

# Relationship between environmental management with quality of kampong space room (Case study: RW 3 of Sukun Sub District, Malang City)

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**Abstract.** RW 3 Sukun Malang was one of kampong that won the competition kampong environment and had managed to maintain the preservation of the kampong. Society of RW 3 Sukun undertake various activities to manage the environment by optimizing the use of kampong space. Despite RW 3 Sukun had conducted environmental management activities, there are several locations in the kampong space that less well maintained. The purpose of this research was to determine the relation of environmental management with the quality of kampong space in RW 3 Sukun. This research used qualitative and quantitative research approaches. Quantitative research conducted by using descriptive statistical analysis in assessing the quality of kampong space with weighting, scoring, and overlay maps. Quantitative research was also conducted on the relation analysis of environmental management with the quality of kampong space by using typology analysis and pearson correlation analysis. Qualitative research conducted on the analysis of environmental management and the relation analysis of environmental management with the quality of kampong space. Result of this research indicates that environmental management in RW 3 Sukun have relation with the quality of kampong space.

## 1. Introduction

Urban kampong is generally known as settlements with high population density, informally built housing, insufficient facilities and infrastructure, and are very densely inhabited [1]. Inside the urban kampong settlements there are various problems that cause unnoticed environment so that there is an impact increasingly quality of settlements. One of the causes of settlement problems is the result of human behavior for needs of using settlement land [2].

Several local governments have been conducting kampong improvement programs since 1978. The kampong improvement program activities are prioritizing the arrangement of the environment so that people are encouraged to action an active role in improving their environment with the help of physical materials [3]. Kampong improvement program has also been organized by the Government of Malang City trough holding a Kampung Bersinar Competition. Kampung Bersinar Competition has three goals, one of the goal is to increase public awareness of the needs clean and beautiful environment.

RW 3 Sukun is the winner of the environmental competition that has maintained the kampong's sustainability by optimizing the use of kampong space in conducting environmental management activities. However, although RW 3 Sukun has conducted environmental management activities and participated in a competition organized by the Government of Malang City, there are still some locations



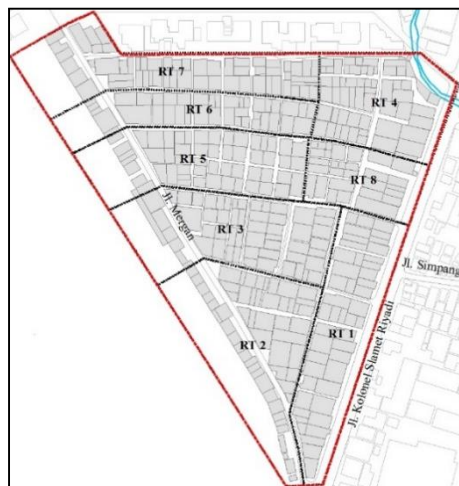
in the kampong space that is less maintained and less clean. So this research is need to know the relation of environmental management to the quality of kampong space in RW 3 Sukun Sub District. The relationship of environmental management with the quality of kampong space can be used as an illustration in managing the kampong environment by utilizing the existing space for another kampong.

## 2. Contents

### 2.1. Methods

This research uses qualitative and quantitative research approaches. Quantitative research on this research is done weighting, scoring, map overlay, typology analysis, and correlation analysis by using person correlation test. Qualitative research in this research is conducted on the analysis of environmental management analysis of environmental management relationship with the quality of the kampong space in descriptive qualitative.

This research will divide the kampong space in RW 3 Sukun Sub District based on RT area boundary. The division aims to facilitate the researchers in the analysis process in describing environmental management in each RT and compare the quality of the kampong space between one RT with another RT.



**Figure 1** Research Sites.

### 2.2. Population and Sample

The population in this study is the kampong space in RW 3 Sukun Sub District and the population of RW 3 Sukun Sub District consisting of 1,125 peoples. The sample in this research is divided into two namely the expert sample and the sample of population of RW 3 Sukun Sub District. Sampling of RW 3 Sukun community using probability sampling method with proportional stratified random sampling technique.

$$S = \frac{\lambda^2 \times N \times P \times (1 - P)}{(d^2 \times (N - 1)) + (\lambda^2 \times P \times (1 - P))} = 218 \text{ responden}$$

$$ni = \frac{Ni}{N} \times n \quad (1)$$

**Table 1.** Sample Distribution.

RT	Among Population	Among Sample
RT 1	125	24
RT 2	105	20
RT 3	212	41
RT 4	132	26
RT 5	174	34
RT 6	113	22
RT 7	149	29
RT 8	115	22
	1125	218

Experimental sampling using non-probability sampling method with purposive sampling technique. The number of samples used five people based on the consideration that the respondents are people who understand about the kampong space and environmental management. Expert samples come from BAPPEDA Malang, DKP Malang, academics (Lecture Department, and environmental competition judging).

### 2.3. Analysis Method

**2.3.1. Weighting.** Weighing criteria in this study using the pair comparison method to give weight value on the criteria of the quality of the kampong space room. The weight of the criteria for the quality of the kampong space room is obtained from five stakeholders. The weighting steps by the paired comparison method [4] is define criteria, create matrix of pair comparisons, calculate the weight of criteria, make consistency ratio estimation, and create a composite opinion matrix. The criteria that used in this study are taken from the theory of Human Rights [5] which is then divided into two namely physical and nonphysical criteria. Physical criteria consist of environmental criteria, environmental management facilities, greening, settlement layout, and roads. While non-physical criteria consist of container activities criteria that supplement income and social activities related to environmental management.

**2.3.2. Scoring.** Scoring is a technique in analyzing data by providing scores on existing circumstances based on predetermined criteria. The criteria used in this study based on the criteria for assessment of Kampong Bersinar Competition and literature study on previous research.

1. Physical environmental criteria in assessed from the cleanliness conditions of the kampung environment is road and alley cleanliness, drainage system, and yard of the house.
2. Criteria of environmental management facilities are assessed from facilities used in environmental management consisting of waste collection facilities, drainage system, biopori, and composter.
3. Greening criteria assessed from the presence and maintenance of plants on the road and yard of the house.
4. Criterion of settlement layout assessed from building density and pattern of layout or building regularity.
5. Road criteria are assessed from road construction and road construction conditions.
6. Criteria of activity containers that supplement income are assessed from potential economic activities, side business, and waste utilization in business.
7. Criteria of social activities that support the settlement environment are assessed from social activities related to environmental management that can improve the quality of the village space consisting of socialization related to environmental management, evaluation of environmental management activities, and discussion on environmental management.

**2.3.3. Map Overlay.** Map overlays are used to get a quality map of the kampong space. In the overlay stage of the map, each criteria score is multiplied by each weight then the whole score is summed to know the value of the quality of the kampong space at each RT in RW 3 Sukun Sub District.

**2.3.4. Pearson Correlation Test.** Pearson correlation test is used to see the resemblance of the distribution of the value of a variable with the value of other variables so that will know whether there is a relationship between two variables. Pearson correlation is used when two variables X and Y each have a scale of interval and ratio measurement [6]. The steps in the correlation analysis consist of determining the hypothesis, determining the probability value, comparing the significant value, and looking at the value of the correlation coefficient.

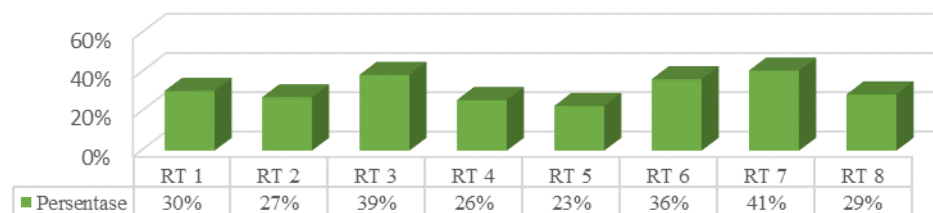
### 3. Results

#### 3.1. Analysis of Environmental Management

The analysis of environmental management consists of the type of activity, actors, location, and time of environmental management activities.

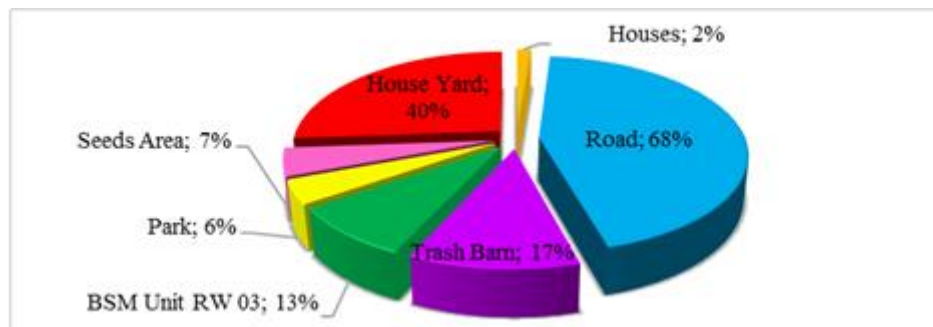
**3.1.1. Type of environmental management activities.** Types of environmental management activities consist of waste management activities, water treatment management, bio pore management, drainage system management, afforestation, consecration work, and clean and improve the kampong environment.

**3.1.2. Person of environmental management activities.** Person of environmental management in RW 3 Sukun Sub District can be seen based on the percentage of RT residents involved. Environmental management person in RW 3 Sukun Sub District are dominated by RT 7 peoples as much as 41%.



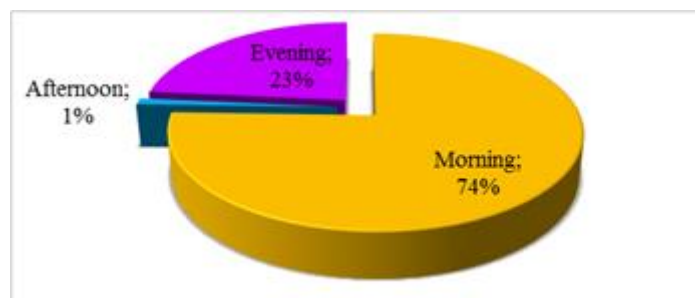
**Figure 2.** Graph of citizens percentage in environmental management at each RT.

**3.1.3. Location of environmental management activities.** The location of environmental management in RW 3 Sukun Sub District is viewed based on space that used for environmental management activities. Used for environmental management activities include roads, yard houses, garbage warehouses, BSM unit in RW 3 Sukun Sub District, parks, nurseries, fields, and houses. The most used kampong space is in the kampong road as much as 68%. This is due to the large number of environmental management activities carried out by roads such as waste sorting activities, plant maintenance, management of biopori management, composter management, drainage system improvements, therapeutic stone improvements and village roads, and other activities.



**Figure 3.** Percentage of space diagram used in environmental management.

*3.1.4. Time of environmental management activity.* Time of environmental management in RW 3 Sukun Sub District is divided into three in the morning, afternoon, and evening. The environmental management activities of RW 3 Sukun Sub District are mostly done in the morning. Generally, residents RW 3 Sukun Sub District do environmental management activities after doing routines in the morning such as cooking, washing, and others. This condition is caused by the majority of RW 3 Sukun Sub District citizens conducting informal communication or conversation in the afternoon. In addition, many people's social activities conducted in the afternoon such as pray, PKK as organization meeting, informal meeting, istigosah, and other meetings are generally done once to four times a month.



**Figure 4.** Percentage of citizens diagram in environmental management.

### 3.2. *Quality Analysis of Kampung Space*

Quality Analysis of kampung space is an analytical process in knowing the quality of kampung space based on the condition of the kampung space in each RT. The high quality of urban space will be influenced by the overall criteria for the formation of the kampung. The quality of the kampung room is calculated using weighting and scoring.

*3.2.1. Weighting.* The weighting comparison method is based on the perception of experts / stakeholders from BAPPEDA Malang, Gardening and Hygiene Office of Malang City, academicians, and environmental competition judges. The result of weighting of pair comparison method can be seen in Table 2. The highest quality of space weights are social activities that support the settlement environment with the weight of 0.234. While the value of the lowest weight is a container activity that adds income with a weight of 0.059.

**Table 2.** Weight Criteria of Kampung Space Quality.

Criteria	Weight	Rating Priority
Physical environment	0,217	3
Environmental management facilities	0,106	4
Container activities to supply income	0,059	7
Greening	0,232	2

Criteria	Weight	Rating Priority
Settlement Layout	0,063	6
Street	0,089	5
Social activities supporting environmental settlements	0,234	1

### 3.2.2. Scoring. Scoring is based on seven criteria of kampong space quality

1. Physical environment. Scores of physical environmental criteria were obtained from the calculation of average score of road hygiene condition and alley (A), drainage system (B), and home yard (C). RT which has the highest score for environmental physical criteria is RT 3, RT 6, and RT 7 with score 3. Scores of physical environmental criteria can be seen in Table 3.

**Table 3.** Physical environment Criteria Score.

RT	Score			Criteria Score
	A	B	C	
RT 1	3	3	2	2,67
RT 2	2	2	3	2,33
RT 3	2	3	3	3,00
RT 4	2	1	2	1,67
RT 5	2	2	3	2,33
RT 6	3	3	3	3,00
RT 7	3	3	3	3,00
RT 8	2	2	3	2,33

2. Environmental management facilities. Scores of environmental management facility criteria are divided from calculation of average scores of garbage collection (A), drainage system construction (B), drainage system condition (C), number of bio pores (D), and number of composter (E). RT which has the highest score for environmental management facility criteria is RT 3 with score 3. Scores of environmental management facility criteria can be seen in Table 4.

**Table 4.** Environmental management facilities Criteria Score

RT	Score					Criteria Score
	A	B	C	D	E	
RT 1	3	3	2	3	2	2,60
RT 2	3	3	2	3	2	2,60
RT 3	3	3	3	3	3	3,00
RT 4	3	3	2	2	2	2,40
RT 5	3	3	1	3	3	2,60
RT 6	3	3	2	3	2	2,60
RT 7	3	3	2	3	2	2,60
RT 8	3	3	1	2	2	2,20

3. Reforestation. The score of greening criteria was obtained from the calculation average score of the existence of plants on the road (A), plant maintenance on the road (B), the presence of plants in the yard of the house (C), and the maintenance of the plants in the yard of the house (D). RT with the highest scores for environmental physical criteria were RT 6 and RT 7 with a score of 2.75. The score of greening criteria can be seen in Table 5.

**Table 5.** Greening Criteria Score.

RT	Score				Criteria Score
	A	B	C	D	
RT 1	1	3	3	3	2,50
RT 2	1	3	3	3	2,50
RT 3	1	3	3	3	2,50
RT 4	1	3	3	3	2,50
RT 5	1	3	3	3	2,50
RT 6	2	3	3	3	2,75
RT 7	2	3	3	3	2,75
RT 8	1	3	2	3	2,25

4. Settlement Layout. Scores of settlement layout criteria are devided from the calculation of the mean score of building density (A) and building layout pattern (B). Scores of settlement layout criteria were dominated by a score of 2-2.5 except on RT 8 which scored 1.5. The road criteria score can be seen in Table 6.

**Table 6.** Settlement Layout Criteria Score.

RT	Score		Criteria Score
	A	B	
RT 1	1	3	2,00
RT 2	2	3	2,50
RT 3	2	3	2,50
RT 4	1	3	2,00
RT 5	2	3	2,50
RT 6	2	2	2,00
RT 7	2	3	2,50
RT 8	1	2	1,50

5. Street. The street criteria score is divided from the calculation of the average score of road construction (A) and the condition of road construction (B). All RTs get a score of 3 except RT 1 with a score of 2.5. The road criteria score can be seen in Table 7.

**Tabel 7.** Street Criteria Score.

RT	Score		Criteria Score
	A	B	
RT 1	3	2	2,50
RT 2	3	3	3,00
RT 3	3	3	3,00
RT 4	3	3	3,00
RT 5	3	3	3,00
RT 6	3	3	3,00
RT 7	3	3	3,00
RT 8	3	3	3,00

6. Container activities to supply income. Score criteria container activities that supply the income obtained from the calculation of the average value of potential economic activities, independent side business, and utilization of waste in the business. The RT which has the highest score for the activity container criteria that supplemented the income was RT 1 with a score of 2.33. The score of the income earning activity container criteria can be seen in Table 8.



**Tabel 8.** Container activities to supply income Criteria Score.

RT	Score			Criteria Score
	A	B	C	
RT 1	3	2	2	2,33
RT 2	1	3	2	2,00
RT 3	1	2	3	2,00
RT 4	1	2	2	1,67
RT 5	1	2	2	1,67
RT 6	1	2	2	1,67
RT 7	1	2	3	2,00
RT 8	1	2	2	1,67

7. Social Activities that Support the Settlement Environment. Criteria score of social activities that support the settlement environment is derived from the calculation of the average community involvement in following social activities. Social activities conducted by RW 3 Sukun Sub District are socialization (A), activity evaluation (B) and discussion (C). The RT with the highest score for the social activity criteria is RT 7 with score 3. The social activity criteria score can be seen in Table 9.

**Tabel 9.** Social Activities that Support the Settlement Environment.

RT	Social Activity			Score			Criteria Score
	A	B	C	A	B	C	
RT 1	75%	50%	85%	2	1	3	2,00
RT 2	70%	55%	85%	2	1	3	2,00
RT 3	63%	69%	94%	2	2	3	2,33
RT 4	77%	64%	88%	2	2	3	2,33
RT 5	73%	38%	90%	2	1	3	2,00
RT 6	76%	67%	95%	2	2	3	2,33
RT 7	86%	87%	94%	3	3	3	3,00
RT 8	79%	55%	79%	2	1	2	1,67

### 3.3. The value of the kampong space quality

Determination value of the quality of kampong space by overlaying the map to get the final map result of the quality kampong map. Overlay results indicate that the highest quality of space is in RT 7 with the value of kampong space 2.809 while the lowest space quality is in RT 8 with the value of kampong.

**Tabel 10.** The value of the kampong space quality.

RT	Value	Space Quality	Large (m <sup>2</sup> )	(%)
RT 1	2,389	Good	4629,66	14%
RT 2	2,373	Good	5606,06	17%
RT 3	2,638	Good	4866,70	15%
RT 4	2,233	Medium	3820,83	12%
RT 5	2,353	Good	4308,92	13%
RT 6	2,602	Good	2967,76	9%
RT 7	2,809	Good	4620,89	14%
RT 8	2,111	Medium	2228,33	7%

The criteria for forming quality of each RT space is different. The criteria is seen from the high level of low value between the criteria of the quality of space in each RT. The criteria for the formation of kampong halls in RT 7 as RT with the highest quality of space is the criteria of social activities. The criteria that make the quality of the kampong space in the two RTs with the highest quality of kampong



halls after RT 7, RT 3 and RT 6 are the physical environmental criteria. While the criteria quality of kampung space in other RT is the criteria of reforestation. Although the criteria for setting up the quality of kampung space at each RT in RW 3 Sukun Sub District but the criteria of social activities, physical environment, and greening are the three criteria that most influence the quality of kampung. The level of criterion for the quality of space in each RT can be seen in Figure 6.

RT	Kriteria 1	Kriteria 2	Kriteria 3	Kriteria 4	Kriteria 5	Kriteria 6	Kriteria 7
RT 7	Kegiatan Sosial	Fisik Lingkungan	Penghijauan	Fasilitas Pengelolaan	Jalan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 3	Fisik Lingkungan	Penghijauan	Kegiatan Sosial	Fasilitas Pengelolaan	Jalan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 6	Fisik Lingkungan	Penghijauan	Kegiatan Sosial	Fasilitas Pengelolaan	Jalan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 1	Penghijauan	Fisik Lingkungan	Kegiatan Sosial	Fasilitas Pengelolaan	Jalan	Wadah Keg. Ekonomi	Tata Letak Permukiman
RT 2	Penghijauan	Fisik Lingkungan	Kegiatan Sosial	Fasilitas Pengelolaan	Jalan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 5	Penghijauan	Fisik Lingkungan	Kegiatan Sosial	Fasilitas Pengelolaan	Jalan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 4	Penghijauan	Kegiatan Sosial	Fisik Lingkungan	Jalan	Fasilitas Pengelolaan	Tata Letak Permukiman	Wadah Keg. Ekonomi
RT 8	Penghijauan	Fisik Lingkungan	Kegiatan Sosial	Jalan	Fasilitas Pengelolaan	Wadah Keg. Ekonomi	Tata Letak Permukiman

**Figure 5.** Level of criteria for the formation of the kampung space quality at each RT.

### 3.4. Analysis of Environmental Management Relationship with Quality of Kampung Space

**3.4.1. Typology Analysis.** The analysis of kampung typology was conducted based on the assessment of the percentage of residents conducting environmental management activities and the value of kampung space quality in each RT which was then compared with the respective mean score. A comparison value of spatial quality and environmental management with each mean score will divide the environmental management and the quality of the kampung space into two typologies: low and high. The results of typology analysis show that RW 3 Sukun Sub District consists of two types of typology, RT with low environmental management, low quality of village space and RT with high environmental management, high quality of kampung halls. Both types of typology explain that there is a relationship between environmental management with the kampung space quality.

**Table 11.** Kampung Typology with Two Interval Class.

RT	Environment Management Clasification	Kampung Space Quality Clasification	Kampung Typology
RT 1	Low	Low	Typology 1
RT 2	Low	Low	Typology 1
RT 3	High	High	Typology 4
RT 4	Low	Low	Typology 1
RT 5	Low	Low	Typology 1
RT 6	High	High	Typology 4
RT 7	High	High	Typology 4
RT 8	Low	Low	Typology 1

Correlation analysis is used to find correlation between environmental management activity conducted by citizen of RW 3 Sukun Sub District with the kampong space quality. Through correlation analysis will be known management of any environment that has a relationship with the kampong space quality. Correlation analysis in this study was conducted using Pearson Correlation test. Based on the results of correlation analysis between environmental management with the kampong space quality, only the persons and spaces of environmental management activities that have a relationship with the kampong space quality while the time of environmental management activities have no relation with the quality of space.

The result of correlation analysis shows that the activity of environmental management has relation with the kampong space quality because the value of Sig.  $< 0.1$ . Then  $H_0$  is rejected, meaning there is a significant relationship between environmental management activities with the kampong space quality. The relationship shows the higher activity of environmental management hence the higher value of kampong space quality. But not all environmental management activities have a significant relationship. Environmental management activities that are related to the kampong space quality include the persons of waste management activities, the persons of bio pore management activities, the person of reforestation activities and the kampong space that used for reforestation activities.

### 3.4.2. Correlation Analysis

**Table 12.** Environmental management activity correlation with kampong space quality.

Variable	Sig. (2-tailed)	Coefficient Correlation	Relations
waste management activities			
Pearson	.024	.776	Significant, strong, positive
biopori management activities			
Pearson	.035	.743	Significant, strong, positive
reforestation activities			
Pearson	.093	.632	Significant, strong, positive
Space			
• Street	.054	.699	Significant, strong, negative
• House Yard	.089	-.637	Significant, strong, negative

Explanation : Sig.  $< 0,1$  there is a significant relation ( $H_0$  rejected)

Sig.  $> 0,1$  there is no a significant relation ( $H_0$  accepted)

## 4. Conclusion

Based on the results of the analysis, the conclusion of the study "Relationship between Environmental Management with Quality of Kampong Space" include:

1. The results of typology analysis indicate that there is a relationship between environmental management and the quality of the kampong space.
2. The result of correlation analysis shows that the activity of environmental management has correlation with the quality of kampong space because the value of Sig  $< 0,1$ . The value of Sig shows  $H_0$  is rejected, the meaning is a significant relationship between environmental management activities with the quality of the kampong space. The relationship shows the higher activity of environmental management hence the higher the value of kampong space quality.
3. Based on the results of correlation analysis between environmental management with the quality of space, only the persons and spaces of environmental management activities that have a relationship with the quality of the kampong space while the time of environmental management activities have no relationship with the quality of space.
4. Environmental management activities that have relationship with the quality of the kampong space are among others the waste management activities, the persons of biopori management activities, the persons of reforestation activities and the space used for reforestation activities.

Overall, environmental management persons have the strongest relationship with the quality of the kampung.

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