Spatial differentiation of community participation on urban forest management at Jakarta Capital City

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Abstract. Climate change that occurs in Indonesia can lead to the increase in urban areas temperature, which makes the forest’s role to control the urban microclimate is important. Urban Forest in Jakarta adjacent to the settlement, hence it is important to determine the participation and perception of the surrounding community in urban forest management. The management consists of planning, maintenance, protection, utilization and monitoring. This study observed two urban forests, namely Rawa Malang and Srengseng Sawah, which are located separately from each other. The urban forest was divided into three clusters, i.e: one cluster located close to the urban forest and two other clusters located farther away from the urban forests. The purposes of this study are to analyze the spatial pattern of community participation in urban forest management and to describe the factors influence perception and participation. Questionnaires distributed to 180 respondent (90 respondent at each urban forest), and the data were analyze using Scoring System and regression. The result showed the participation of the society which is influenced by four variables. Community participation in urban forest management is not influenced by the level of community education, but by good urban forest conditions.

1. Introduction
Climate change phenomenon occurs due to human activities, thus making an impact on urban areas such as environment, health, politics and social phenomena. According to Septriana et. al [1], converting RTH (Green Open Soace) into buildings and industries in the urban area will cause the reducing of oxygen. The high population density in urban areas makes the increasing is required. Balancing the needs of space with human activities that are with the closure of vegetation in the urban areas is needed.

According to Olmsted [2], trees are the most important thing in urban areas because it can filter air or become the lungs of the city. According to Undang-undang Republik Indonesia No. 26 the years 2007 about Spatial Planning, at least 30% of the area is a green open space. One form of green open space is the urban forest. Based on Government Regulation No. 63 of 2002, the Urban forest is an expanse of land that grows compact trees and meetings in urban areas both on state land and land rights, which are designated as urban forests by authorized officials.

The emergence of environmental problems that occur in urban areas is caused by the lack of harmonious relations between humans and the urban environment. According to Ren [3], human activities have an effect on the existence of urban forests. Therefore, the existence of urban forests in urban areas, especially DK1 Jakarta, is influenced by the perception and community participation in the forest management activities of the city of DK1 Jakarta.
Participation is the most important thing in managing urban areas, especially if there is a relationship or direct contact with the area where people live. Participation is the involvement of the community in the decision-making process, implementation, utilization, results and evaluation [4]. Factors that influence the level of participation are internal factors. Internal factors consist of gender, status in the household, level of education, ethnicity, religion, language, occupation, level of income, the distance of house to location, and ownership of land (building). Participation is influenced by the perception of each individual who is influenced by two factors namely structural factors and functional factors.

Based on the background, this study aims to determine the level of community participation in urban forests management, and analyzing the spatial pattern of community participation in urban forest management.

2. Methodology

2.1. Research approach

This study using a quantitative approach, as a method to test variables and see the relationship between variables using appropriate supporting data [5].

2.2. Research sites and data collection techniques

This study conducted in 2 research locations, divided into 2 urban forests, namely Kota Rawa Malang Forest (North Jakarta) and Srengseng Sawah Urban forest (South Jakarta). This study, the urban forest that was examined in the form of clustered or centralized with a minimum number of 100 trees with irregular density [6].

The Location was determined by purposive sampling. Purposive sampling is a technique that takes samples with certain consideration. In addition, the selection of objects is based on certain characteristics that are considered to have a connection with population characteristics that have been known before, in other words adapted to certain criteria based on research objectives. This study divided into three villages namely Semper Timur Village, North Jakarta, Srengseng Sawah Village and Ciganjur Village, South Jakarta.

The target of this study is for respondents who live in the vicinity of the urban forest or directly adjacent to the urban forest area. Precisely in two urban forests in the province of DKI Jakarta. Determination of the community living in the vicinity of the urban forest is divided into 3 based on the distance of the residence with the urban forest. The stipulation based on purposive sampling. Data collection used questionnaire techniques to 180 respondents, with each of 90 respondents per urban forest. Determination of the number of respondents done using Quota Sampling by looking at special characteristics [7].

In this study, Community Perception on urban forests uses a Likert scale. The measurement aims to see people's views on urban forests on social, economic and environmental life.

| Scale | 1 | 2 | 3 | 4 |
|-------|---|---|---|---|
| Answer Choice | Strongly Disagree | Disagree | Agree | Strongly Agree |

This scale is made by the author to conduct a qualitative assessment. The results obtained from the perception questionnaire are processed using SPSS, which will then be interpreted using sentences that are easily understood by the readers.

Measurement of community participation in urban forests, referring to the Ministry of Forestry's Regulation of the Republic of Indonesia Number: P17/Menhut-II/2009 and the Governor of DKI Jakarta Regulation No.17 of 2017 concerning Implementation of Urban forests. Based on the regulation, the form of Urban forest management includes 5 stages: (1) Develop a management plan (setting goal, determination of short and long terms programs, establishment of activities and institutions, and
establishment of a monitoring system), (2) Maintenance (optimization of growing space and quality of place to grow), (3) Protection and security (deforestations, theft Flora and Fauna, forests fire, and plants pest and diseases), (4) Benefit (recreations, educations, and forest product), and (5) Monitoring and Evaluation.

3. Result and Discussion
In this study, urban forests are located in two types, namely urban forests in industrial areas and urban forests in residential areas. Urban forests in industrial areas are located in Rawa Malang Urban Forest, while residential areas are located in Srengseng Sawah Urban Forest.

3.1. Rawa Malang Urban Forest
Rawa Malang Urban Forest located around settlements which are included in industrial areas in North Jakarta. In table 2 can be seen the demographic conditions of respondents around the Rawa Malang Urban Forest. Rawa Malang Urban Forest located at Semper Timur, at this location a total population of 41,751 inhabitants consisting of 21,134 people was male and 20,617 were female. With a comparison of 50.6% men and 49.3% are women.

Table 2. Demographic characteristic respondant Rawa Malang Urban Forest, Jakarta Utara

| Demographic Characteristic          | Frequency |
|------------------------------------|-----------|
| **Gender**                         |           |
| Male                               | 62        |
| Female                             | 28        |
| **Marriage Status**                |           |
| Married/widowed/divorced           | 82        |
| Single                             | 8         |
| **Family size**                    |           |
| 0                                  | 1         |
| 1-3                                | 26        |
| 4-6                                | 63        |
| **Age**                            |           |
| 21-30                              | 13        |
| 31-40                              | 31        |
| 41-49                              | 29        |
| 50-70                              | 17        |
| **Education**                      |           |
| No Formal Education                | 0         |
| Primary School – Senior High School| 86        |
| Diploma – Master                   | 4         |
| **Employer**                       |           |
| Government employees               | 0         |
| Private employees                  | 40        |
| Self Employees                     | 19        |
| Students                           | 0         |
| Housewife                          | 28        |
| Not employed                       | 0         |
| others                             | 3         |

Source: Personal Data, 2018
In Rawa Malang Urban forest, around 82 respondents are married people. The last education of 86 respondents is elementary or junior high school, while 4 others is diploma graduate even S2. Most of the female respondents living in the vicinity of Rawa Malang Urban Forest were housewives, amounting to 36 respondents, after which many worked in private companies and 17 respondents were self-employed. The location of respondents was obtained based on the distance between the respondent's house and the Rawa Malang Urban Forest.

3.2. Srengseng Sawah Urban Forest
Srengseng Sawah Urban forest located in a residential area of South Jakarta. Table 3 shows the demographic conditions of respondents in the vicinity of Srengseng Sawah Urban forest.

| Demographic Characteristic | Frequency |
|----------------------------|-----------|
| Gender                     |           |
| Male                       | 52        |

Table 3. Demographic characteristic respondent Urban Forest Srengseng Sawah Jakarta Selatan
| Marriage Status           | Count |
|--------------------------|-------|
| Married/widowed/divorced | 78    |
| Single                   | 12    |

| Family size             | Count |
|-------------------------|-------|
| 0                       | 11    |
| 1-3                     | 23    |
| 4-6                     | 56    |

| Age                     | Count |
|-------------------------|-------|
| 21-30                   | 14    |
| 31-40                   | 16    |
| 41-49                   | 9     |
| 50-70                   | 51    |

| Education               | Count |
|-------------------------|-------|
| No Formal Education     | 3     |
| Primary School – Senior High School | 83 |
| Diploma – Master        | 4     |

| Employer                | Count |
|-------------------------|-------|
| Government employees    | 15    |
| Private employees       | 23    |
| Self Employes           | 4     |
| Students                | 4     |
| Housewife               | 30    |
| Not employed            | 4     |
| others                  | 14    |

Source: Personal Data, 2018

Srengseng Sawah Urban forest located in two villages, namely Srengseng Sawah Village and Ciganjur Village. The total population of Srengseng Sawah village was 73,493, consist 37,185 male and 36,308 female, with a ratio of 51% male and 49% female. The total population of Ciganjur village was 48,622 inhabitants, consisting of 24,534 males and 24,088 females, with a ratio of 50% males and 50% females.

**Figure 5.** Level education responden Srengseng Sawah Urban Forest, South Jakarta

**Figure 6.** Community income at the research location in Srengseng Sawah Urban Forest, South Jakarta
Figure 7. Type of work of the respondents in Srengseng Sawah Urban Forest, South Jakarta

Figure 8. Distance respondent to Srengseng Sawah Urban Forest, South Jakarta

In Srengseng Sawah City Forest approximately 78 respondents are married people. The last education of 83 respondents is elementary or junior high school, while, 4 other is diploma graduate even S2, and 3 respondent have not formal education. In this research location, 30 female respondents were housewives and 23 respondents were self-employed.

Table 4. Regression analysis all of research location

| Variable   | Model 1 Overall | Model 2 North Jakarta | Model 3 South Jakarta |
|------------|----------------|-----------------------|-----------------------|
| Education  | 0.144          | -0.210                | 0.851                 |
| Income     | 3.59 x 10^{-7} | 2.423 x 10^{-7}      | 3.494 x 10^{-7}      |
| Distance   | -0.005         | -0.004                | -0.002                |
| Perception | 0.603          | 0.433                 | 0.585                 |

Source: Personal Data Processing, 2018

The relationship between respondent's house distance and participation was negative in South Jakarta and North Jakarta. The negative value (r = -0.004) in North Jakarta means there is a negative and significant relationship, while in South Jakarta has a negative value (r = -0.002), means there is a negative and significant relationship by emphasizing the community towards urban forests. Overall both North Jakarta and South Jakarta have negative values, which means the distance between respondents and urban forests affects the level of community participation. the closer the distance between respondents and urban forests, the higher the level of community participation in urban forest management. The survey results in Rawa Malang Urban Forest can be seen in tables 6, while the explanation of Srengseng Sawah Urban forest can be seen in tables 7.

Table 5. Community participation level in all research location

|                         | N  | Minimum | Maximum | Mean  | Std. Deviation |
|-------------------------|----|---------|---------|-------|----------------|
| Community Participation | 180| 56.00   | 86.00   | 70.6889 | 5,99468        |
| in Urban Forest         |    |         |         |       |                |
| Valid N (listwise)      | 180|         |         |       |                |

Source: Personal Data Processing, 2018

In this study, we examined 4 variables, namely education level, community income, the distance of the house with the urban forest and community perception of urban forest. Community Perception
consists of the importance of urban forests in place of residence; positive and negative impacts of urban forests on settlements; the desire of the urban forest to be better; view of urban forests as a deterrent to disasters in urban areas. The factor of education is considered important, the higher the education of a person must have extensive knowledge of development and the procedures for participation given [8]. Based on Table 4, it was found that the level of education was not significant, or the level of education did not affect community participation in managing urban forests. In previous research conducted by Ol [9]. The level of education is a factor that influences people to participate. According to Arnstein [10], the ability of people to participate in a program is influenced by the level of education. In this study there is no relationship that influences community participation from the level of education, because the community at the location of this study chose to participate not because of the knowledge of the urban forest but because of the good condition of the urban forest. The relationship between community income and community participation is positive, which means that the higher the level of community income, the higher the level of community participation both in North Jakarta and South Jakarta, as a whole is significant with the correlation coefficient.

| Community participation level in Rawa Malang Urban Forest | N   | Minimum | Maximum | Mean  | Std. Deviation |
|---------------------------------------------------------|-----|---------|---------|-------|----------------|
| Community participation in Rawa Malang Urban Forest     | 90  | 64.00   | 82.00   | 73.3667| 4.27286        |
| Valid N (listwise)                                      |     |         |         |       |                |
| Source: Personal Data Processing, 2018                  |     |         |         |       |                |

| Community Participation Level in Srengseng Sawah Urban Forest | N   | Minimum | Maximum | Mean  | Std. Deviation |
|-------------------------------------------------------------|-----|---------|---------|-------|----------------|
| Community participation in Srengseng Sawah Urban Forest      | 90  | 56.00   | 86.00   | 68.0111| 6.28623        |
| Valid N (listwise)                                          |     |         |         |       |                |
| Source: Personal Data Processing, 2018                      |     |         |         |       |                |

Based on table 6, the level of community participation in the Rawa Malang Urban Forest is 73.3667 greater than the level of community participation in the Srengseng Sawah Urban Forest. Based on the results of the study, the level of community participation in Rawa Malang Urban Forest is influenced by the condition of the Urban Forest itself. In addition, Rawa Malang Urban Forest has good facilities compared to the Srengseng Sawah city forest (can be seen in the picture below).
Society is a social factor that has high mobility in preserving and damaging the environment [11]. Therefore, public perception is the thing that makes people do positive or negative actions towards something. Community perceptions of urban forests have a significant value, which means that community perceptions of urban forests affect community participation in managing [12]. In this study, the two urban forests have different environmental conditions. The condition of the Rawa Malang City Forest is better and open to the public and able to facilitate the community to travel in the City Forest. The condition of Srengseng Sawah City Forest does not seem to facilitate the community to be able to travel to the City Forest, the acknowledgment was stated by the resident management, Pak RW (as the community leader) in the interview below.

"Srengseng Sawah Urban Forest is good for settlements and help the residents to realize that urban forests have a good impact on shelter, such as getting cool air, avoiding flooding and protecting our ground water ... but with Urban forest conditions were always closed, making residents more choose not to enter because of fear if it required to pay"

4. Conclusion
Each urban forest has its own characteristics. Participating in the management of the City Forest cannot be seen from the level of education and income of the people around the urban forest. Communities around urban forests want to participate in urban forest management because urban forests have a positive impact on their lives. In addition, the distance of the respondent's house to the urban forest affects community participation in managing urban forests.

Regional differences in urban forests do not affect community participation in urban forest management. Overall the level of community participation in good management in Malang City Rawa Forest and Srengseng Sawah Urban Forest is influenced by the distance, income and public perception of urban forests.

Therefore, community participation in urban forest management is the most important thing in maintaining the city's climate in urban forests. Community participation in maintaining the climate condition in urban areas is the main thing especially for people who live in the vicinity of urban.

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