Short communication

Tourism sustainability in the Bogor Botanical Gardens, Indonesia

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ABSTRACT

The Bogor Botanical Gardens (BBG) represents one of the most prominent gardens in the largest urbanised area of SE Asia. However, the BBG is poorly visible in academic literature, and research on its role as an urban forest is particularly lacking. This study assesses sustainability of tourism management in the BBG. Stakeholders such as staff members, travel agents, tour guides, etc. were interviewed. The analysis of the responses showed that the respondents rated non-destructive use of resources and improving visitors’ satisfaction as the first and second highest values, respectively. Conversely, the regulatory role of the garden’s law enforcement, management monitoring and participation of stakeholders received the least ratings. Our survey shows that the BBG is implementing certain elements of sustainable tourism, yet there was a lack of discipline and participation in the face of problems generated by rapid urbanisation and growing number of visitors. These findings can be relevant to other botanical gardens in fast-growing conurbations of SE Asia and the developing world. These results also suggest that a deeper study is necessary to better understand and manage the problems related to the increasing number of visitors.

Botanical gardens have a long history tightly related with the evolving knowledge on plants (Spencer and Cross, 2016). The comprehensive history of botanical gardens till the beginning of 20th century is given by Hill (1915), who described the origins and major stages of the development of botanical gardens. The precursors of the European botanical gardens were mostly physic gardens generally associated with universities, and represented repositories for the medicinal plants described in the herbals. In the Age of Exploration, however, botanical gardens changed to displaying new, strange, highly decorative or economically important plants brought from the European colonies. The Renaissance brought a new role of botanical gardens as they became centres of science and education. Taxonomy and plant classification based on herbaria appeared as the major focus of the botanical gardens of this era. In the 19th century, botanical gardens tried to enrich their collections with any foreign plant species, or became specialised in various aspects of horticulture by breeding decorative and economic plants. The history of botanical gardens in the 19th and 20th centuries is comprehensively given in the works of Heywood (1987, 2009). A large number of civic or municipal botanical gardens were founded with strong horticultural traditions. They were beautifully maintained parks and often were under general parks administrations. However, in the 1970s, plant conservation and the heritage value of exceptional historic landscapes became the increasingly important foci of botanical gardens, the situation that continues today.

The newest trend, however, is that botanical gardens are becoming increasingly important components of urban green space in the increasingly urbanising world (Murray et al., 2007; Ward et al., 2010; Titus, 2015). However, the global growth in garden visitation and its consequences remain little studied, especially in developing countries (Murray et al., 2007; Crilley, 2008). Actually almost 90% of articles on the use of public green spaces including botanical gardens comes from the developed world (Shackleton, 2012). In spite of this bias and overall scarcity, the available information shows a dramatic growth in the numbers of visitors from the early 90s of the last century (Garrod et al., 1993; Russel, 2002; Sutherland, 2009; Titus, 2015). During 2000, about 12 million visits were made to the 123 botanic gardens, arboreta and herbal gardens in Australia (Murray et al., 2007). Also in 2000, German botanical gardens received about 14 million visitors (Borsch and Löhne, 2014). Between 2006 and 2007, the South African national botanical gardens received their highest recorded number of visitors of 1,258,032 people (Ward et al., 2010). In 2008, over one million visits were recorded in the Singapore Botanic Gardens (Crilley et al., 2010). In 2000 it was estimated that 150 million people visited public gardens globally (Wyse and Sutherland, 2000), while by 2008 this estimate went up to 200 (Wassenberg, 2012) or even to 250 million (Ballantyne et al., 2008). As a result, botanical gardens become important touristic destinations: the number of visitors received by the Singapore Botanic Gardens
Gardens in 2008 accounted for 8 percent of the market share of the leisure attraction sector, whilst 34% of Australia’s adult population visit botanical gardens annually (Crilley et al., 2010). In 2009, garden visiting was ranked among the top ten activities undertaken by international tourists in New Zealand, with 519,405 visits recorded. Worldwide, over 600 new botanical gardens have been created during the past two decades (Chang et al., 2008), and this clearly boosts the potential of botanical gardens as urban green space (Ward et al., 2010).

The novel situation, however, is that nowadays recreation is the most important activity of botanical gardens (Baker, 2006; Othman et al., 2015; Krishnan and Novy, 2016), and brings about a need for new styles of garden management (Moskwa and Crilley, 2012; Krishnan and Novy, 2016; Catahan and Woodruffe-Burton, 2017). Among the new challenges, managing large numbers of visitors sustainably becomes of particular importance (Crilley and Price, 2006; Titus, 2015; Catahan and Woodruffe-Burton, 2017).

The presented study is about tourism sustainability in the Bogor Botanical Gardens (hereafter BBG). The BBG is not only the most prominent in Indonesia or SE Asia, but represents one of the world’s outstanding gardens and features a huge plant collection of over 17,000 species representing tropical trees, palm trees, orchids, etc. (Santosa et al., 2014; Gunawan and Pratiwi, 2015); the BBG also manages one of the most complete collections of germplasm in SE Asia (Hotimah et al., 2015). At the same time, the BBG offers an excellent example of a botanical garden that became an important urban green area:

- the BBG represents an urban forest of 87 ha that survived for centuries in the city (Hotimah et al., 2015);
- the BBG is located within Jabodetabek, the second most populous conurbation of the world comprising 6392 sq km with over 30 million inhabitants (Rustiadi et al., 2009);
- the BBG is well connected to Jabodetabek through a network of highways, roads and commuter trains (Hasibuan et al., 2014).

The annual number of visits in the BBG is not easy to estimate as official numbers are rarely issued. The most accurate count was published in 1995 and reports the total number of visitors equal to 1.33 million (Benfield, 2013). Since then this figure could only increase, and if so, then the BBG is probably the most visited botanical garden in SE Asia: the estimated number of visitors in the BBG is 2 million per year (see Table 1 for the comparison of prominent botanical gardens).

Overall, the BBG has been developing in a context that noticeably differs from those of other prominent botanical gardens, which already have been examined as important urban green areas. The BBG has just celebrated its 200th anniversary (founded in 1817). Originally the BBG was situated in a small provincial settlement of Bogor, but now the BBG finds itself in a rapidly urbanising area with dramatically increasing number of visitors (above). Such a context is rare (if any) for the botanical gardens existing in already urbanised areas (Shackleton, 2012). Our study of the BBG was conducted to contribute to understanding the new role of botanical gardens in rapidly urbanising areas. In particular, this study was focused on the sustainability of tourism management at the BBG (Fig. 1).

The study was conducted from February 2016 to February 2017. Initially, literature was reviewed and a search for relevant information associated with the travel agencies, tourists and related administrative departments of the gardens performed. The next stage was devoted to data collection: 135 questionnaires composed in Indonesian language with overall 10 questions (see also below) were distributed purposively. A hundred of respondents returned the filled questionnaires, which we divided into nine groups; in each group there were eight to 13 respondents (11 in average, Table 2). The survey took six months starting from May 2016.

The survey was based on the concept of sustainability using the following indicators: (1) generating financial profit without destroying the garden’s resources and cultural values of local communities (Lee, 2011; Catibog-Sinha and Wen, 2008; Sang et al., 2011); (2) Regulatory role of garden’s environment law enforcement (Thomas, 2016); (3) management and monitoring plans (Ward et al., 2010; Ballantyne et al., 2008; Thomas, 2016); (4) potential for improving visitors’ satisfaction (Hakkinen and Vare, 2008; Morari and Giardini, 2002); (5) participation of the enterprising stakeholders (Laia and Cicia, 2016); (6) understanding the garden’s natural environment and culture (Jennings, 2004; Murray et al., 2007); and (7) controlling tourism impacts (Sang et al., 2011; Lee, 2011). These indicators allow for validating sustainable tourism activities that maintain a good balance of environmental, economic, socio-cultural and tourism development policies based, specifically, on the following criteria: (1) utilising the botanical garden’s resources optimally; (2) respecting socio-cultural life of the city, and (3) contributions of the Botanical Gardens to the local economy (Prabprie et al., 2016; Ruhanen, 2013; Haller et al., 2011). We constructed two semi-structured questionnaires where the above indicators were used to derive corresponding affirmative statements as follows:

1. The Gardens gains profit without destroying its resources
2. Law enforcement regulates the Garden’s environment successfully
3. Management and monitoring plans are effective
4. Visitors’ satisfaction is improving
5. Enterprising participation of stakeholders is active
6. The importance of the Garden’s landscapes and culture is well understood
7. Tourism impacts on the Garden are well controlled

And

1. The Garden’s resources are utilised optimally
2. Socio-cultural importance of the Garden to the city of Bogor is important
3. The Garden’s contribution to the city’s economy is important

The statements were transformed into questions by asking the respondents to express their agreement or disagreement to these statements according to the Likert scale (Miller and Salkind, 2002) through six levels from 1 (strongly disagree) to 6 (strongly agree). To ensure consistency, each respondent was questioned five different times (Jenning, 2001; Davenport and Davenport, 2006).

The collected data were analysed with content analysis. The contents were extracted based on the respondents ratings of the above statements, and the Inter-rater’s agreement was quantified as Fleiss’ kappa (κ) as described by Landis and Koch (1977). All the analyses and calculations were performed using software SAS/STAT (SAS Institute Inc., NC, USA).

We also organised two group discussions. First, 50 respondents discussed “Sustainable management in the Bogor Botanical Garden”. Second, 50 respondents discussed “Sustainable tourism in Botanical Garden”. The group discussion participants were new. These meetings were rather general discussions to see whether the picture emerged from the survey was representative (Ong and Smith, 2014; Dredge and Jamal, 2013). At the meeting, the participants discussed the importance of the BBG to the social, economical and cultural life of the city of Bogor. These discussions were semi-structured in the sense that the

<table>
<thead>
<tr>
<th>Botanical Garden</th>
<th>Area</th>
<th>Annual number of visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kew Gardens, UK</td>
<td>128 ha landscaped and 490 ha natural vegetation</td>
<td>1 million</td>
</tr>
<tr>
<td>Kirstenbosch, South Africa</td>
<td>82 ha</td>
<td>1 million</td>
</tr>
<tr>
<td>Singapore, Singapore</td>
<td>87 ha</td>
<td>4.7 millions</td>
</tr>
<tr>
<td>Bogor, Indonesia</td>
<td>87 ha</td>
<td>2 million</td>
</tr>
</tbody>
</table>

Table 1
participants discussed the same 10 indicators of sustainable tourism (above).

Our survey established certain components of sustainability in visitor management at the BBG. Maintaining profitability without destroying the garden’s resources was the most highly rated by the respondents (Table 3a). The respondents also rated improving visitors’ satisfaction and controlling tourism impacts as the second and third highest values, respectively. Conversely, managing and understanding natural environment as well as its links to the culture received lower ratings. Apparently, participation of enterprising stakeholders as well as natural environment as well as its links to the culture received lower values, respectively. Conversely, managing and understanding natural environment as well as its links to the culture received lower values, respectively.

The values of $\kappa > 0.6$ indicate to a substantial agreement among the respondents (Landis and Koch, 1977). Therefore, the results of assessment of tourism sustainability (Table 3b) actually validates the results of assessment for management sustainability (Table 3a). Overall, our analyses of sustainable tourism in the BBG indicates an already high level of resource utilisation, whilst the economic profitability of visitors management is not clear and needs further study for optimisation.

The general discussions mostly conformed to the main findings emerged from the survey (as reported in Tables 3a and 3b). Mostly the opinions were similar and the participants easily agree with each other. Important additional issues, even though not directly related to the BBG, were raised. Among these issues were the tower-type buildings erected close to the garden which spoil the landscapes of the BBG, and the city’s planning of roads and traffic which appears to be poor. Most importantly, all unanimously agree that the BBG represents not only a great cultural and social asset for the city of Bogor as well as for the entire nation, but also the BBG is a very important urban green area which shall enjoy wide public support and special care from the authorities.

Our results suggest that certain components of sustainably managed tourism are strongly present in the BBG. This is evident from the high ratings given to non-destructive use of the garden’s resources and caring about visitors’ satisfaction. While the importance of non-destructive resource use to sustainable tourism is self-evident, that of visitors’ satisfaction might not be so clear for botanical gardens as their traditional functions do not include mass tourism. Nevertheless, recreation can be the most important motivation to the majority of garden visitors as it was found in Germany (Borsch and Löhne, 2014), the United States of America (Wassenberg et al., 2015) and South Africa (Ward et al., 2010). Titus (2015) reports that 73% of visitors came to the Kirstenbosch National Botanical Gardens for leisure and recreation, whilst only 9% of the visitor preferences were for educational reasons – to gain knowledge on plants. These preferences of the visitors must be satisfied (Grilley et al., 2010) and this seems to be already incorporated

Table 2
Respondent groups of the questionnaire-based survey.

<table>
<thead>
<tr>
<th>Group of respondents</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogor travel agents</td>
<td>11</td>
</tr>
<tr>
<td>Ministry of tourism staff members</td>
<td>9</td>
</tr>
<tr>
<td>Tourist bus drivers</td>
<td>11</td>
</tr>
<tr>
<td>Taxi drivers</td>
<td>12</td>
</tr>
<tr>
<td>Public car drivers</td>
<td>12</td>
</tr>
<tr>
<td>The BBG receptionists, concierges, reservation and other officers</td>
<td>12</td>
</tr>
<tr>
<td>City Hall officers (Dept. Infrastructure, Dept. Social and Environmental Impact Assessment)</td>
<td>8</td>
</tr>
<tr>
<td>Bogor local community members</td>
<td>13</td>
</tr>
<tr>
<td>Bogor tour guides</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 3a
Sustainability of management in the Bogor Botanical Gardens.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
<th>Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability without destroying natural resources</td>
<td>36</td>
<td>0.1837</td>
</tr>
<tr>
<td>Improving visitors’ satisfaction</td>
<td>31</td>
<td>0.1582</td>
</tr>
<tr>
<td>Controlling tourism impacts on the botanical gardens</td>
<td>28</td>
<td>0.1429</td>
</tr>
<tr>
<td>Understanding garden’s natural environment and culture</td>
<td>27</td>
<td>0.1378</td>
</tr>
<tr>
<td>Regulatory role of garden’s environment law enforcement</td>
<td>26</td>
<td>0.1327</td>
</tr>
<tr>
<td>Management and monitoring plans</td>
<td>25</td>
<td>0.1276</td>
</tr>
<tr>
<td>Participation of the enterprising stakeholders</td>
<td>23</td>
<td>0.1429</td>
</tr>
<tr>
<td>Coefficient Kappa ((\kappa))</td>
<td>0.6222</td>
<td></td>
</tr>
</tbody>
</table>

Table 3b
Sustainability of tourism in the Bogor Botanical Gardens.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
<th>Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilizing the botanical garden’s resources optimally</td>
<td>29</td>
<td>0.3494</td>
</tr>
<tr>
<td>Botanical gardens’ economic contributions</td>
<td>28</td>
<td>0.3373</td>
</tr>
<tr>
<td>Respecting socio-cultural life of the city</td>
<td>26</td>
<td>0.3133</td>
</tr>
<tr>
<td>Coefficient Kappa ((\kappa))</td>
<td>0.6148</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1. Location of the Bogor Botanical Gardens: total area 87 ha, Latitude: – 6.5959, Longitude: 106.7900, Annual Rainfall: 4330 mm, Altitude: 250 m (http://www.worldatlas.com/as/id/jb/where-is-bogor.html).
into the tourism management at the BBG.

Other components of sustainable tourism management appeared to be presented weakly at the BBG. In particular, the respondents did not rate highly the regulatory role of garden’s environment law enforcement and monitoring management plans. Systematically, these low ratings coincide with certain signs of poor management in the BBG that can dissatisfy visitors (the authors’ personal observations). There are landfills and water draining spots in the garden which visitors can easily see or even come to contact; it is easy to find garbage freshly littered in many corners, among others in the famous lily pond; some benches are “decorated” with graffiti; many trees or plants lack tags, or the tags are faded and impossible to read; there are fallen tree trunks seen—all these together give an impression of relatively low discipline in the management of the BBG. Actually, there were casualties when a tree fell down accidentally (The Jakarta Post, 2015 January 11). Also, recently an old lychee tree of the garden fell down after heavy rains, this time no casualties (The Jakarta Post, 2017 October 4). There are other negative trends too, which can be attributed to the rapid development of the City of Bogor (Hotimah et al., 2015): the number of bird dies in urban setting and its relationship in motivational theory. Procedia-Soc. Behav. Sci. 170, 442–451.

In conclusion, the obtained results show that the BBG is implementing certain elements of sustainable tourism management but there are also problems that require attention and action. Evidently, a deeper study is necessary to better understand and manage these problems, first of all the limited monitoring and implementation of management plans and weak stakeholder participation. The situation described in our study can be similar to those existing in rapidly growing urban centres in Bogor. These issues should be addressed urgently and most probably will need active participation between workers and the communities surrounding the BBG.

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