

# Study of blue open space perception in riparian landscape of Ciliwung river

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**Abstract:** Bogor is a city with a high population density where located along of the middle part of the Ciliwung river watershed. The need settlement of low income community lead to the occupation and unplanned settlement on the riparian. The using of the riparian river as undeveloped area has impact to safety community and ecological system at the riparian and the blue open space (BOS). The objectives of this study were, to analysis the situation of the activities and perceptions community in two different locations. This research was conducted in Bogor City area, in Pulo Geulis and Griya Katulampa. The data perception were collected by purposive sampling method and analyzed by using Chi-Square test analysis. Based on landscape character and socio cultural of the community has different condition and situation between in Pulo Geulis ang Griya Katulampa. Based on the the result of perception in Pulo Geulis's, the background of age has the most influence while at Griya Katulampa were the educational and the education background the most influential aspect to the material aspects being tested. Based on its preference, in Pulo Geulis, the background of respondents' most influential character in responding it was the background of kind of work while in Griya Katulampa the background of origin, length of stay and education. Based on its preference, in Pulo Geulis, background of character respondents' that most influencial it was type of work while in Griya katulampa were origin, length of stay, and education.

**Keyword:** blue open spaces, riparian, Ciliwung River

## 1. Introduction

Bogor City potential to become a residential area and housing development supported by the regulation of Bogor City No 1 year 2000 about Spatial Planning, where Bogor City has function as residential city, commerce, industrial, tourism and education. The high demand of urban housing causes the need for land also increases exploited for development. Limited conditions of urban land lead to irregular population distribution. This has an impact on the conversion of protected lands into constructed land as in the Ciliwung River riparian section. This is due to the extent of land change patterns over a period of 30 years in the Ciliwung watershed, changes from water bodies to settlements of 76.39% of total extent of water bodies changed [1] as well as the economic condition of low-income communities which resulted in the inability of the community to build or rent a decent dwelling [2].

Communities utilize protected areas as a living activity space to perform various of social interaction in it and can change the face of a landscape. The spatial use pattern is the spread of cultivation and protection activities and their linkages to achieve social, economic and cultural development targets

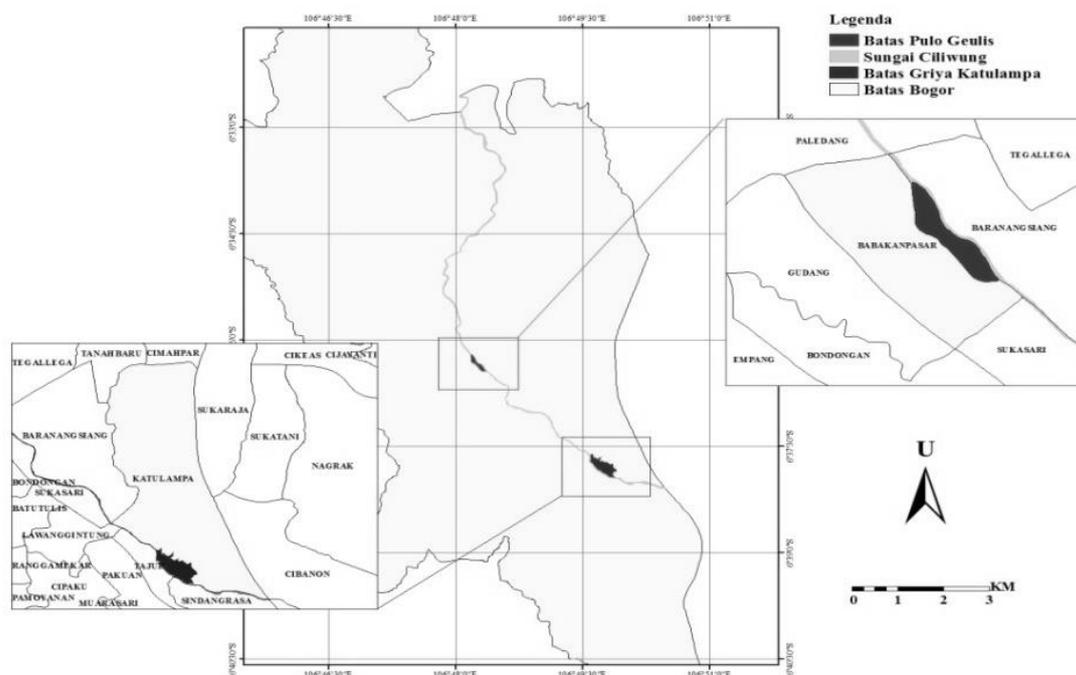


based on the potential of natural, human and artificial resources [3]. People with different educational backgrounds and economic conditions will influence people's perception of the existence of blue open space (BOS) in their daily life. The formation of a landscape is the result of a combination of interactions between various aspects of human resources, natural resources, artificial resources, social, cultural, economic, technological, information, administration, security defense, aquaculture protection function and environmental aesthetics, space and time dimensions which is in complete unity as well as qualified to form spatial planning [4]. The purpose of this study is to analyze the public perception of RTB.

## 2. Methods

### 2.1. Study Area and Sampling Technique

This research was conducted in Bogor City, in Pulo Geulis and Griya Katulampa (Figure 1). The study was conducted in four months, starting from January to April 2017.



**Figure 1.** Research location

This research used descriptive qualitative method to describe systematically and analyze public perception. The data were collected by literature study, documentation, interviews with resource persons (community and managers), and field survey. Data collected in aspects of physical condition, demography (population, population density, age, gender), social, culture, maps (location) and people's perceptions.

Method of collecting data perception by spreading the questioner to respondent by using purposive sampling method. The criteria of respondents that must be a local citizen, willing to be a respondent, is quite close to riparian river with a distance of about 10 m-30 m from the river, and limit of age respondents at least 17 years. The number of questionnaires distributed at the research sites was 60 copies each location getting 30 copies.

### 2.1. Data analyses

Perception data was analyzed using descriptive statistic method, Chi-Square test as a tool. This test was done with Statistical Product and Service Solution (SPSS) with  $\alpha = 0.05$ . The variables tested were seven respondents' background (gender, age, education, type of work, origin, tribe and length of stay) and questionnaire material consisting of five aspects (level of community knowledge, utilization, comfort, visual, and policy). The percentage of respondent characteristics backgrounds in Pulo Geulis and Griya Katulampa can be seen in Table 1. The result of the respondent's perception is seen from the influence of the respondent's character background on the questionnaire material tested in Pulo Geulis and Griya Katulampa.

**Table 1.** Percentage of respondent characteristics

Respondent's character	Category	Percentage (%)	
		Pulo Geulis	Griya Katulampa
Gender	Male	43.33	53.33
	Female	56.67	46.67
Age (year)	17-25	6.67	6.67
	26-65	90	86.67
	66-75	3.33	6.67
Education	No school	0	0
	Elementary school	40	6.67
	Junior high school	36.67	6.67
	Senior high school	16.67	50
	Diploma	6.67	10
Type of work	College	0	26.67
	Does not work	3.33	0
	PNS/ TNI/ POLRI	0	13.33
	Entrepreneur	23.33	20
	Student / Student	333	10
	The Informal Sector	30	16.67
Origin	Housewife	40	40
	Native	73.33	16,67
Tribe	Comer	26.67	83,33
	Sundanese	86.67	53.33
	Chinese	6.67	10
	Javanese	3.33	23.33
Length of Stay (year)	Others	3.33	13.33
	01-10	6.67	40
	10-20	10	13.33
	20-30	13.33	43.33
	30-40	20	3.33
	40-50	23.33	0
	50-60	16.67	0
60-70	10	0	

### 3. Results and Discussion

The result of the respondent's perception is seen from the influence of the background of the respondent's character toward the perception of the questionnaires tested on Pulo Geulis and Griya Katulampa. The seven backgrounds of the respondents are gender, age, education, type of work, origin, tribe and length of stay. The questionnaires tested consisted of five aspects: level of community knowledge, utilization, comfort, visual, and policy (regulation). The background of respondent's gender affects the material aspects of the questionnaires tested at the Pulo Geulis site in the aspects of utilization, comfort and policy while in Griya Kayulampa affect the visual and policy aspects. Background age of respondents influence on the questionnaire material tested in Pulo Geulis is on the material level of knowledge, utilization, comfort, and policy while in Griya Katulampa is on the material level of knowledge of

respondents. Respondent's educational background influences the questionnaires that are tested in Pulo Geulis that is on the material level of knowledge, utilization, convenience, and policy while in Griya Katulampa that is influential on material utilization, visual and policy. The background of the respondent's work affects the questionnaires tested in pulo geulis on the material of utilization, comfort, and policy while in Griya Katulampa that is on the comfort and visual material. Background of the respondent's influence on the questionnaires tested in Pulo Geulis is on the material level of knowledge, comfort, and policy while in Griya Katulampa that is only on the material utilization and visual. The background of the respondent's tribe has no effect on the material being tested either on location at Pulo Geulis and Griya Katulampa. Background of respondents' long life affect the questionnaires material tested in Pulo Geulis is on the material level of utilization and comfort while at the Griya Katulampa that is on the material utilization, comfort, visual and policy.

In knowledge aspects, the character of respondents background that influential in Pulo Geulis were education, age and origin while in Griya Katulampa the influence background was age (Table 2). Related aspects of knowledge in Pulo Geulis, on the material the function of blue open space is influenced by the educational background of junior high school graduates provide the highest response 26.67% do not understand. This showed that the educational background of respondents in the age of productive age was still relatively low affects the weak knowledge of responders related of BOS either from definition, type, or function. Material of river as one of blue open space influenced by background respondent's of age and origin, age of 26-65 years give highest response 60% do not understand and indigenous people give highest response 40% strongly agree. One's perception of the quality of a landscape was determined by the strong interaction between one's variables and one's knowledge of the landscape [5]. Related to the level of knowledge in Griya Katulampa, the material of water as the source of life was influenced by the background of age 26-65 years gives the highest response 66.67% strongly agree. Water is not only to demand of the needs of human life but also for all living things. The presence of blue open space has a positive impact on improving people's mental health [6]. River utilization material has been used in accordance with the function influenced by the age background, age 26-65 years gave the highest response 50% strongly agree. Based on the results shown by productive age (26-25 years) in Griya Katulampa was very responsive to knowledge about water which become an important part in life must be utilized in accordance with its function in daily life. The productive age has the highest level of knowledge in a community that was influenced by the number of interaction activities with its environment so that it can see, hear and obtain more the information [7].

In utilization aspects, the character of respondents background that influential in Pulo Geulis were gender, age, education, occupation and length of stay while in Griya Katulampa were education and origin (Table 3). Related to the aspect of utilization in Pulo Geulis, on the material of water source used in daily life age of 26-65 years 63.33% choosed to use river, and elementary and junior high school background as much as 36.67% have used PDAM. Based on the results, productive age was an active user of the river in daily activities other than the river as a source of water utilized, educational background it affects respondents to utilize PDAM water sources mainly for consumption in daily life. Materials of river as household waste and garbage was influenced by background of age 26-65 years give the highest response 87.67% disagree. Public perceptions were reflected of behavior that affects to the environment, due to the cleanliness caused by many residents who throw garbage in the river causing the impression of a slum and smell [8]. Material of utilization of water in the right way affects the quality of the environment, age group 26-65 years gives the highest response 86.67% agreed. However, the condition of the river in Pulo Geulis was very in bad conditions so its was not to be used as a source of water in daily life caused by the amount of waste in the river. Related to the material of river used in daily life, 16.67% of men use river as gathering place, 26.67% of men and 6.67% do not work as fishing grounds, and 6.67% entrepreneur use river for fishing and keramba, 30% housewives and 16.67% length of stay 50-60 years using the river as a bath, and 10% length of stay 60-70 years using the river as a toilet. Activities carried out by the community in the river, especially men with background of freelance, visited the river either just to sit or spending time to fishing, while housewives and also

people who have lived over 50 years come to the river to using river to daily activities (washing, bath and toilet).

**Table 2.** Result of Chi-Square test of respondent's perception on knowledge aspects

No	Aspects of Knowledge	Gender		Age		Education		Type of work		Origin		Tribe		Length of Stay	
		Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya
1	Water as a source of life	0.10	0.61	0.36	<b>0.04*</b>	0.54	0.54	0.46	0.32	0.83	0.49	0.26	0.93	0.66	0.43
2	The function of the blue open space	0.06	0.17	0.94	0.52	<b>0.00*</b>	0.50	0.23	0.16	0.14	0.29	0.87	0.92	0.48	0.30
3	River as one of the blue open spaces	0.11	0.13	<b>0.02*</b>	0.82	0.17	0.89	0.15	0.18	<b>0.03*</b>	0.46	0.93	0.16	0.55	0.25
4	Utilization of the river has been in accordance with the function	0.64	0.35	0.55	0.06	0.06	0.80	0.59	0.34	0.12	0.82	0.88	0.46	0.17	0.53

Description Value  $\alpha = 0.05$  if test value  $> 0.05$ , then the tested background is not mutually tied (free) with questionnaire material in question. when the test value  $< 0.05$ , then the tested background is tied to the questionnaire material in question. bold print (\*), showing test values  $\alpha < 0.05$ .

**Table 3.** Chi-Square test results of perceptions of respondents on utilization aspects

No	Utilization Aspects	Gender		Age		Education		Type of work		Origin		Tribe		Length of Stay	
		Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya
1	Benefits of water in daily life	0.37	0.92	0.16	0.70	0.86	0.10	0.07	0.28	0.27	0.51	0.98	0.14	0.66	0.93
2	Water resources in daily life:														
a	River	0.25	0.28	<b>0.00*</b>	0.79	0.67	0.91	0.49	0.82	0.54	<b>0.02*</b>	0.98	0.82	0.16	0.72
b	wells	0.87	0.74	0.81	0.19	0.22	0.59	0.86	0.38	0.14	0.13	0.82	0.53	0.44	0.33
c	PDAM	0.35	0.92	0.31	0.69	0.05	0.11	0.11	0.52	0.42	<b>0.00*</b>	0.45	0.39	0.18	<b>0.02*</b>
d	Water springs	0.43	0.70	0.36	0.92	0.98	0.72	0.21	0.72	0.61	0.74	0.57	0.68	0.16	0.58
3	River as a place of disposal of household waste and garbage	0.11	constant	<b>0.00*</b>	constant	0.67	constant	<b>0.00*</b>	constant	0.43	constant	0.99	constant	0.69	constant
4	Utilization of water in the right way affects the quality of the	0.85	0.24	<b>0.00*</b>	0.90	0.73	<b>0.02*</b>	0.08	0.41	0.70	<b>0.03*</b>	0.10	0.36	0.12	0.83

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Description Value  $\alpha = 0.05$  if test value  $> 0.05$ , then the tested background is not mutually tied (free) with questionnaire material in question. when the test value  $< 0.05$ , then the tested background is tied to the questionnaire material in question. bold print (\*), showing test values  $\alpha < 0.0$

In comfort aspects, the character of respondents background that influential in Pulo Geulis were gender, age, origin, and length of stay while in Griya Katulampa length of stay and type work (Table 4). In Pulo Geulis related to the material of the comfort level around the river was influenced by the background of male which gives the highest response 26.64% less comfortable. Related to the material of comfort level when interacting with the river was directly affected by the ages of 26-65 year age provides the highest response 43.33% comfortable. The perception of the individual depends on his psychological state affecting his vision, taste, smell, hearing and touch [5]. Related to the comfort level material aspects at Griya Katulampa, the material level of comfort when interacting with the river was directly influenced by the background of long stay, the length of stay 20-30 years provide the highest response 26.67% comfortable. The Griya Katulampa community in general were comers with a length of stay more than 20 years still quite comfortable with the river existing condition, it was because the spatial condition of the housing located not directly on the edge of the river then no decreased direct interaction with the river. The comfort level of residential homes, the length of stay 1-10 years provides the highest response 30% comfortable. For the condition of the residential, people felt still quite comfortable and worthy to be occupied because of the environment that was still in good condition, especially protected area like the green line on riparian rivers and springs. The reason for choosing the location of the current residence of 36.67% housewife felt quite comfortable with the current occupancy because there has high society tolerance, due to high diversity and heterogeneity of society around there.

In visual aspects, the character of respondents background that influential in Griya katulampa were gender, education, occupation and origin (Table 5). Related to the visual material aspects in Griya Katulampa, the material of the river was influenced by educational background, high school graduates provide the highest response 26.67% less comfortable. Related to the level of comfort visual spacial arrangement, educational background of high school graduates provides the highest response 30% less comfortable. The level education of community was very influential on the assessment of the visual quality of the river, it can be concluded that the difference background status of educational that was part of the internal factors affected perception of the visual quality of the landscape. The perception of a person was not only influenced by internal factors but also external factors that was in the form of the stimulus itself and the circumstances in which the perception takes place [9]. Housewives were as a lower-frequency group doing activities outside the home compared to workers who work outdoors daily so that it affects their perception with what was seen and felt when looking at the environment. In addition, good visual conditions greatly affect the quality of life of the community. People living with BOS view shown that they have a more comfortable life with a more positive emotional level [10].

In policy aspects, the background of influential character of respondents in Pulo Geulis were gender, age, occupation, and origin while in Griya Katulampa were gender, education, and length of stay (Table 6). Related materials of the have been aware of policies and regulations regarding the use and protection of river areas, borders and the surrounding environment, the native people providing the highest response 40% already know. Based on this it can be seen that most people in Pulo Geulis already know and realize that the policy that protects the river area legally. The materials of the application of policies and regulations in the right way were influenced by the background of age and occupation, age of 26-65 years gave the highest response 36.67% and 13.33% of housewives rate was not appropriate. It also proves that the level of public awareness in running the rules and policies that have been set still very far from the word accordingly so that there are still many violations that cause environmental contamination. In Griya katulampa related to the material of the extent to which policies and regulations have been affected were influenced by gender and type of work backgrounds, 26.67% of men, 20% of housewives, and the informal sector rate the policies that were only partially implemented.

**Table 4.** Chi-Square test results of respondents' perceptions of comfort aspects

No	Comfort aspects	Gender		Age		Education		Type of work		Origin		Tribe		Length of Stay	
		Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya
1	Comfort levels around the river	<b>0.02*</b>	0.26	0.53	0.14	0.78	0.08	0.59	0.37	0.17	0.15	0.65	0.07	0.68	0.40
2	Comfort level when interacting with the stream directly	0.50	0.72	<b>0.02*</b>	0.12	0.97	0.14	0.77	0.90	0.55	0.58	0.34	0.73	0.87	<b>0.02*</b>
3	The level of comfort of residential homes today	0.64	0.72	0.14	0.06	0.53	0.09	0.76	0.85	0.64	0.21	0.71	0.69	0.88	<b>0.01*</b>

Description Value  $\alpha = 0.05$  if test value  $> 0.05$ , then the tested background is not mutually tied (free) with questionnaire material in question. when the test value  $< 0.05$ , then the tested background is tied to the questionnaire material in question. bold print (\*), showing test values  $\alpha < 0.05$ .

**Table 5.** Chi-Square test results of perceptions of respondents to the visual aspects

No	visual aspects	Gender		Age		Education		Type of work		Origin		Tribe		Length of Stay	
		Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya
1	Visuals of the river affect the quality of the environment	0.25	0.75	0.08	0.26	0.13	0.21	0.39	0.77	0.08	0.53	0.50	0.44	0.14	0.93
2	The visual level of the river	0.64	0.57	0.62	0.99	0.59	<b>0.00*</b>	0.67	0.28	0.29	0.60	0.41	0.10	0.79	0.91
3	Level of comfort of visual arrangement	0.69	0.33	0.22	0.86	0.97	<b>0.00*</b>	0.12	0.53	0.62	0.74	0.23	0.27	0.43	0.40

Description Value  $\alpha = 0.05$  if test value  $> 0.05$ , then the tested background is not mutually tied (free) with questionnaire material in question. when the test value  $< 0.05$ , then the tested background is tied to the questionnaire material in question. bold print (\*), showing test values  $\alpha < 0.05$ .

**Table 6.** Chi-Square test results of perceptions of respondents on the policy aspects

No	Policy Aspects	Gender		Age		Education		Type of work		Origin		Tribe		Length of Stay	
		Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya	Pulo	Griya
1	Knowing the policies and regulations regarding the use and protection of river areas, borders and the surrounding environment	0.09	0.26	0.53	0.23	0.62	0.35	0.45	0.28	<b>0.03*</b>	0.14	0.62	0.89	0.14	0.25

2	Conformity in the application of policies and regulations	0.27	<b>0.03*</b>	<b>0.00*</b>	0.60	0.92	0.43	<b>0.00*</b>	0.21	0.54	0.74	0.30	0.42	0.45	0.27
3	The extent to which policies and regulations are in place	<b>0.03*</b>	0.75	0.96	0.75	0.56	0.08	<b>0.01*</b>	0.37	0.44	0.82	0.09	0.22	0.58	0.54

Description Value  $\alpha = 0.05$  if test value  $> 0.05$ , then the tested background is not mutually tied (free) with questionnaire material in question. when the test value  $< 0.05$ , then the tested background is tied to the questionnaire material in question. bold print (\*), showing test values  $\alpha < 0.05$ .

## Conclusion

Based on the physical condition of the landscape and socio-cultural background of the community, there are differences in landscape character and community behavior between Pulo Geulis and Griya Katulampa on the utilization of water in daily activities and their interaction with RTB. Based on the perception, in Pulo Geulis, the background of age is the background that has the most relevance to the four aspects of the five aspects that are tested on the aspects of knowledge, utilization, comfort, and policy while in Griya Katulampa educational background that has the highest linkage to the three aspects of the five aspects tested. Educational backgrounds have relevance to aspects of utilization, visual, and policy.

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