

IDENTIFYING COLONIAL LANDSCAPE STYLES IN BOGOR BOTANICAL GARDEN THROUGH VISITORS' GEO-TAGGED PHOTOS

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Abstract

The landscape of Bogor Botanical Garden (BBG) is influenced by different eras, particularly Dutch Colonial and post-war Indonesia. The research investigates visitors' perceptions related to landscape of BBG based on visitors' on-site experiences. The research involved 94 research participants, include local tourists and landscape architecture students. They were asked to take photo of landscape or elements they deemed colonial look landscape style using their own camera and send them online to researcher by social media. Each respondent were handed a GPS logger to record the capture locations of each photo. The results revealed that the most photos of colonial look landscape style were consist of buildings and hardscapes as focused objects, where Presidential Palace and Lady Raffles monument were buildings that mostly appear in photos. The photos' captured locations were also concentrated to those buildings indicated that landscape surround those buildings had strong characteristics of colonial landscape style. The study also showed the effectiveness of inviting participants with educational background in landscape architecture than normal visitors to show perception of colonial look landscape on BBG site.

INTRODUCTION

The botanical gardens and protected areas are green heritage consist of native and non-native plant that introduced by Dutch to Indonesia as colony in colonial era (Abendroth et al. 2012). An example is the Bogor Botanical Garden (BBG) located in the middle and a landmark of Bogor City (Tohjiwa 2015). It also

plays an important role in Indonesia's long history of botanical research and science (Chen et al, 2009) and tourism industry (Hermansyah and Waluya 2012). As a common problem of botanical gardens today, visitors' motivation for visiting one shifts from learning of conservation issues to the more complex tourism context (Ballantyne et al,

2008). To balance the conservation and commercial use of BBG as a heritage site, studying tourist attitude toward heritage sites is important (Henderson 2001).

The history of botanical gardens in Indonesia cannot be separated from the influence of the Dutch East Indies in the colonization era. The Dutch's attention to the sciences in its colonies was implemented by the achievements of British Java Governor Thomas Stamford Raffles, who contributed to the advancement of natural sciences in Java during the British rule from 1811 to 1814 (Jepson and Whittaker 2002). The Dutch effort to explore science in colony began with the establishment of the botanical garden of Buitenzorg; other botanical gardens, research institutes, and protected areas were formed after (Abendroth et al. 2012; Jepson and Whittaker 2002; Smith 1924). BBG was built in 1817 under the supervision of Prof. Caspar George Carl Reinwardt, a botanist and professor who was sent by the Dutch kingdom (Smith 1924; Wieringa, Van Dun, and Gill 1989). Reinwardt and his assistants collected plants through expeditions to various parts of the colony (Jepson and Whittaker 2002). These plants were later used to create a botanical garden located in Bogor City that was akin to a thick rainforest (Wieringa et al. 1989). When BBG was initially formed, it functioned as a research centre for biological science and agriculture, with the goal of boosting the colonial economy (Boomgaard 2006). It was eventually used for introducing valuable plants for the establishment of other botanical gardens and protected areas in Java and other parts of Indonesia (Abendroth et al. 2012).

In 1949, four years after Indonesia gained independence, BBG's management was transferred from the Dutch East Indies to the Indonesian government (Ministry of Agriculture 1956). BBG became a research centre for botanical plants under the Indonesian Institute of Research (locally called Lembaga Ilmu Pengetahuan Indonesia

or LIPI). When it was opened to the public in 1968, it served as a tourism and recreational site apart from its main function as a research centre for ex-situ conservation plants. As a response to the high demand of tourism, the LIPI management developed physical elements and facilities to support both tourism and research activities.

The development of BBG since Colonial era overcome various landscape sceneries of BBG include colonial look landscape style as original landscape style of BBG and modern landscape style of BBG. In this present era, it is important to investigate if visitors still able to recognize colonial look landscape style sceneries of BBG and popular location where visitors able to see those sceneries. However, visitors' perception and preference research related with colonial look landscape style of BBG has not been investigated yet. In these research, we tried to investigate participants' perception about colonial look landscape style through their photos. This research aimed to investigate visitors' perceptions of the colonial style landscape of BBG and investigate whether visitors have a grasp of the characteristics and elements of colonial style landscapes. The study was not only try to explore participants' perceptions but also detecting locations where colonial look landscape style of BBG were visible.

RESEARCH METHOD

The method was perception study with photos elicitation. The photos used were participants' photos that they took on-site and had Geo-tagged information (Geo-tagged photos). The GPS logger used to detect locations where participants took photos of colonial look landscape, which was called as vantage points, and analyzed the popular locations of vantage points of colonial look landscape style. The perception research with participants' geotagged photos were able to detect popular locations where the landscape

sceneries impressed participants as viewers (Hadi et al. 2017; Mizuuchi et al. 2015). By the successful of previous research, we used the method to detect colonial look landscape style of BBG in this research. The online chat applications were used to contact participants, received selected photos from participants and ask questions to participants about photos they selected. The statistical software were used to analyze correlation between participants' attributes to their answer. The ArcGIS software used to detect popular locations of vantage points where colonial look landscape style photos captured by participants.

Study site

The study site is BBG with total area 87 hectares located in Bogor City in West Java Province (see Figure 1). The BBG was selected as site study because it is a landscape that has historical value, located in the middle of city and open for public. This site is suitable to be a study site for landscape preference research based on visitors' experience. The on-site observations were held on April 19th to 25th,

2016. The BBG consist of smaller historical thematic gardens, such as Teijsman garden, Sigunting pond, Astrid Avenue and Soedjana Kassin Garden. The historical buildings that still preserved in BBG are include zoological museum, Lady Raffles monument, Reinwardt monument, Teijsman monument, Red bridge, and Dutch tomb. The Presidential palace which is important building for BBG history is no longer part of the BBG, but visitors still able to see it from Srigunting pond.

Participants, tools, and materials

There were 94 participants invited to BBG include 42 normal visitors (NV) and 52 Landscape Architecture students (LA). The total participants were composed of 60 females and 34 males with age ranging from 10 to 38 years (median of 21 years old). Of the normal visitors, one was a housewife, 25 were professionals in various fields and 17 were high school students. The participants' frequency of visiting BBG ranged from 1 to 30 times. The tools used in this study were the

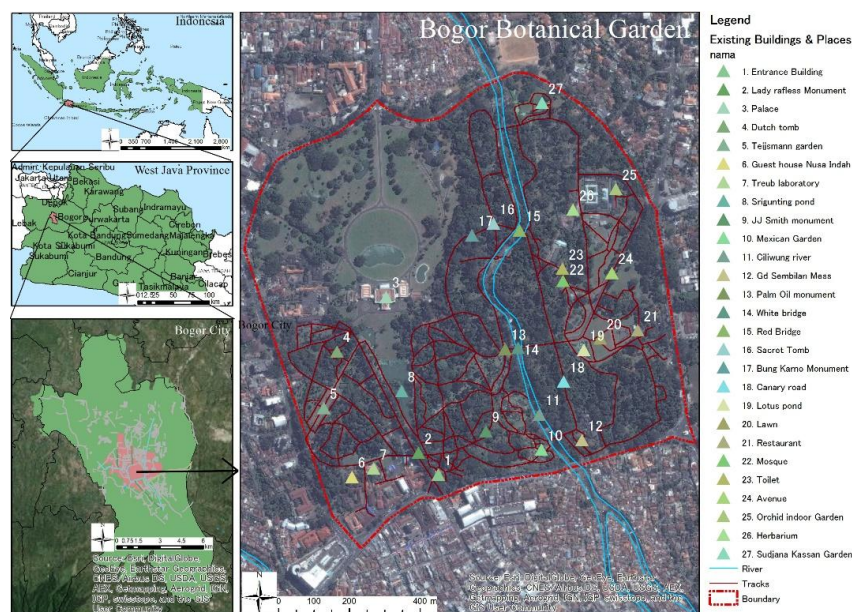


Figure 1. Location of the study

participants' cameras or phones with camera to capture landscapes or elements and GPS logger to record actual geographic position information while they took photos inside the BBG.

In BBG site, participants were asked to take photos of any preferred landscape or objects. The researcher asked the participants to take photos of what they deem as colonial style landscape and impressive landscape. In this research, we used colonial style landscape photos as research object and impressive photos were used for another research. One month after observation day, participants were asked questions about what photos show a colonial style landscape through online chat applications (*Whatsapp, Line and Blackberry Messenger*). In online interview, participants were asked to determine the landscape of BBG that shows colonial style by showing photos and giving free answers. The questions to participants were "*which photo shows Colonial look landscape?*" and if they show a photo, the next question was "*what is element in the photo that make the landscape looks colonial style?*" The name or type of objects visible in the photos and mentioned by participants as answer of the question were stated as focused objects of each photo. Each photo was grouped according to its focused object. The focused object answers were used to identify element that influence a landscape view become colonial look landscape style.

Analysis method

The participants' photos were photos of the 'colonial look' they perceived in the landscape. Each photos were grouped according to photos' focused object mentioned by participants in the chat session. The number of focused objects mentioned by participants were analyzed according to participants' attributes include educational background, frequency of visiting and gender by using JMP version 12 (SAS Institute, Inc. YEAR). This

type of analysis was implemented to analyze correlation between participants' attributes to their perception about colonial look landscape style of BBG.

On the other hand, each photos were matched with GPS logger's time tracking data to obtain geo-position of vantage points of each photos by using GeoSetter software. The vantage points are locations where participants saw the views of colonial look landscape style. In ArcGIS, the Geo-tagged photos were represented in point features. The grid 20 x 20 m² were used as reference area to count number of points in certain area. The photos' points were joined with each grid and how many points fallen in each grid as counted. The grids with number of Geo-tagged photo points more than 10% were stated as popular area for seeing colonial look landscape style. The densest vantage points revealed by overlapped points' buffer performed the most common locations in which visitors perceived the 'colonial look' in BBG.

RESULTS AND DISCUSSION

The first question to participants is "*which photo shows Colonial look landscape style?*". There were 85 photos of 'colonial look' landscapes style collected from 85 participants. All LA participant (52 participants) sent photos of 'colonial look' landscapes style but not all of NV participants sent photos. There were only 33 NV participants sent photos and 9 participants did not send photos. The participants' reasons of why they did not send requested photos were inability to find examples of colonial style in BBG's landscape (3 people), lack of interest in the colonial style (1 person) and the rest did not provide any reason (5 people). By using chi-square test analysis, it shows that the participants ability to answer question of "*which photo shows Colonial look landscape?*" by sending photos was influenced by

educational background ($p < .05$), where LA students were more efficient to be selected as research participants than normal visitors due to ability to answer questions and show selected photos to researcher.

The Photos' Objects that characterized Colonial look landscape style

The second question to explain content of selected photos was "*what object in the photo that made the photo looks Colonial look landscape?*" The participants' answer were various due to free answers of participants. We grouped the answers according to similarity of elements that mentioned by participants, where those elements influenced participants' decisions that photos they selected were representing colonial look landscape style. The elements that frequently mentioned by participants were buildings and hardscapes, corridor, water features and garden (Table 1).

The number of photos according to photos' focused objects were counted (Table 2). The example of photos selected by participants to represent colonial look landscape style based on its focused objects were available in Figure 2. The photos with buildings and hardscapes as focused objects were the most photos selected by LA participants and NV participants to represent colonial look landscape style (87.06%). In identifying a 'colonial look' landscape, participants tended to select views that consist of colonial-look building or structures as marker of the 'colonial look' landscape. Based on participants' explanations, the selected buildings and hardscapes as colonial look style based on the presence of elements or parts of buildings, such as roof, column, stairs, structures, high window, high door and white color of wall (34 reasons). The colonial style of buildings and hardscapes mostly easy to be recognized by Indonesian people since its style is different with common local or traditional buildings in Indonesia.

Table 1. Participants' reasons for selecting and classifying photos as 'colonial look' landscape

No	Reasons of taking photos	Categorized as
1	There is a building that look old and has historical impression	Building & hardscape
	The presence of elements of buildings and structures by its roof, column, stairs, structures, high window, high door and white color of wall.	
	There is a colonial look building with its surrounding landscape that look colonial landscape style	
2	There is a colonial look building or structures on the site - without more explanation	Corridors
	Only Photos of buildings or hardscapes without any reason	
	The corridor looks colonial style - without more explanation	
3	No reason	Garden
	There is a fountain and wide lawn inside the garden	
4	The geometric pattern of garden form	Plant
	There is an old tree therefore the landscape look colonial style	
	There are many flowers look like in western countries	

The existence of colonial style of buildings and hardscapes on a site influenced participants' decision that the total view of landscape were colonial look landscape style.

Based on participants' educational background, there were no significant different between LA and NV participants in selecting photos represent colonial look landscape style. Both LA participants and NV participants selected photos with buildings and hardscapes as focused object to represent colonial look landscape style. It means that the education background between LA and NV

participants did not influence participants' perspective to colonial landscape style.

There were 18 buildings and hardscapes captured as focused objects of 'Colonial look' landscape style photos (Table 1). The landscape photos with Presidential Palace and Lady Raffles monument as focused objects were the most photos selected by participants to express colonial look landscape style. The Presidential palace used to be Raffles governor house and it was the oldest building in BBG which was built in 1745 and reconstructed in 1839 (Wieringa et

Table 2. Number of Photos based on Photos' Focused Objects

Photos Received from		Building hardscapes & Corridor	Water features	Plant garden	& Total	
NV Participants	n	29	3	0	1	33
	%	34.12%	3.53%	0.00%	1.18%	38.82%
LA Participants	n	45	0	5	2	52
	%	52.94%	0.00%	5.88%	2.35%	61.18%
Total	n	45	3	5	3	85
	%	87.06%	3.53%	5.88%	3.53%	100%



Figure 2. Examples of Colonial look Landscape Style Photos selected by Participants based on Photos' focused objects

obstacle that covering visitors' view (Figure 6).

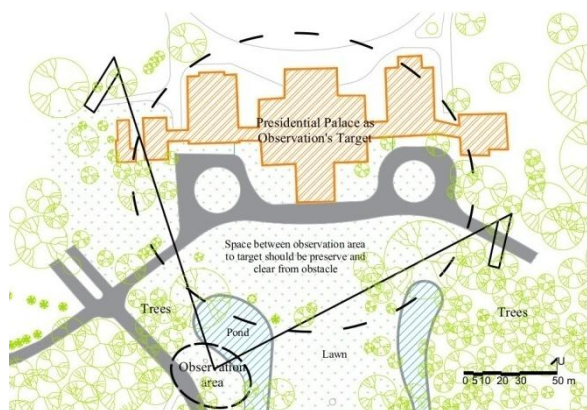


Figure 5. Concept of Preserving Popular View of Colonial Look Landscape Style in BBG

CONCLUSION

The number of normal visitor participants who did not sent colonial look landscape style photos shows that the normal visitors did not have interest in colonial look landscape style on BBG site. For normal visitors participants who sent the photos were also some of them cannot explained about the reason why they chose the photos as colonial look landscape style. This result shows that the educational background of participants is important to be considered in landscape perception research. For the landscape perception research that aimed to obtain clear explanation about colonial character of landscape on a site study, the landscape architecture students is more efficient invited as research participants than normal visitors.

The colonial look landscape style that perceived by participants in this research referred to landscape that the historical or colonial look building and structures style exist. Building and structures that exist on BBG site were become identity of a landscape perceived as colonial look landscape style. The part of buildings and structures were elements that easy to be seen by participants and different from common Indonesian traditional style, such as gable roof, high

column, high windows and white colour of wall. By those elements, participants decided whether the buildings and structures were colonial look style or not. The colonial look style buildings and structures of BBG are very important to characterize landscape as colonial look style.

The identification of the 'colonial look' landscape by participants shows that this style and its elements in BBG attract visitors' attention while engaging in activities in BBG. The number of photos of the 'colonial look' landscape that include historical buildings as colonial identity shows that participants relate BBG visits with heritage tours. This result may indicate that the 'colonial look' landscape is an attraction in itself, apart from the main 'green' attraction of BBG.

In conserving the landscape visual of colonial or historical look in a landscape, the preferred viewing locations and target views of visitors comprise an important aspect. The point density map of the 'colonial look' landscapes provides information on the trend of viewer positions and photo targets. BBG management may consider these trends in their conservation efforts, as they particularly reveal the importance associated by visitors to colonial heritage and Indonesian landscape attributes. Landscape maintenance and infrastructure planning in BBG, particularly those aimed at modernization, must be done with care.

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