

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 80% 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

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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

Table 1
Comparison of prominent botanical gardens (data from <http://www.bgci.org>).

Botanical Garden	Area	Annual number of visitors
Kew Gardens, UK	128 ha	1 million
Kirstenbosch, South Africa	38 ha landscaped and 490 ha natural vegetation	1 million
Singapore, Singapore	82 ha	4.7 millions
Bogor, Indonesia	87 ha	2 millions

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 (Prabpriree 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

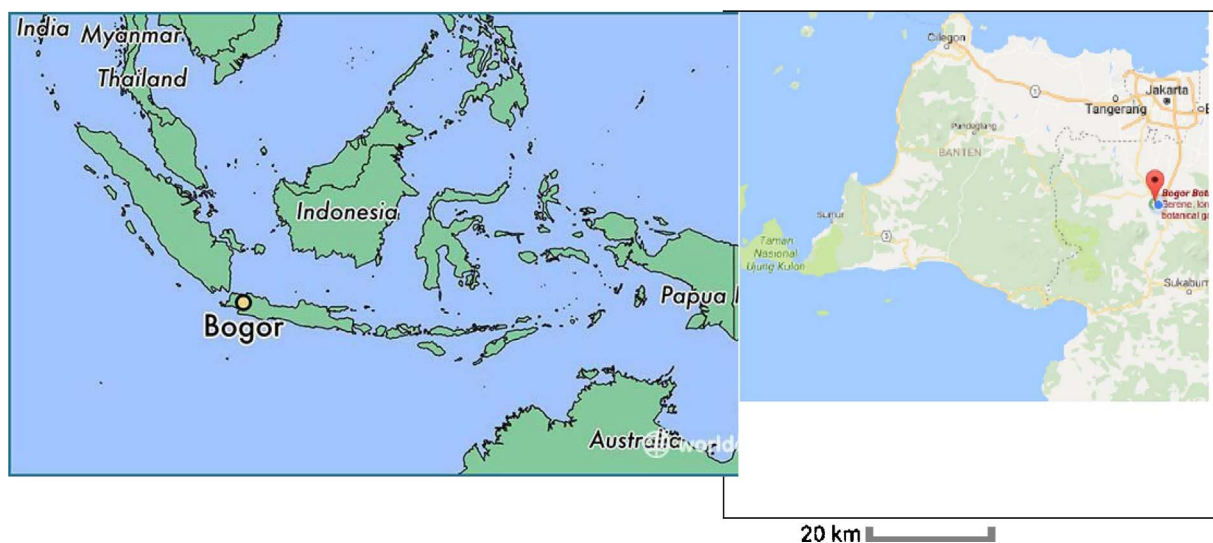


Fig. 1. Location of the Bogor Botanical Gardens: total area 87 ha, Latitude: -6.5959, Longitude: 106.7900, Annual Rainfall: 4330 mm, Altitude: 250 m (<http://www.worldatlas.com/as/id/jb/where-is-bogor.html>).

Table 2
Respondent groups of the questionnaire-based survey.

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

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 (Tables 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 management performance and monitoring were ranked rather weakly in the life of the BBG. The results of assessment of tourism sustainability at the BBG (Table 3b) conformed to those of management sustainability (Table 3a) with close values of raters’ agreement: the coefficient kappa (κ) was 0.62 and 0.61 for the management and tourism, respectively.

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

Indicator	Value	Freq
Profitability without destroying natural resources	36	0.1837
Improving visitors’ satisfaction	31	0.1582
Controlling tourism impacts on the botanical gardens	28	0.1429
Understanding garden’s natural environment and culture	27	0.1378
Regulatory role of garden’s environment law enforcement	26	0.1327
Management and monitoring plans	25	0.1276
Participation of the enterprising stakeholders	23	0.1429
Coefficient Kappa κ =	0.6222	

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

Indicator	Value	Freq
Utilizing the botanical garden’s resources optimally	29	0.3494
Botanical gardens’ economic contributions	28	0.3373
Respecting socio-cultural life of the city	26	0.3133
Coefficient Kappa (κ)	0.6148	

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

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. Symptomatically, 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 species decreased from 85 in 2002 to 35 in 2007, bat abundance decreased noticeably, and the shade cast by trees became less; there are too many cars allowed to circulate within the garden. These issues should be addressed urgently and most probably will need active participation between workers and the communities surrounding the BBG.

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 conurbations of Malay Archipelago, Indochina and SE Asia. The reported findings can be also relevant to urbanising areas of the developing world in general.

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References

- Baker, K., 2006. Tempering the elements: botanic gardens and the search for paradise. In: PLEA2006—The 23rd Conference on Passive and Low Energy Architecture. Geneva, Switzerland, 6–8 September 2006.
- Ballantyne, R., Packer, J., Hughes, K., 2008. Environmental awareness, interests and motives of botanic gardens visitors: implications for interpretive practice. *Tour. Manag.* 29 (3), 439–444.
- Benfield, R., 2013. *Garden Tourism*. CABI.
- Borsch, T., Löhne, C., 2014. Botanic gardens for the future: integrating research, conservation, environmental education and public recreation. *Ethiop. J. Biol. Sci.* 13 (1S), 115–133.
- Catahan, N., Woodruffe-Burton, H., 2017. Strategically managing sustainable and innovative business development in uncertain times: an exploratory study of botanic gardens. In: The 50th Academy of Marketing Conference, Freedom Through Marketing: Looking Back, Going Forward. 3–6 July 2017, Hull University Business School.
- Catibog-Sinha, C., Wen, J., 2008. Sustainable tourism planning and management model for protected natural areas: Xishuangbanna Biosphere Reserve, South China. *Asia Pac. J. Tour. Res.* 13 (2), 145–162.
- Chang, L.S., Bisgrove, R.J., Liao, M.Y., 2008. Improving educational functions in botanic gardens by employing landscape narratives. *Landsc. Urban Plan.* 86 (3), 233–247.
- Crilley, G., Price, B., 2006. Visitor service quality, visitor benefits, and behavioural intentions: an empirical investigation at an Australian botanic garden. *CAUTHE 2006: To the City and Beyond*. pp. 1378.
- Crilley, G., Hills, J., Cairncross, G., Moskwa, E., 2010. Identifying visitor service quality in Australian regional botanic gardens. *Ann. Leis. Res.* 13 (3), 476–496.
- Crilley, G., 2008. Visitor service quality attributes at Australian botanic gardens: their use in predicting behavioural intentions. *Ann. Leis. Res.* 11 (1–2), 20–40.
- Davenport, J., Davenport, J.L., 2006. The impact of tourism and personal leisure transport on coastal environments: a review. *Estuar. Coast. Mar. Sci.* 67 (1–2), 280–292.
- Dredge, D., Jamal, T., 2013. Mobilities on the Gold Coast, Australia: implications for destination governance and sustainable tourism. *J. Sustain. Tour.* 21 (4), 557–579.
- Garrod, G., Pickering, A., Willis, K., 1993. The economic value of botanic gardens: a recreational perspective. *Geoforum* 24 (2), 215–224.
- Gunawan, A., Pratiwi, P.I., 2015. User behaviours on specific environment in Bogor Botanical Garden. *ASEAN J. Hosp. Tour.* 14 (1), 3–12.
- Hakkinen, M., Vare, H., 2008. Taxonomic history and identity of *Musa dasycarpa*, *M. velutina* and *M. assamica* (Musaceae) in Southeast Asia. *J. Syst. Evol.* 46 (2), 230–235.
- Haller, I., Stybel, N., Schumacher, S., Mossbauer, M., 2011. Will beaches be enough? Future changes for coastal tourism at the German Baltic Sea. *J. Coast. Res. Manag. Recreat. Resour.* 61, 70–80.
- Hasibuan, H.S., Soemardi, T.P., Koestoe, R., Moersidik, S., 2014. The role of transit oriented development in constructing urban environment sustainability, the case of Jabodetabek. *Procedia Indonesia. Environ. Sci.* 20, 622–631.
- Heywood, V.H., et al., 1987. The changing rôle of the botanic gardens. In: Bramwell, David (Ed.), *Botanic Gardens and the World Conservation Strategy*. Academic Press, London, pp. 3–18.
- Heywood, V., 2009. Botanic gardens and genetic conservation. *Sibbaldia: J. Bot. Gard. Hort.* 7, 5–18.
- Hill, A.W., 1915. The history and functions of botanic gardens. *Ann. Mo. Bot. Gard.* 2 (1/2), 185–240.
- Hotimah, O., Wirutomo, P., Alikodra, H.S., 2015. Conservation of world heritage botanical garden in an environmentally friendly city. *Procedia Environ. Sci.* 28, 453–463.
- Jenning, G., 2001. *Tourism Research*. John Wiley & Sons Australia, Ltd., pp. 136–152.
- Jennings, S., 2004. Coastal tourism and shoreline management. *Ann. Tour. Res.* 31 (4), 899–922.
- Krishnan, S., Novy, A., 2016. The role of botanic gardens in the twenty-first century. *CAB Rev.* 11 (23), 1–10.
- Laia, M.B., Cicia, G., 2016. Pescaturism, a sustainable tourist experience. *J. Clean. Prod.* 133 (1), 1034–1042.
- Landis, J.R., Koch, G.G., 1977. The measurement of observer agreement for categorical data. *Biometrics* 33 (1), 159–174.
- Lee, T.H., 2011. How recreation involvement, place attachment and conservation commitment affect environmentally responsible behavior. *J. Sustain. Tour.* 19 (7), 895–915.
- Miller, D.C., Salkind, N.J., 2002. *Handbook of Research Design and Social Measurement*. Sage.
- Morari, F., Giardini, L., 2002. Irrigation automation with heterogeneous vegetation: the case of the Padova botanical garden. *Agric. Water Manag.* 55 (3), 183–201.
- Moskwa, E.C., Crilley, G., 2012. Recreation, education, conservation: the multiple roles of botanic gardens in Australia. *Ann. Leis. Res.* 15 (4), 404–421.
- Murray, D., Price, B., Crilley, G., 2007. Advocacy and visitation levels in Australian botanic gardens: process and outcome benefits. *J. Park Recreat. Adm.* 25 (3), 67–88.
- Ong, L.T.J., Smith, R.A., 2014. Perception and reality of managing sustainable coastal tourism in emerging destinations: the case of Sihanoukville, Cambodia. *J. Sustain. Tour.* 22 (2), 256–278.
- Othman, N., Mohamed, N., Ariffin, M.H., Razak, M.A.W.A., 2015. Landscape visual studies in urban setting and its relationship in motivational theory. *Procedia-Soc. Behav. Sci.* 170, 442–451.
- Prabprirree, M., Maneenetr, T., Siriwong, P., Yaipool, K., 2016. Implementing sustainable beach tourism management framework for the Royal Coast Cluster, Thailand. *Asian Soc. Sci.* 12 (8), 146–153.
- Ruhanen, L., 2013. Local government: facilitator or inhibitor of sustainable tourism development? *J. Sustain. Tour.* 21 (1), 80–98.
- Russel, W., 2002. *The Christchurch Botanic Gardens: Their Place in Contemporary Urban and Tourism Development*. Lincoln University Doctoral dissertation.
- Rustiadi, E., Saefulhakim, S., Panuju, D.R., 2009. *Perencanaan dan pengembangan wilayah*. Yayasan Pustaka Obor Indonesia.
- Sang, W., Ma, K., Axmacher, J.C., 2011. Securing a future for China's wild plant resources. *BioScience* 61 (9), 720–725.
- Santosa, E., Widiyanto, G., Lontoh, A.P., Agustini, E.K., Takahata, K., Mine, Y., Sugiyama, N., 2014. Invasive weeds in Bogor Botanic Gardens, Indonesia and its implication on surrounding landscapes. *Bul. Kebun Raya (Sci. J.)* 17 (2), 113–126.
- Shackleton, C.M., 2012. Is there no urban forestry in the developing world? *Sci. Res. Essays* 7 (40), 3329–3335.
- Spencer, R., Cross, R., 2016. The origins of botanic gardens and their relation to plant science, with special reference to horticultural botany and cultivated plant taxonomy. *Muelleria* 35, 43–93.
- Sutherland, L.A., 2009. Broadening the view of ecotourism: botanic gardens in less developed countries. In: Hill, J.L., Gale, T. (Eds.), *Ecotourism and Environmental Sustainability: Principles and Practice*, pp. 197–222.
- The Jakarta Post, 2015a. *Four Dead, 21 Injured After Tree Falls in Bogor Botanical Gardens*. January 11. <http://www.thejakartapost.com/news/2017/10/04/oldest-tree-in-bogor-botanical-gardens-falls-down-after-heavy-rains.html>.
- The Jakarta Post, 2015b. *Oldest Tree in Bogor Botanical Gardens Falls down After Heavy Rains*. October 4. <http://www.thejakartapost.com/news/2017/10/04/oldest-tree-in-bogor-botanical-gardens-falls-down-after-heavy-rains.html>.
- Thomas, W.W., 2016. 125 years of floristic research and collecting at The New York Botanical Garden. *Brittonia* 68 (3), 222–229.
- Titus, N., 2015. *A Model for the Development of Slow Tourism in South Africa Using the Economic Resources of the Kirstenbosch National Botanical Gardens*. Cape Peninsula University of Technology Doctoral dissertation.
- Ward, C.D., Parker, C.M., Shackleton, C.M., 2010. The use and appreciation of botanical gardens as urban green spaces in South Africa. *Urban For. Urban Green.* 9 (1), 49–55.
- Wassenberg, C.L., Goldenberg, M.A., Soule, K.E., 2015. Benefits of botanical garden visitation: a means-end study. *Urban For. Urban Green.* 14 (1), 148–155.
- Wassenberg, C.L., 2012. *Botanic Garden User Outcomes: A Means-End Investigation*. A Thesis Presented to the Faculty of California Polytechnic State University, San Luis Obispo.
- Wyse, J., Sutherland, L.A., 2000. *International Agenda for Botanic Gardens in Conservation*. Botanic Gardens Conservation International.