Jakarta Green Open Areas and Its Challenges

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Abstract

Green open areas (GOA) are open areas where the land surfaces are not covered by designed building or housing or other constructions. Inside this open areas are grew or planted by designed plants, such as the species of grasses, herbs, shrubs and trees. The GOA in Jakarta are basically divided into two big groups, those are protected GOA and Guided GOA. In the protected GOA, they include nature reserves, protected forests and tourism forests; and in the guided GOA are urban forests, which include city parks, many kinds of greenbelts along the roads, railways, rivers, lakes etc., cemeteries or graveyards, and other GOA. In this paper the condition, function and use, problem and suggestion how to solve and manage the GOA in Jakarta are discussed.

Key Words: condition, greenery space, management, metropolitan city, use

1. Introduction

Jakarta is a capital city of the world's fifth populous nation and home to more than 10 million Indonesian people (Anonymous, 1999) and Jakarta is also as a metropolitan city by any measure and with status as a special region province of the capital city (Propinsi Daerah Khusus Ibukota).

According to Widyastuti (2005), based on study of the Landscape Department, University of Trisakti in 2003, the results mentioned that the green open area: GOA of Jakarta in the year 1972 were 32,110 hectares or about 49 percent of the total city areas of Jakarta. The GOA had declined dramatically up to 11 percent in year of 1999 or becoming about only 7,247 hectares. The main causes of the declining of GOA in Jakarta are due to currently too many of the GOA have been converted into business and commercial centres and also housing areas. Based on Jakarta City Park Agency (Dinas Pertamanan Propinsi Daerah Khusus Ibukota Jakarta), the GOA in Jakarta is currently about 6,824 ha or about 9.97 percent of the total city areas (Table 1), where the total city areas of Jakarta is about 68,445 hectares.

Historically, Jakarta had developed during the Dutch colonial zed city of Batavia, the previous name

Table 1. The total area of green open areas in Jakarta.
(Source: Jakarta City Park Agency, 2002)

Types of GOA	Total area of GOA	
	Area (ha)	Percentage to total area of Jakarta (%)
Protected Green Areas	**340.80**	**0.50**
1. Nature reserve	196.22	
2. Protected forest	44.76	
3. Tourism forest	99.82	
Guided Green Areas	**6,482.82**	**9.47**
1. Urban forests, city parks etc.	786.69	
2. Median and margin Greenbelt of roads	555.80	
3. River green belts	28.84	
4. Sport green areas	498.55	
5. Cemeteries / Graveyards	566.48	
6. Agricultural areas	3,431.55	
7. High-voltage transmission lines	23.70	
8 GOA of islands	51.00	
9. Other GOA	1,882.70	
i.e. - Public building parks		
- Railways greenbelts		
- Recreation parks		
Total Areas:	**6,823.62**	**9.97**

of Jakarta. It grew up around the ancient spice-trading harbour during the 15th and 16th centuries, and it was known as Sunda Kelapa in year of 1522. This port located at the northern end of Jakarta where the Ciliwung river met the Java sea. In 1527, the port was conquered by the joint Islamic forces of Banten and Demak Kingdoms and re-named as Jayakarta, which means "City of Victory" (Boileau, 1991). When 'Dutch colonialist' built up the Batavia city (houses, buildings, offices and roads and others), they also built parks, gardens and greenbelt of roadside by planting of ornamental plants and shade trees. Today, some of those trees still grow in many places of Jakarta. The development of GOA which basically divided into two big groups, those are the protected GOA (which include nature forest, protected forest and tourism forest) and the guided GOA (as urban forests which they include city parks, public gardens, all types of greenbelts, etc.) are formally based on the Jakarta's Master Plan 1965-1985. And then it develops into the Jakarta Master Plan 1985-2005. In 1999, there were the administration revision on the 1985-2005 Master Plan and creating what is now called as the Jakarta 2000-2010 Master Plan.

This paper will discuss the understanding, types and uses of GOA in Jakarta. Some of agencies which do responsible for GOA, the condition of GOA in 2004 and the future GOA programs, with their planning, problems and suggestions, and the plants tree species, which are used for greening of GOA are also discussed.

2. Jakarta and Its City Development

Jakarta as a capital city of Indonesia lay on the lowland area, at the southern part of the Jakarta bay. Jakarta has developed relatively faster than other cities in Indonesia. The city has developed in many aspects of purposes therefore they have caused the declining of the quantity and quality of the GOA in Jakarta.

Naturally, the declining or destruction of GOA are able to be shown by the increasing of the air temperature, the decreasing of the soil water content, inundation and flooding, intrusion of the sea water and beach abrasion. The city development may increase the prosperous of the city population in the economic value. However on the other side, it can produce the negative impacts to the environment. In particular for the city planning aspects, where the city developments are able to decrease the GOA, where GOA itself are used for the stabilization of the city ecosystem.

The development of parks, gardens and greenery areas were formally based on Jakarta's Master Plan 1965-1985. The Master Plan has laid down pattern of green and recreation areas. The greenbelts will have to extend into the very core of the city along some natural features that made these extensions possible, such as rivers, lakes, valleys, old parks, rice fields etc.

To carry out the development of GOA in Jakarta, the most important is the available GOA, which is enough for all population or people in Jakarta, and this means that GOA can increase the sustainable of city living environment. For this duty, Jakarta City Park Agency has become the main agency for to do planning, developing, maintaining and guarding of the GOA. It is due to realize the beauty, clean, health, nice and well-planned metropolitan city.

3. Green Open Areas in Jakarta

The development of the GOA in Jakarta before the 1965-1985's Jakarta Master Plan was mostly in connection with the governmental political purposes, for example was the establishment Senayan Sport Areas in the Central Jakarta, with the Main Stadium as a centre areas. This sport areas are purposed for Asian Games event at that time. In the Jakarta 1985-2005's Master Plan, the strategy was to lay down a pattern of green open and recreation areas, and in ecological view it means to anticipate the sustainable of the soil water resources. Therefore, South Jakarta has been decided as the catchments areas with GOA and greenbelts along the streets or river margins. As the city's lung, GOA are the major producer of oxygen, an absorber of carbon dioxide and other pollutants, while aiding in the drainage of excess water.

3.1. What is green open areas?

The GOA are defined as "an open area where the land surfaces are not covered by designed building or housing and in this open areas are grew or planted by designed plants, such as the species of grasses, herbs, shrubs, and trees". In the GOA, where urban forests as part or component, they are developed to protect the balance and harmonizing of the nature and artificial ecosystems. And this conditions are able to decrease many kind of pollutions, and it will create a clean, health, nice, beauty and safe of the city environments (Jakarta Regional Laws No. 6, 1999). With this regulation, all GOA in Jakarta are able to be controlled, directed and managed. The GOA in Jakarta include the areas such as city parks, playing fields, cemeteries or graveyards, botanical gardens, green median strips and those beneath over-

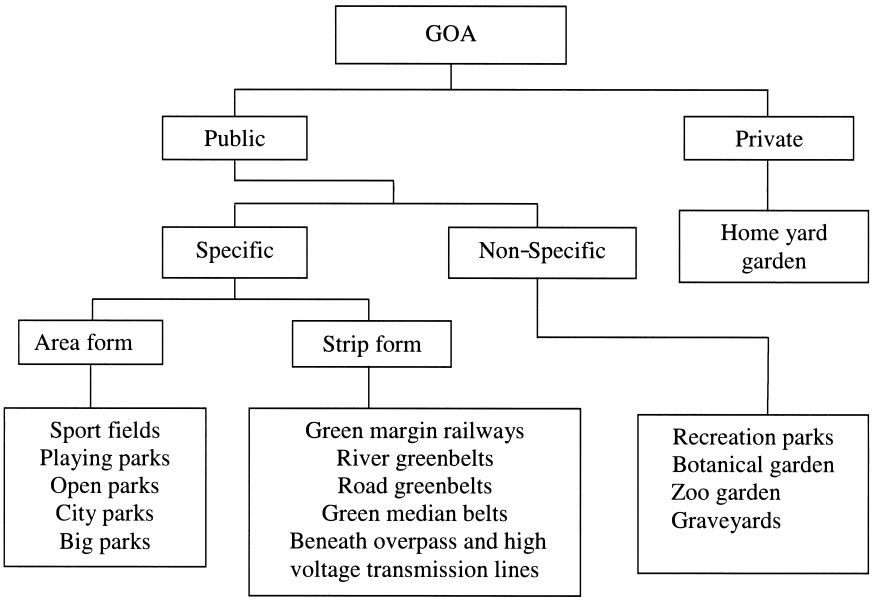

Figure 1. Types of GOA in Jakarta. Source: Jakarta City Planning Agency (2000)

pass and high-voltage transmission lines, as well as open areas along and around river banks, coastlines, lakes, marshes, reservoirs, dams and also environmentally friendly municipal dumps. All types GOA which are mentioned above are the part of the urban forests. Briefly, the GOA (Figure 1) are able to be divided based on the utilization (public or private), specification (i.e. cemetery, recreation park, etc.) and without-specification (i.e. open park, playing park, etc.), the form of area (i.e. city park, etc.) or strips (i.e. greenbelts etc).

3.2. What agencies do really responsible to GOA ?

Jakarta City Park Agency is an Agency or Service Office who really responsible in planning, developing and maintaining of GOA in Jakarta City. This Agency works and responsible to Jakarta Provincial Government. Other agencies do also responsible on GOA in Jakarta and make coordination and networking with Jakarta City Park Agency are such as:

- Jakarta City Planning Agency
- Jakarta Public Work Agency
- Jakarta Agricultural Agency
- Jakarta Forestry Agency
- Jakarta Fishery Agency
- Jakarta Poultry Agency
- Jakarta Sport and Youth Agency
- Jakarta City Tourism Agency
- Jakarta City Cleaning Agency
- Jakarta Public Cemetery Plan Agency
- Jakarta Governmental Electricity Company

- Jakarta Governmental Road Construction Company
- Jakarta Regional Planning Board
- Jakarta Regional Environment Impact Analysis Board

The horizontal relationship between those agencies or service offices formerly was through the regional offices, but now is directly to the local government which are under the authority of the governor, and then city mayor. In the case of GOA, those Agencies work by a guiding of their Department missions, under the coordination of Jakarta City Park Agency to achieve the target on GOA program and planning.

Based on the Provincial Regulation of Jakarta No. 3, 2001, the main task of Jakarta City Park Agency is to take care of system and maintain the GOA, city open areas, the beauty of city and the city ornaments and also services in park and garden information.

The vision of Jakarta City Park Agency is to realize the system planning on the GOA, the beauty of Jakarta city and they are four missions to be achieved, those are:

1. To create GOA which in match to the Jakarta City developments.
2. To do greening activities with plants species in all of open areas in Jakarta.
3. To increase the beauty of city through the adding of suitable ornamental of the city accessories in the open areas.
4. To lay a foundation for the activity of public participation on city park aspects and the beauty of Jakarta city.

The reality target of the vision, mission and task of Jakarta City Park Agency in the future are the increasing of quality and quantity of city parks, greenbelts along roads and rivers, shelter or shade trees, and the participation of publics for supporting and maintaining the parks and its city ornaments.

3.3. Condition and management of green open areas in Jakarta

Based on the Jakarta City Park Agency (2002), the total area of GOA in Jakarta was only 9.97 percent of the total Jakarta area or about 6,824 hectares (Table 1). And the total areas of Jakarta as Special Region of Indonesian Capital City is about 68,445 hectares.

The GOA which is directly managed by the Jakarta City Park Agency are divided into protected GOA and guided GOA (Daerah Binaan Hijau Terbuka). Guided GOA are particularly city parks and greenbelts along the roads and rivers. Evaluation of the total city parks, greenbelts and guided public parks by Jakarta City Park Agency (2002) showed that in a whole the total areas were about 2,067 hectares. The distribution of city parks, city greenbelts and guided public parks are scattering in all 5 county (Kota Madya), those are Central Jakarta, West Jakarta, East Jakarta, North Jakarta and South Jakarta (Table 2). For example in Central Jakarta, it has 158 city parks with the total areas of about 131.91 ha; 403 greenbelts with the total areas 139.28 ha and 72 guided public areas with the total areas about 102.84 ha.

The head of county is a City Mayor (Walikota). The hierarchy between City Mayor, Governor of the Jakarta Province and the Minister of Internal Affair (Menteri Dalam Negeri) is a consultancy line, but from governor to head of the village are a direct order. Under the Governor, there are many Agencies or Service Offices (Dinas), Regional Planning Board (BAPPEDA), and Regional Environmental Impact Analysis Board (BAPEDALDA). The Regional Environmental Impact Analysis Board acts as a local government to manage the local natural environment (Figure 2).

Table 2. Total number city parks, greenbelts and guided public parks in Jakarta based on Jakarta City Park Agency (2002)

No	County Level	GOA						Total areas (ha)
		City park		Greenbelts		Guided public parks		
		Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	
1.	Central Jakarta	158	131.91	403	139.28	72	102.84	374.03
2.	North Jakarta	105	18.91	134	76.75	18	0.73	96.38
3.	West Jakarta	75	8.68	127	76.04	11	5.75	90.48
4.	South Jakarta	290	244.03	303	138.44	80	21.19	403.66
5.	East Jakarta	157	678.57	211	185.42	13	238.52	1,102.51
Total		785	1,082.10h	1,178	615.93h	194	369.03h	2,067.07

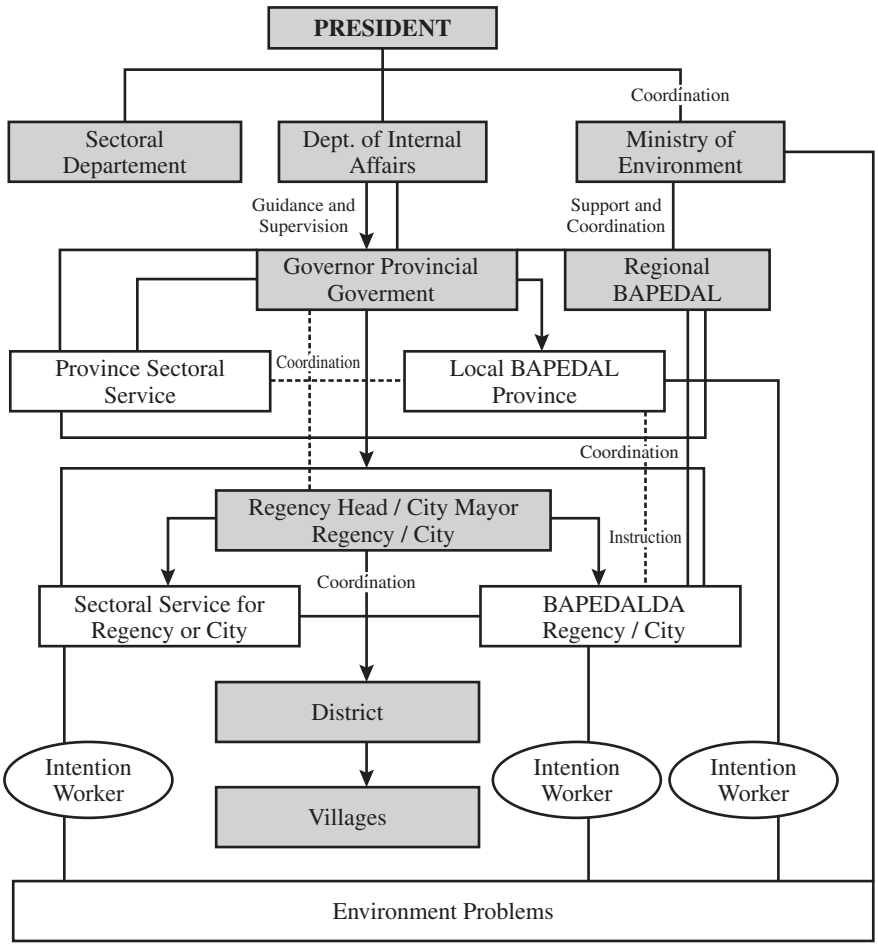

Figure 2. Government structure and environmental management. Source: Moersidik (2003)

3.4. Function and use of green open areas

Trees are a necessary component of GOA in the urban ecosystem. Urban forest must be adequately considered for residential areas, school playground, parks and civic centres which provide services and benefits to the people.

The ecological, social and economic benefits of the provided trees are considerable values into the urban environment. Trees have the ability to control wind and water erosion, help stabilizing the soil, provide shade from the heat of the sun, filter impurities from the air by minimizing the toxic effects of pollutants, offer beauty and comfort, screen objectionable views, as well as provide privacy and modify temperature and humidity. They also reduce or abate noise. Economically, trees provide added value to real property. On the social aspect, trees are perceived as important natural features in the urban landscape, provide sensory stimulation in an urban environment and calm effects to the tense atmosphere (Ramoran, 1980; Gold, 1977).

On the other word, GOA with trees as the main living component are supplying to urban or city people, such as fresh and clean air, comfortable, beautiful and healthy environment and also adding value to real property i.e. fruit and wood.

4. Planning of Green Open Areas for Year 2010

Based on the Jakarta City Park Agency (2002), on the Regional Planning on Space Arrangement (Rencana Tata Ruang Wilayah) 2010, the target for GOA in 2010 is about 13.4 percent or 9,544.81 hectares (Table 3). It means the total of GOA in Jakarta has been planned to increase from 9.97 percent to 13.94 percent of the total areas of Jakarta.

Table 3. Target of Jakarta Green Open Areas in 2010. Based on Jakarta City Park Agency (2002).

Types of GOA	Planning target of GOA in 2010	
	Area (h)	Percentage to total area of Jakarta (%)
Protected green areas	340.80	0.50
1. Nature reserve	196.22	
2. Protected forest	44.76	
3. Tourism forest	99.82	
Guided green areas	9,204.01	13.44
1. Urban forests, City parks	1,294.78	
2. Green median strips and roads greenbelts	2,320.61	
3. River greenbelts	159.64	
4. Sport GOA	498.55	
5. Cemetery areas	745.18	
6. Agricultural areas	3,431.55	
7. Green areas under high-voltage transmission	23.70	
8 Island GOA	190.00	
9. Other GOA	540.00	
Total	9,544.81	13.94

5. Tree Species for Greening Program in Jakarta

As mentioned earlier that trees are the most important biotic component in the city or urban GOA. Results from the short field-survey in some sites of GOA in Jakarta on July 2004 showed that there are some common tree species which generally used for the greening program.

Indonesian government through the Forestry Department has two (2) programs for rehabilitation on the abandonment and destroyed areas, those are called "reboisasi" (particularly on the abandonment or destroyed forest areas, i.e. after logging operation or abandonment lands after shifting cultivation) and "penghijauan" (greening programme and it is programmed for abandonment open land areas in the villages and urban areas). List of tree species which be used for greening (penghijauan) programs are shown in Appendix 1.

Pratiwi (2000) mentioned that in West Java (include Jakarta and Banten), there are nine (9) favourite tree species for local reboisasi and penghijauan programmes. They are jati (*Tectona grandis*), pinus (*Pinus merkusii*), mahoni (*Swietenia macrophylla*), damar (*Agathis dammara*), sungkai (*Peronema canescens*), sengon (*Paraserianthes falcataria*), kayu afrika (*Maesopsis eminii*), karet (*Hevea brasiliensis*) and durian (*Durio zibethinus*).

Some of the common and familiar tree species along the road or street and they are used as greenbelts on the urban or city areas are i.e. bungur (*Lagerstroemia speciosa*), tanjung (*Mimusops* elengi), asam jawa (*Tamarindus indica*), sonokeling (*Dalbergia latifolia*) and mahoni (*Swietenia macrophylla*). Other tree species can be seen in the Appendix 1.

Riswan and Rachman (2004) based on his study on the vegetation along the Ciliwung river (river greenbelts) in Bogor and Jakarta Areas, mentioned that all species of bamboo, palm and trees protected the "sempadan" (river margin) from the erosion processes and economically useful for the local people. Tree species for erosion protection are such as *Dracontomelon dao, Hibiscus tiliaceus, Dysoxylum densiflorum, Ficus glomeorata, F. benjamina, F. padana, Syzygium pycnanthum, Pometia pinnata and Artocarpus elasticus*. Beside for erosion control, these species are also economically useful. Those species are *Antidesma bunius, Artocarpus integer, Cocos nucifera, Elaeocarpus grandiflorus, Gnetum gnemon, Erythrina fusca, Pterocarpus indicus*, and some bamboo species such as *Giganthochloa apus, G. verticillata, G. atter and Bambusa vulgaris*.

6. Management on the Green Open Areas in Jakarta

The Jakarta City Park Agency is facing a lot of problems for maintaining and developing of the Jakarta GOA and those problems are caused by such as:

1. Lacking on the coordination between involving agencies
2. There are many conflict interest in using the open city areas
3. There is no an integrated city planning
4. GOA in Jakarta are not yet effectively developed
5. The degree of the natural resource destruction and the environmental pollutions are too high
6. Participation of public society and stake holder are too weak

To achieve the planning target for year 2010, Jakarta City Park Agency (2002) is hoping that the programs on the GOA development and management have to be succeeded. This hoping include as follows:

1. The successful of the priority program of GOA development and City Greening as a basic support to the Jakarta City Ecosystem
2. Increasing of the public awareness on the existence of GOA, which both concern to the vegetation and the green areas where the plants grow
3. Increasing the public participation together with the local government to protect and save the achievement on the city greening program
4. Target for year 2010 GOA planning as much as 13.94 percent or about 9,544.81 hectares of the total area of Jakarta must be achieved
5. Jakarta City Park Agency is hoping a task to manage and develop the Central Government asset on GOA in Jakarta, i.e. Kemayoran urban forest and GOA on Senayan Main Stadium Areas. It will make easy for integrated management on GOA in Jakarta.

7. Conclusion

Urban forests as the main component of the GOA in Jakarta as a special region of capital city of Indonesia are able to be defined as the cultivation and management of trees for their present and potential contribution to the physiological, sociological and economic well-being of an urban society (Ramoran, 1980).

Based on the 2000-2100 Jakarta City Master Plan, it really needs that in 2010, the target of 13.94 percent or about 9,544.81 hectares of GOA in Jakarta have to be achieved. Therefore, there are a balancing between the sustainable GOA, the environmental development and the increasing population of Jakarta.

Jakarta can be divided into 5 County (Kota Madya), those are Centre, East, West, South and North Jakarta. The lowest total areas of GOA is in West Jakarta (90.48 hectares) with 75 City Parks, 127 Greenbelts and 11 Guided Public Parks. East Jakarta has the biggest total areas of GOA (1,102.51 hectares) with 157 City Parks, 211 Greenbelts and 13 Guided Public Parks (Table 2).

The GOA are really very important to keep the balancing in the urban ecosystem. Trees provide an considerable value in the urban or city environment by the ecological, social and economic benefits. Trees, as main living component in GOA system are able to supply fresh and clean air, include beauty, healthy and comfortable landscape and adding value of the real properties, i.e. fruit and wood.

Participation of local government and society, NGO which concern in particular on GOA and stake holders are needed to solve the problems in the management and development of GOA in Jakarta.

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Appendix 1. List of plant species for City Greening Program
(Source: Anonimous, 2002 ; Soejono, 20003)

No. Species	Family
I. Street Greenbelts:	
1. *Adenanthera pavonina* L.	Fabaceae
2. *Borassus flabellifer* L	Arecaceae
3. *Canarium indicum* L.	Burseraceae
4. *Cassia javanica* L.	Fabaceae
5. *Dalbergia latifolia* Roxb.	Fabaceae
6. *Diospyros celebica* Bakh.	Ebenaceae
7. *Lagerstroemia speciosa* (L.) Spreng	Lythraceae
8. *Maniltoa schefferi* K. Sch.	Fabaceae
9. *Mimusops elengi* L.	Sapotaceae
10. *Tamarindus indica* L.	Fabaceae
11. *Livistona rotundifolia* (Lamk.) Martius	Arecaceae
12. *Melaleuca cajuputi* Powel	Myrtaceae
II. Residential areas:	
1. *Averrhoa bilimbi* L.	Oxalidaceae
2. *A. carambola* L.	Oxalidaceae
3. *Cynometra cauliflora* L.	Fabaceae
4. *Syzygium cumini* (L.) Skeels	Myrtaceae
5. *S. polyanthum* (Wight) Walp.	Myrtaceae
6. *Graptophyllum pictum* (L.) Griffith	Acanthaceae
7. *Areca catechu* L.	Arecaceae
8. *Aglaonema pictum* (Roxb.) Kunth.	Araceae
9. *Codiaeum variegatum* (L.) Bl.	Euphorbiaceae
10. *Aglaia odorata* Lour.	Meliaceae
III. Shade plants:	
1. *Alstonia scholaris* (L.) R. Br.	Apocynaceae
2. *Azadirachta indica* A. Juss.	Meliaceae
3. *Barringtonia asiatica* (L.) Kurz.	Lecythidaceae
4. *Callophyllum inophyllum* L.	Guttiferae
5. *Diospyros blancoi* A. DC.	Ebenaceae
6. *D. malabarica* (Desr.) Koster.	Ebenaceae
7. *Ficus benyamina* L.	Moraceae
8. *Manilkara kauki* (L.) Dubard	Sapotaceae
9. *Terminalia catappa* L.	Combretaceae
10. *T. microcarpa* Decne	Combretaceae

Appendix 1. *Continued*

No.	Species	Family
IV. City and urban forest plants:		
1.	*Mimusops elengi* L.	Sapotaceae
2.	*Canarium commune* L.	Burseraceae
3.	*Filicium decipiens* (Wight & Arnott) Thwaites	Sapindaceae
4.	*Cynometra cauliflora* L.	Fabaceae
5.	*Crescentia cujete* L.	Bignoniaceae
6.	*Ficus benyamina* L.	Moraceae
7.	*F. elastica* Roxb. Ex Hornem	Moraceae
8.	*F. racemosa* L.	Moraceae
9.	*Diospyros ferrea* (Willd.) Bakh.	Ebenaceae
10.	*Elaeocarpus sphaericus* (Gaertn.) K. Schum.	Elaeocarpaceae
11.	*Milletia xylocarpa* Miquel	Fabaceae
12.	*Michelia champaca* L.	Magnoliaceae
13.	*Cananga odorata* (Lamk.) Hook f. & Thomson	Annonaceae
14.	*Agathis philippinensis* Warb.	Araucariacee
15.	*Swietenia macrophylla* King	Meliaceae
16.	*Myristica fragrans* Houtt.	Myristicaceae
17.	*Cassia siamea* Lamk.	Fabaceae
18.	*Bauhinia purpurea* L.	Fabaceae
19.	*B. malabarica* Roxb.	Fabaceae
20.	*Aleurites moluccana* (L.) Willd.	Euphorbiaceae
21.	*Tectona grandis* L.f.	Verbenaceae
22.	*Tamarindus indica* L.	Fabaceae
23.	*Terminalia catappa* L.	Combretaceae
24.	*Lagerstroemia loudonii* Teysm. & Binnend.	Lythraceae
25.	*Manilkara kauki* (L.) Dubard	Sapotaceae

Note: Scientific name refers to:

a. Backer and Bakhuizen van den Brink (1963-1968)

b. Jansen et al. (1991)