Landscape Management of Public Open Space in Bogor Heritage City

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Abstract. Public open space landscape plays important role in Bogor Heritage City. Although these spaces can carry various kind of public activities and enhance environment quality, they are fragile to disturbance and changing due to city development. Therefore, as an effort to maintain public open space landscape in 8 zones within Heritage City of Bogor, management of public open space landscape is necessary.

Synthesis of public open space landscape management had been held by using Analytical Hierarchy Process (AHP). The AHP result showed public open space landscape in Palace and Botanical Garden of Bogor zone (20%) is in high priority to be maintained. The other zone are Situ Gede (16.9%), Plan Karsten (12.3%), European Settlement (12%), Suryakencana (11.2%), Batu Tulis (10.2%), Empang (9.2%) and West Development (8.2%). Ecological function (34.8%) becomes the most important function to be maintained (34.8%) then social culture (31.2%), economic (17%), and aesthetics (17%).

1. Introduction
The history of Bogor began from a resting place of Governor-General of the Dutch East Indies called Buitenzorg in the former capital of the Pajajaran Kingdom in 17th Century. In 1817 Stamford Raffles built a botanical gardens in Buitenzorg as a major research center for agriculture and horticulture. After Dutch reoccupied Buitenzorg from British, they developed Buitenzorg as modern city in 19th Century. The city landscape was designed to highlight the beauty of the rivers and views of Mount Salak. The remain of Buitenzorg which can still be seen today are city spatial pattern, historical buildings and some public open spaces such as streets, parks, square and waterfront.

In 2012 the Directorate General of Spatial Planning Ministry of Public Works and Indonesian Heritage Preservation Council (BPPI) initiated Planning and Preservation of Heritage Cities Program (P3KP). Bogor was chosen as one of 10 pilot project of Heritage Cities in Indonesia. The term of Heritage City used to define a city that puts heritage conservation activities as a key strategy into sustainable cities. Heritage can be natural heritage, cultural heritage (physical and non-physical) and landscape heritage. Through this program spatial plan which is owned by the city is expected to boost the quality and quantity of Heritage Region. Since the establishment of Heritage City in 2012, Bogor has conducted some actions due to Heritage City Program. However, the maintaining of public open space in Heritage Region of Bogor gets less attention than building structures.

Public open space is an open public land in the form of parks, sports fields and other open spaces that can be accessed and used by people without limitation of space, time, and costs (Permen PU No 12 Year 2009). Forms of public open space consists of green open space (RTH) and non-green open
space (RTNH). Public open space has ecological, economic, social, cultural, aesthetic and emergency function.

Public open space is an important element in urban environment that contributes positively to the quality of life in the city [1]. Beside enhancing the identity and shape of the city, public open space is also a social infrastructure, improving economic conditions, aesthetic, ecological protection, and containers of cultural activity [2]. Public open space is fragile to disruptions and changes that occur in the city. The aim of this study is to propose a landscape management strategy of public open space in Heritage Region of Bogor.

2. Method

2.1. Study Area

The study was conducted in 8 zones in Heritage City of Bogor, West Java, Indonesia (Figure 1). Six zones have been established by Planning and Preservation of Heritage Cities Program (P3KP) in 2013, they are: 1) Palace and Botanical Garden of Bogor; 2) Arabic Settlement of Empang; 3) Chinatown of Suryakencana; 4) European settlement; 5) West Development; and 6) Karsten Plan. Two more zones are proposed zone which are strategic area of the environment and culture that defined in the RTRW Bogor 2011 - 2031, they are (1) Batu Tulis and (2) Situ Gede. Situ Gede had been established as natural heritage based on PERWALI BOGOR (City Mayor Regulation) No 17 Year 2015. The study was conducted from December 2015 until May 2016.

![Figure 1. Location of 8 zones in Heritage City of Bogor](image-url)
2.2 Syntesys of Landscape Management strategy of Public Open Space
Strategic management of public open space in Heritage Region conducted with an approach to the various stakeholders and relevant experts. The methods were interviews and Analytical Hierarchy Process (AHP) by using Expert Choice software. The AHP questionnaire aims to determine the priority function of public open space landscape. The choices of the function are: 1) ecology, 2) socio-cultural, 3) economic, and 4) aesthetics. Each function is subdivided into several alternatives. Specialists who were asked to participate in assessing the AHP are: 1) the experts from Regional Development Planning Departement of Bogor (BAPPEDA), 2) City Park Department of Bogor (DKP), and 3) Cultural Community of Bogor.

3. Result and discussion
From 8 zones of study location, the European settlement zone has more diverse forms of public open space than the other zones (Table 1). Pedestrian path, waterfront path, parks and waterfront parks are forms of public open space which is almost exist in each zone. Bike path, plaza, playground and sport field are still rare to be built. Linear shaped of public open space i.e pedestrian paths, bike path, waterfront paths and plazas that exist today are mostly situated in historical value street that has existed since the Dutch colonial era. Some parks, waterfront parks and sports field are renovated parks from the old ones that also has existed since Dutch colonial era.

Table 1. Public Open Space Matrix in Heritage Region of Bogor

| Form of Public Open Space | Palace and Botanical Garden of Bogor | European Settlement | Karsten Plan | West Development | Suryakencana | Empang | Batu Tulls | Situ Gede |
|---------------------------|--------------------------------------|---------------------|--------------|------------------|---------------|--------|------------|----------|
| Pedestrian path           |                                      |                     |              |                  |               |        |            |          |
| Bike path                 |                                      |                     |              |                  |               |        |            |          |
| Waterfront path           |                                      |                     |              |                  |               |        |            |          |
| Plaza                     |                                      |                     |              |                  |               |        |            |          |
| Park                      |                                      |                     |              |                  |               |        |            |          |
| Playground                |                                      |                     |              |                  |               |        |            |          |
| Waterfront Park           |                                      |                     |              |                  |               |        |            |          |
| Sport field               |                                      |                     |              |                  |               |        |            |          |

After the implementation of the Heritage Cities Action in 2015, addition of several public open spaces has been carried out. Some public open spaces which are the improvement from the previous one are: Tugu Kujang plaza (Palace and Bogor Botanical Gardens zone), Taman Ekspresi (Karsten Plan zone), Taman Air Mancur (Europe Setlement zone), and Garden and Suryakencana Gate (Suryakencana zone) (Table 2). The Parks and plazas are utilized by the citizen to carry out various social and cultural activities now. Giving new function (adaptive re-use) to new public open space has
positive impact to revive the old heritage region [3]. Taman Air Mancur and Taman Kencana are actively used as social and cultural spaces. Alun – alun, a historical square park in Empang zone is in bad condition because of lack management.

| Form of Public Open Space | Zone | Name | Length/Square | Management authority |
|---------------------------|------|------|---------------|----------------------|
| Pedestrian path           | Palace and Botanical Garden of Bogor | Juanda street | 3.329,18 m | Bina Marga Departement |
|                           |      | O. I. Dinata street | 1.478,80 m | Bina Marga Departement |
|                           |      | Jalak Harupat street | 1.970,65 m | Bina Marga Departement |
|                           |      | Pajajaran street | 663,56 m | Bina Marga Departement |
|                           | European Settlement | Kapten Muslihat street | 883,50 m | Bina Marga Departement |
|                           |      | Dewi Sartika street | 1.719,18 m | Bina Marga Departement |
|                           |      | Pengadilan Stree | 974,94 m | Bina Marga Departement |
|                           |      | Sawojaajar street | 1.060,35 m | Bina Marga Departement |
|                           |      | Jend. Sudirman street | 2.645,10 m | Bina Marga Departement |
|                           |      | Ahmad Yani street | 1.793,05 m | Bina Marga Departement |
|                           | Karsten Plan | Sempur street | 675,66 m | Bina Marga Departement |
|                           |      | Pajajaran street | 2.360,00 m | Bina Marga Departement |
|                           | West Development | Jembatan Merah street | 1.550,73 m | Bina Marga Departement |
|                           |      | Merdeka street | 2.841,24 m | Bina Marga Departement |
|                           |      | Semeru street | 5.029,26 m | Bina Marga Departement |
|                           | Suryakencana | Suryakencana street | 1.966,02 m | Bina Marga Departement |
|                           |      | Siliwangi street | 3.120,00 m | Bina Marga Departement |
|                           | Empang | R. Saleh street | 756,04 m | Bina Marga Departement |
|                           |      | Empang street | 329,44 m | Bina Marga Departement |
|                           |      | Pahlawan street | 1.619,86 m | Bina Marga Departement |
|                           | Batu Tulis | Batu Tulis street | 1.382,86 m | Bina Marga Departement |
|                           |      | Cipaku street | 650,82 m | Bina Marga Departement |
|                           |      | S. Danasasmita street | 404,92 m | Bina Marga Departement |
|                           | Bike path | European Settlement | 415,68 m | Bina Marga Departement |
|                           |      | Juanda street | 133,71 m | Bina Marga Departement |
|                           | Waterfront path | Europe Settlement | 385,62 m | Bina Marga Departement |
|                           |      | J. Sudirman street | 304,06 m | Bina Marga Departement |
|                           |      | Kapten Kidul street | 326,74 m | Bina Marga Departement |
|                           |      | Pulo Empang street | 382,01 m | Bina Marga Departement |
|                           |      | Cipaku street | 650,82 m | Bina Marga Departement |
|                           | Plaza | Palace and Botanical Garden of Bogor | 602,94 m | Bina Marga Departement |
|                           |      | Nyi Raja Permas | 251,70 m | Bina Marga Departement |
|                           | Park | Taman Air Mancur | 3.036 m² | City Park Departement |
|                           |      | Kapten Muslihat | 7.852 m² | City Park Departement |
|                           |      | Taman Kencana | 4.795 m² | City Park Departement |
|                           |      | Taman Ekspresi | 1.098 m² | City Park Departement |
|                           | Empang | Alun – alun Empang | 2.747 m² | Local community |
|                           | Playground | Sempur | 1.398 m² | City Park Departement |
|                           | Waterfront Park | Taman Peranginan | 1.699 m² | City Park Departement |
|                           |      | Taman Cipakancilan | 1.194 m² | City Park Departement |
|                           |      | Sempur | 1.202 m² | City Park Departement |
|                           | Batu Tulis | Taman Cipaku | 5.600 m² | City Park Departement |
|                           | Sport field | Europe Settlement | 10.554 m² | Youth and Sports Dept. |
|                           |      | Sempur | 38.831 m² | City Park Departement |
A landscape management strategy is proposed to maintain these public open space by using Analytical Hierarchy Process (AHP). Based on the AHP combined results, public open space landscape of Palace and Botanical Garden of Bogor zone (20%) is the first priority to be maintained (Figure 2). Another zones are Situ Gede (16.9%), Karsten Plan (12.3%), European settlement (12%), Suryakencana (11.2%), Batu Tulis (10.2%), Empang (9.2%), and West Development (8.2%).

![Figure 2. Priority zone in Heritage Region of Bogor City](image)

For priority function of public open space, ecological function is the first priority function which should be prioritized in the Heritage Region of Bogor with a value of 34.8% (Figure 3). The next priority after the ecological function are the social culture (31.2%), economy (17%), and aesthetics (17%).

![Figure 3. AHP result of priority function of public open space management](image)

Based on the AHP Result, Palace and Botanical Gardens of Bogor is the first priority in the management of public open space landscape. Landscape Palace and Botanical Gardens is a milestone development of the city. It also the green open space (RTH) which dominates in the city. Therefore, to protect the historical landscape, public open space located in the outer ring of the zone must be preserved and enhanced.

Ecological function is in high priority of the management of public open space landscape. Public open space landscape of Bogor is dominated by the presence of green open space (RTH) in the form of street greenery and parks. They support the ecological functions of the city. Water infiltration, oxygen supply, protection of natural forms, temperature/climate comfort, and biodiversity conservation are several alternatives to improve the quality of ecological function in Heritage Region (Table 3). Public open space on the edge of the river serves as a water catchment, forms a protective nature and biodiversity conservation. Parks and street greenery also serves as a water catchment and create a comfortable temperature/climate in Heritage Region. These public open spaces need to be maintained and enhanced in order to make a better quality of ecological function of Bogor Heritage City in the future.

Social Culture function of public open space is the second priority function in Heritage Region. This function provide a wide range of social and cultural activities in public open space. Evacuation, socialization of citizens, cultural activities, education and research, recreation, and sports are a few
alternative of social culture function in the Heritage Region (Table 3). Some parks that have been renovated now actively used to carry out various social and cultural activities.

Economic and aesthetic function of public open space in Heritage Region take the third priority to be managed (Table 3). After the establishment of the Bogor Heritage Cities, tourism as an important contributor sector to the heritage city's economy can be increased by improving the quality of the public open space around the historical and cultural sites. Pedestrian path, plazas and parks need to be improved in order to give comfort to the travellers. Public open space at Heritage Region also needs to be managed to empower informal economy industries related to preserve the cultural heritage products such as traditional food and crafts. Management of public open space around natural site and historical/cultural site will also enhance the beauty of the urban environment and architectural of the Heritage City. Creativity of citizen is needed to enhance the environment beauty of Heritage Region. Adding the element of public space that represents the uniqueness of each zone can be done to highlight the aesthetic in each zone. To highlight the traditional character in the Empang zone could be done by restoring Alun – alun square park into new public open space. The existence of the Alun - alun as a public open space will make the visual character of the Muslim region can be easily recognized [4].

Table 3. Function alternatives of AHP result

| Function          | %   |
|-------------------|-----|
| Ecological        |     |
| Water infiltration| 34.80 |
| Oxygen supply     | 31.70 |
| Protection of natural forms | 24.30 |
| Temperature/climate comfort | 20.60 |
| Biodiversity conservation | 12.40 |
| Social culture    |     |
| Evacuation        | 31.20 |
| Socialization of citizens | 23.30 |
| Cultural activities | 22.60 |
| Education and research | 18.30 |
| Recreation        | 13.90 |
| Sports            | 12.30 |
| economic          |     |
| Tourism           | 17.00 |
| Empower informal economy industries | 9.60 |
| Urban agriculture | 27.60 |
| aesthetics        |     |
| The beauty of urban environment | 47.60 |
| The beauty of urban architecture | 24.80 |
| Creativity of citizen | 37.90 |

4. Conclusion and recommendation

This study concludes public open space plays important roles to Bogor Heritage City. Palace and Botanical Gardens of Bogor is the first priority zone in management of public open space landscape. Landscape Palace and Botanical Gardens is a milestone development of the city. It also the green open space (RTH) which dominates in the city. Therefore, to protect the historical landscape, public open space located in the outer ring of the zone must be maintained and enhanced. Ecological function is in
high priority of the management of public open space landscape. The presence of green open space (RTH) in the form of street greenery and parks support the ecological functions. These public open spaces need to be enhanced in order to make a better quality of ecological function in Bogor Heritage City. Tourism as an important contributor sector to the heritage city's economy can be increased by improving the quality of the public open space around the historical and cultural sites. Management of public open space around natural site and historical/cultural site will also enhance the beauty of the urban environment and architectural of the Heritage City. Adding the element of public space that represents the uniqueness of each zone can be done to highlight the aesthetic in each zone.

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