jatiluwih, Jatiluwih, Village Gunungsari, Gunungsari Umakayu and North Gunungsari. The number of head of family in Jatiluwih Village until 2018 was 889 heads of households, consisting of 1,341 man and 1,493 women so that the amount of population in Jatiluwih Village was 2,834 humans.

**Table 1.** Sample amount for measuring waste composition

NO	District	People	S	Amount Sample
		Year 2018	$S = (PS)^{0.5 \times 0.5}$	$K = S/N$
1	Kesambi	293	8.56	2
2	North Kesambahan	259	8.05	2
3	South Kesambahan	317	8.90	2
4	Jatiluwih Kawan	394	9.92	2
5	East Jatiluwih	443	10.52	3
6	Village Gunungsari	512	11.31	3
7	Gunungsari Umakayu	338	9.19	2
8	South Gunungsari	278	8.34	2
	Amount	2834	Mean	2

Residents in Jatiluwih Village carry out activities that produce waste from morning until night and take out garbage at night and the next day. Based on the survey, authors asked residents, who become the target samples, to put their trash by giving 2 rubbish bags on previous afternoon for measurement and identification of samples of waste landfill. Authors do it in the afternoon until next afternoon.

#### 3.2. Measuring composition with characteristics waste on Jatiluwih

Waste generation data is collected to determine the amount of generation and types of characteristics of waste produced by residents in Jatiluwih Village. The following data on the average volume generation and identification of the types waste throughout the district in Jatiluwih Village is shown in Table 2.

**Table 2.** Result for composition district on Jatiluwih Village.

Name of District	Waste	Wet Organic		Dry Organic		Anorganic	
		Weight (kg)	Volume (ltr)	Weight (kg)	Volume (ltr)	Weight (kg)	Volume (ltr)
Gunungsari South Day 1	House 1	0.07	6.000	0.115	13.000	0.071	9.000
	House 2						
Gunungsari South Day 2	House 1	0.000	0.000	0.009	1.900	0.074	9.000
	House 2						
Gunungsari South Day 3	House 1	1.000	19.000	1.341	25.000	0.004	3.000
	House 2						
Gunungsari South Day 4	House 1	1.001	18.500	1.370	25.000	0.000	0.000
	House 2						
Gunungsari South Day 5	House 1	1.224	21.000	0.000	0.000	0.002	2.000
	House 2						
Gunungsari South Day 6	House 1	0.001	1.500	1.250	24.000	0.111	14.500
	House 2						
Gunungsari South Day 7	House 1	1.088	19.000	1.022	22.000	1.220	20.000
	House 2						
Gunungsari South Day 8	House 1	0.001	2.000	0.022	7.000	0.077	7.000
	House 2						

**Table 3.** Comparison waste on Jatiluwih Village

Type of waste	Percentage
Wet organic	37%
Dry organic	35%
An-organic	28%

From the results of the graph above, it can be seen that the average household waste disposal and waste composition of residents of Jatiluwih Village for 8 consecutive days is 72% organic waste which is dominated by leaves, flowers, vegetables, fruit, cotton, paper, etc. Whereas an-organic waste is 28% which is dominated by bottle and plastic. For the results of the survey conducted for 8 consecutive days, it was found that organic waste dominates compared to an-organic waste. Because of the large number of trees and plants in homes and around restaurants, the yard area is quite large and the amount of cooking per day is quite a lot considering the writer conducted a survey just before Nyepi Day.

#### 4. Conclusions

Composition waste on Jatiluwih Village is 72 % organic and 28 % an-organic. Wet organic domination bay waste from house is vegetable and food, dry organic is waste. From temple and backyard, an-organic domination by bottle drinking and plastic bag. Media for waste in the house not in good condition. Jatiluwih Village have potency to treatment the waste from organic using reducing, and an-organic partnership with collected waste.

## 5. References

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