The actual use of urban forest for Jakarta's dwellers

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Abstract: Urban forest is urban landscape feature serves as recreation area for urban dwellers. Jakarta has 15 urban forests spread all over Jakarta. Urban forest is urban landscape feature serves as a recreation area for urban dweller. How the actual use of urban forest by Jakarta city's dwellers is important to evaluate. The objective of this study were to analyse the extent of each urban forest coverage can reach by walk and how many dwellers's villages were visiting the urban forest from inside and outside Jakarta. This study combined field based interviews of urban forest's visitors with GIS analysis. As a result, University of Indonesia (UI) Forest (55 ha) and Dukuh Forest (0,58 ha) were identify as the largest (36 villages, 6.696,38 ha) and smallest urban forest (2 villages, 38,20 ha), respectively. Overall 73,33% visitors came from within the urban forest coverage area, whereas the rest (26,66%) came from outside. Therefore the actual use of urban forest has proven that urban forest as one of recreation area for Jakarta city's dwellers.

Keywords: dwellers, urban forest, urban landscape

1. Introduction

Urban forest is the expanse of land with cohesive and dense trees in urban areas, both on state land and authority land that have been set by the goverment. Urban forest can serve as a dweller recreation area [3]. As a recreational area, urban forests were used as a gathering place and doing their daily activities [1]. People who visits urban forests will feels happier, relaxed, calm, and feel closer to nature. Urban forests also have a positive influence on visitors for the activities they do [9].

Jakarta is one of the largest cities in Indonesia (66,150 ha). Jakarta has 15 urban forests with the total area 9.97% spread all over Jakarta [2, 6]. Urban forest is one of the green open space for dweller as a recreation area. Urban forest should be easily accessible and close to dwelling area, especially for the dweller who lives around the urban forest in radius 5-10 minutes by walk. The distance between urban forest and dwelling area is between 300 - 500 m [5].

Urban forest should be located in the settlement area and place for dweller activities [7]. Dwellers will use urban forests based on the facilities and design of the urban forests [11]. Urban forest has important thing to increase the urban social side. For example, if urban forest has good accessibility, crop structure is preferred by the dweller, good facilities, and complete infrastructure, it will increase visitors attract. In this study, we tried to analyze the extent of

each urban forest coverage can reach by walk and how many dwellers were visiting the urban forest from inside and outside Jakarta.

2. Methodology

This study was conducted in 15 urban forest located in Jakarta (fig 1), at coordinates 607'0 " latitude - 6024'00 " latitude and 106040'30 " longitude - 106058'30 " longitude. This research consisted of data collection, field survey, interview, and data analysis. Visitors sampling method was done by non-probability sampling approach through convenience sampling method, thats mean respondent was in the research location and willing to be interviewed. Total visitors sampling for this research were 120 visitors.
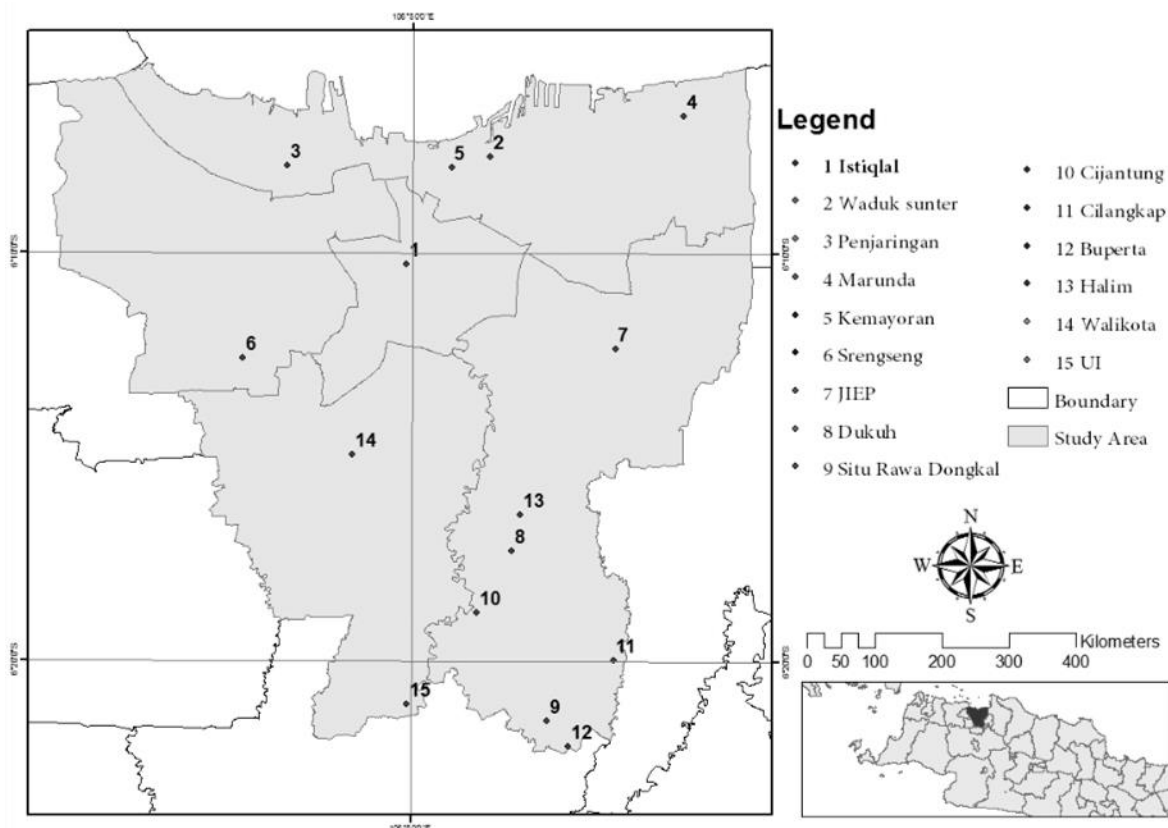

Figure 1. Study Area

The analysis was done using ArcGIS tools with buffer analysis. A buffer analysis is a method of analysis in the form of a region or zone of a certain distance around a physical entity, such as a point, line or polygon that has been defined [8]. The required information in this stage of analysis was a map of urban forest distribution in Jakarta and the area of urban forest. Each map was done by overlay analysis. Then buffer analysis was used to find out the extent to which urban forests can be driven by urban communities by walk. Buffer analysis for each urban forest are different depend on the extent of urban forest area, modified (Table 1).
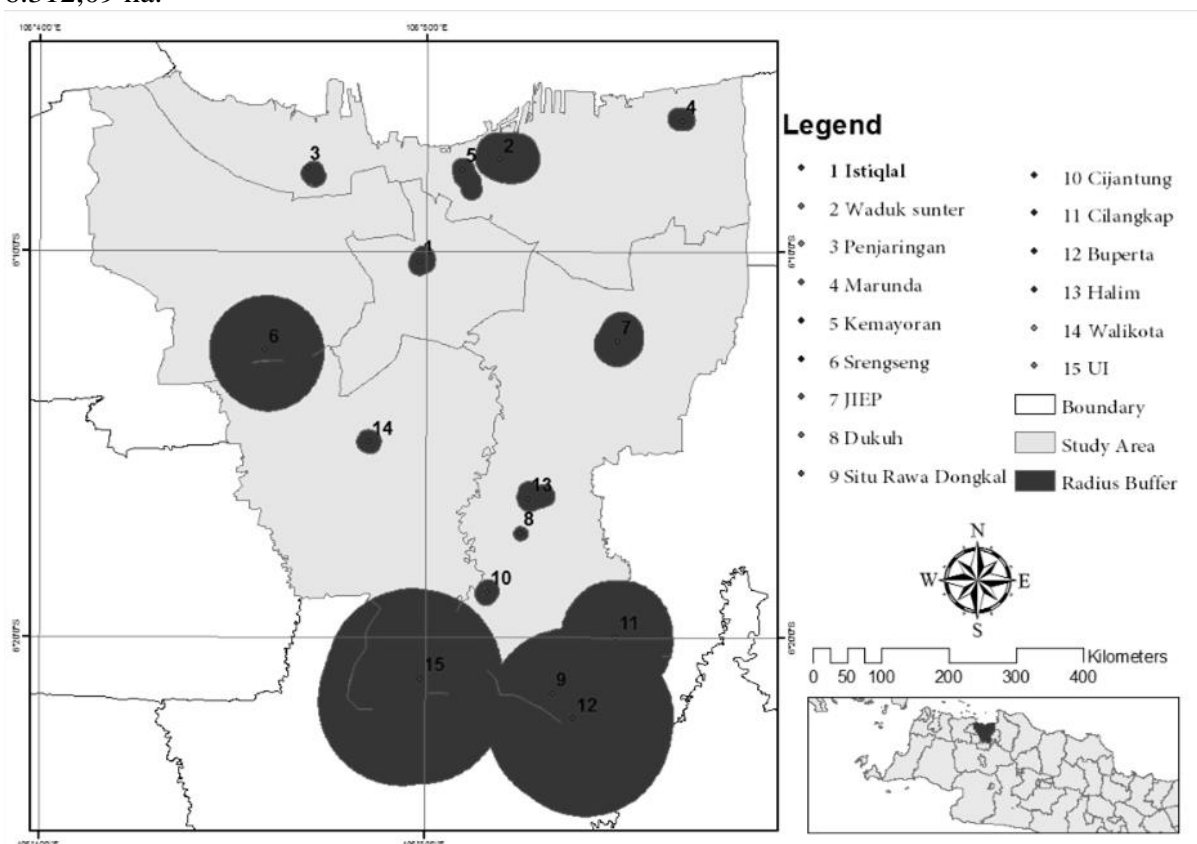
Table 1. Area and range of urban forest by walk

No	Urban Forest Area (ha)	Radius Buffer (km)
1	>20	>4
2	20	4,0
3	18	3,5
4	16	3,0
5	14	2,5
6	12	2,0
7	10	1,5
8	8	1,0
9	2	0,5
10	<2	0,3

Source: [12]

3. Results

The results shown that urban forest can coverage many villages in Jakarta (fig 2). The largest urban forest in Jakarta is Univesity of Indonesia forest (55,46 ha). University of Indonesia forest can coverage 36 villages with total area coverage is 6.696,38 ha (table 2). Furthermore, the second largest urban forest is Bumi Perkemahan Cibubur forest (27,32 ha). Bumi Perkemahan Cibubur forest can coverage 25 villages around urban forest with the total coverage area is 6.312,09 ha.

Figure 2. Buffering Area of Urban Forest

The smallest urban forest in Jakarta is Dukuh forest (0,58 ha). Dukuh forest can coverage only 2 villages around urban forest. The total area that Dukuh forest can coverage is 30,20 ha. The second smallest urban forest is Blok P forest (1,64 ha). Blok P forest can coverage 3 villages with the total coverage area is 106,94 ha.

In the Fig 5 shown that 73,33% of urban forests in Jakarta can coverage less than 10 villages. They are Istiqlal Mosque forest (4 villages), Waduk/Danau Sunter forest (5 villages), Kanal Banjir Barat forest (4 villages), Barikat Nusantara forest (3 villages), Kemayoran forest (4 villages), PT JIEP forest (6 villages), Dukuh forest (2 villages), Situ Rawa Dongkal forest (2 villages), Komplek Kopasus Cijantung forest (3 villages), Lanud Halim forest (5 villages), and Blok P forest (3 villages). While only 26,66% of urban forest that can covered more than 10 villages, they are University of Indonesia forest (36 villages), Bumi Perkemahan Cibubur forest (25 villages), Srengseng forest (17 villages), and Mabes TNI Cilangkap forest (18 villages).

Table 2. Urban Forests Coverage

Name of Urban Forest	Urban Forest Area (Ha)	Radius Buffer (Km)	Total Coverage Villages Area (Ha)
Istiqlal Mosque	1,08	0,5	140,70
Waduk/Danau Sunter	8,20	1	620,33
Kanal Banjir Barat	2,49	0,5	114,17
Barikat Nusantara	1,59	0,5	116,85
Kemayoran	4,60	0,5	200,73
Srengseng	15,00	2,5	2.366,26
PT JIEP	8,90	1	475,05
Dukuh	0,58	0,3	38,20
Bumi Perkemahan Cibubur	27,32	4	6.312,09
Situ Rawa Dongkal	3,28	0,5	157,64
Komplek Kopasus Cijantung	1,75	0,5	111,35
Mabes TNI Cilangkap	14,43	2,5	2.372,59
Lanud Halim	3,50	0,5	200,05
Blok P	1,64	0,5	106,94
University of Indonesia	55,40	4	6.696,38

Table 3 shown that 73,33% visitors came from coverage villages area (Fig 3). There are Waduk/Danau Sunter forest, Kanal Banjir Barat forest, Srengseng forest, PT JIEP forest, Dukuh forest, Bumi Perkemahan Cibubur forest, Situ Rawa Dongkal forest, Komplek Kopasus Cijantung forest, Lanud Halim forest, Blok P forest, and University of Indonesia forest. Furthermore, 26,66% visitors came from outside coverage villages area. There are Istiqlal Mosque forest, Kanal Banjir Barat forest, Srengseng forest, and Bumi Perkemahan Cibubur forest.
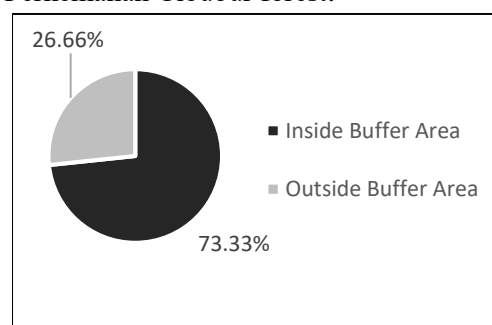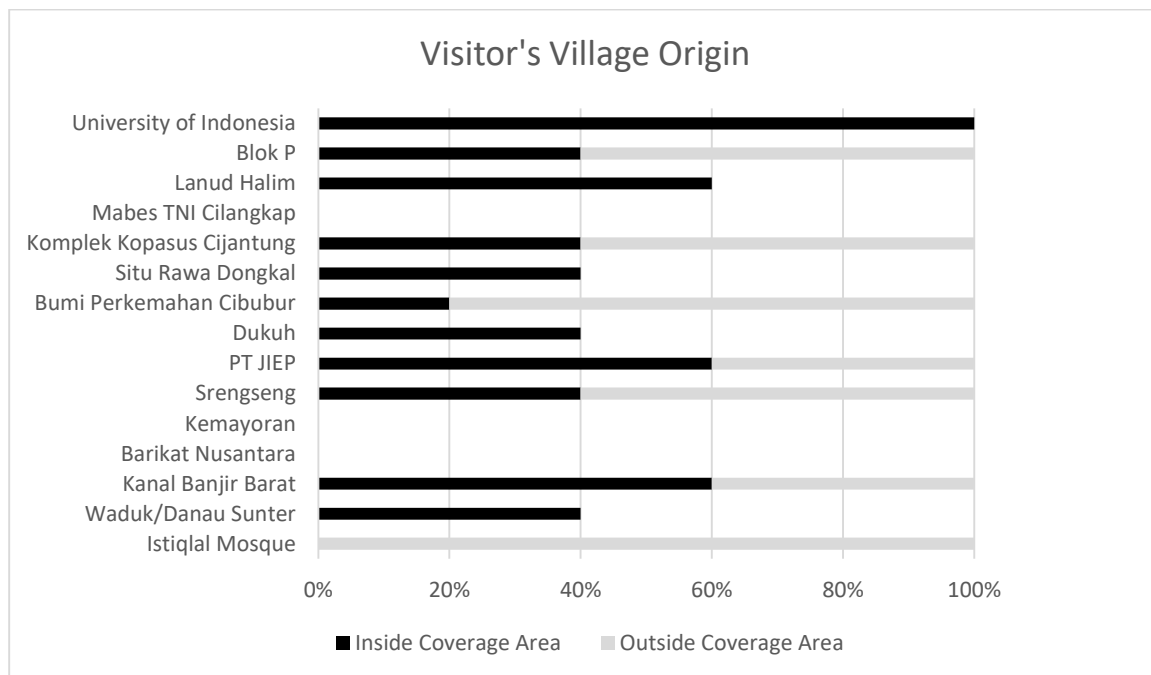

Figure 3. Visitor

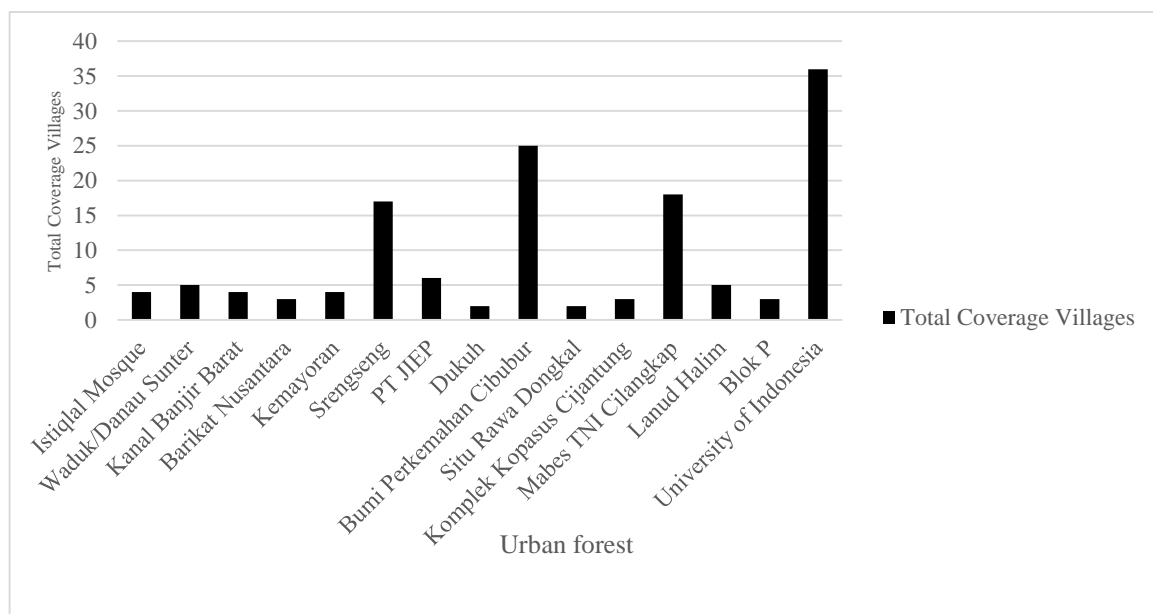**Figure 4.** Visitor's Village Origin of Urban Forest

Figure 5. Total Coverage Villages

4. Discussion

Based on table 2 and figure 2, we can see there are 4 urban forests coverage more than 10 villages, while there are 11 urban forests coverage less than 10 villages. There are only 28,47% areas in Jakarta have been coverage by urban forest. It means most of urban forests in Jakarta has not been coverage many villages around urban forest. Urban forests coverage villages based on their areas. In Jakarta there are only 4 urban forests has large area, there are University of Indonesia forest, Bumi Perkemahan Cibubur

forest, Mabes TNI Cilangkap forest, and Srengseng forest. Each urban forest has more than 10 ha areas, so they can coverage many villages around them.

Based on table 3 it can be seen that 73,33% of urban forest visitors are dweller who live in the coverage villages. This shown that many urban forest visitors are from the urban forest coverage villages. Visitors prefer to visit the urban forest that is close to their location. This is because the distance is close so it is easy to access and does not take a long time to get to the urban forest [10] [12].

A total of 26,66% of urban forest is not visited by the dweller in the coverage area. Among them are Istiqlal Mosque forest, Barikat Nusantara forest, Kemayoran forest, and Mabes TN Cilangkap forest.

Visitors of Istiqlal Mosque forest are generally came from outside the coverage villages, which came from the Cempaka Putih Barat Villages, Kelapa Gading Villages, Harapan Jaya Villages, Bekasi, and Depok. Visitors came to the Istiqlal Mosque forest aims to pray in the Istiqlal Mosque. This is why many of Istiqlal Mosque forest visitors are came from outside the coverage villages.

Barikat Nusantara forest is one of the urban forests located in an industrial area. When researchers visited the urban forest, there was no one visited the urban forest. Based on the results of observations of this research is due to inadequate facilities and infrastructure, not accessible, and included in the area that less secure because it was to quiet. This is why people rarely to visits the Barikat Nusantara forest.

Kemayoran forest and Mabes TNI Cilangkap forest are the urban forest that is closed for public. Visitors are prohibited to enter the urban forest, unless they have permission to visit the urban forest. Kemayoran forest is devoted to research activity for researcher, while for Mabes TNI Cilangkap forest located inside Indonesian National Armed Forces area.

Urban forest is not only visited by the dweller from the coverage villages, there are also some urban forests visited by visitors who are not from the coverage area. A total of 26,66% of urban forest is visited by people who are not from coverage area. They are Istiqlal Mosque forest, Banjir Kanal Barat forest, Srengseng forest, and Bumi Perkemahan Cibubur forest.

Banjir Kanal Barat forest, Srengseng forest, and Bumi Perkemahan Cibubur forest are urban forest that functioned as conservation area. Although the urban forest functioned as a conservation area, many of visitors also came from outsite coverage area not olny from coverage area. This is becouse the urban forest offers some attraction and complete facility. One important factor to attract visitors is attraction [4]. Banjir Kanal Barat forest, Srengseng forest, and Bumi Perkemahan Cibubur forest offers a wide range of attractions and facilities that visitors can enjoy. Urban forest should be offers many attractions and facilities [5]. Such as jogging track, lake, parking lot, mosque, gazebo, toilet, park bench, sports field, hall, children's playground, and camping ground. The number of facilities provided by urban forest manager so that many visitors coming from outside the coverage villages.

5. **Conclusion**

As a result, it is found that University of Indonesia forest is the urban forest with the most coverage villages of villages, that are 36 villages. Also, as many as 73.3% of urban forest visitors are the community who are included in the coverage villages Visitors choose the urban forest based on the closest to their location. This is because it is more efficient by visitors when compared to having to visit places far from their location. In addition, not only dweller who are in the coverage area who visited the urban forest, there are also some urban forest visitors came from outside the coverage area. At least 26.6% of urban forest are visited by visitors from outside the coverage villages. The urban forest is designated as urban forest with a function as a place of recreation, so that existing facilities are adequate for the visitors.

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