CHAPTER 01
CHAPTER 1
HISTORICAL BACKGROUND IN WAYSIDE TREES AND GREEN CITY

1.1. INTRODUCTION

The man has passed a number of stages during his development. In the hunter/gatherer phase, he was a wanderer and with no one place named as a home needing planted trees. Trees provided him with fuel, tools and also shelter. As food production increased to a level that could support several families, villages were formed (Fig. 1.1). Over time these villages grouped together and formed cities. People lived in suburbs linked by tracks. Track is a word that implies the most basic course along which movement may take place. The wide streets, laid out like spokes of a wheel allowed for rapid deployment of troops to any part of the city. Many economic activities developed within cities and there was a need to build a network of roads and streets linking cities and the path of cities.

Fig. 1.1 a) The avenue tree creates the formal approach to the village. It is enhancing the natural landscape setting of the village area (Reproduced by courtesy of the Trustees, The National Gallery, London). Source: McCluskey, 1992

Fig. 1.1 b) A Sri Lankan example from an avenue of royal palm in Peradeniya Botanical Garden. Credit: Gunasinghe W.K.D.
The concept of “Green City” can be used to develop cities with vegetation merging with the natural environment. Though there is no clear definition of the term Green City and a number of attempts have been made to define the term. Green cities can provide sufficient green areas for functional and productive green space (Hough 1990; Beer 1994). Green areas can be designed not only for recreation, but also for productive purposes. By using organic gardening practices, people learn more about the nutrient cycle. Organic gardening, "the development of planting design techniques, inspired by natural plant succession and speeded up through management, has helped to prepare the soil through sequential plant associations" (Hough 1984, p. 250). The amount of green space should be based upon site specific and community requirements, instead of a blanket policy requiring a certain percentages (Charette 1995).

The word street is derived from the Latin sternere, to pave, and so relates to all latin-derived words with the str root that are connected with building, with construction. Alley, for example, always implies a narrow passage; avenue, a wide street with one or more lines of trees; boulevard again suggests a tree-lined street as applied to eighteenth- and nineteenth-century towns. All of these words suggest different ways of considering the street. The term high street or main street, commonly a name of the principal street of many English and American towns, still carries the suggestion that an important long distance route passes through a settlement, and its built-up area (Anderson, 1978). Planting trees, landscaping parkway strips, and growing gardens offers that rare hands-on opportunity for neighbors to work together side by side, says Berry, director of San Jose’s Our City Forest but always within a coordinating plan related to the particular kind of streets involved.

The introductions of trees to urban areas including roads increase the green coverage in an area and add to the aesthetic value. Brenda Colvin (1973) has elaborated this idea stating that a town without gardens and vegetation in which two open space element of the pattern consist only of roads, courtyards and paving soon becomes monotonous, the larger the town the greater the need for green open spaces and tree forms as a foil to the buildings, and as additional elements in the design aesthetic indications again corresponding with the biological needs of sound health and social structures (Colvin,
Foot paths and cart roads have been traditionally used for traveling and for the transport of goods and as these roads extended into the surrounding country. The offered the travelers the opportunity to experience surrounding nature. Source: (McCluskey, 1992)

Brenda - Land and Landscape. It is not surprising that roadsides (waysides) in Sri Lankan urban and suburban areas have been planted with trees mainly for the practical purpose of providing shade and thus this was particularly beneficial in providing shelter for travellers on foot and by cart from earlier times. Many of these pathways and cart roads were eventually incorporated into Sri Lankan modern road network (Fig.1.2). Most of the ancient foot paths and cart roads were constructed through forest vegetation without exerting much pressure on the surrounding vegetation (De Silva, 1973) (Fig.1.3). For instance, during the Anuradhapura, Polonnaruwa kingdoms, roadsides were planted with trees and these roads were considered as a landscape element (Knox, 1681).
Both endemic and exotic trees have long been planted along these roadsides. Further, during the colonial period wayside trees were planted as a shady element in urban environments. Therefore, it is important to investigate the reintroduction of planting wayside trees along Sri Lanka's roads and to explore the community perception on the potential use of wayside trees in a landscape context. Introducing trees along the roadside will contribute to the mitigation of atmospheric CO₂ through the sequestration process carried out by green plants and offers landscape strategies that encourage sustainability and increase green space in the city. This helps to offset destruction of trees in cities, for road construction is very much higher than their introduction and establishment. Rapid urban growth with subsequent land clearances, construction or expansion of roads and increase in traffic threatens trees in our cities.

1.2. HISTORY OF WAYSIDE TREES LANDSCAPING AND GREEN CITY

The history of planting trees along roadsides extends back to the ancient civilizations (Geoffrey Jellicoe, 1987). It has been well-known that beautiful trees and water bodies are linked to religious faiths. For instance, in Mesopotamia, the Sumarians built the cities along the rivers which later these cities were organized into city-like structures referred to as "temple towns". Subsequently, this Green City concept led to introduction of wayside trees. The ancient Egyptian Civilization provides a best example of urban planting of trees (Fig.1.4) (Jellicoe, 1975, 1987).
During the early history, (Fig.1.5) in China there were vast functional water project way the inspiration for a tranquil lake landscape active with artificial islands and bunds and an urban scene of water streets that must have been clean and healthy (Jellicoe,1975,1987).

Fig. 1.5. Ancient China garden function with tranquil lake, buildings and trees.
Source: www.aroundchina.chinaassistor.com

In France tree-lined boulevards were introduced to Paris in the mid-1800s (Fig. 1.6). The main reason for boulevards, however, was to control movement of troops, and the trees provided those with some measure of shade and such plantings also provided beauty and unified architectural elements (Gene and Frederick, 1986). Trees have been esthetically important to people since earliest civilization. The Egyptians, Phoenicians, Persians, Greeks, Chinese and Romans held trees in high esteem and in certain situations worshipped them. They used trees for their esthetic benefits, developing formal gardens and sacred groves to enhance temple settings and to provide shade.

Fig. 1.6 The tree lined boulevard is the main character of the early France cities.
Source: (McCluskey, 1992)
In Western Classicism of wayside trees has been describing according to Jellicoe, 1975, 1987. By mid-century the Authoritative straight line across the landscape, the ideal of which had been the enclosed tree-lined avenue, began to take note of the environment through which it passed, whether urban or rural. Conceptually, the road or path may well pre-exist the permanence of human settlements (Anderson, 1978).

Even in these early culture trees were also used to complement status and provide a landscape for buildings. Along with these uses developed a rudimentary knowledge of tree care. Trans-planting of trees was common as early as 1500 B.C. in Egypt (Winters, 1974). Jorgensen stated that urban forestry as developed in Canada does not deal entirely with city trees or with single tree management, but rather with tree management in the entire area influenced by and utilized by the urban population. Part of the report focused on the theme that city trees constituted a resource that was not being adequately cared for.

An urban and community forestry program is created in the United States Forest Service. The program should encourage research into the problems of city trees, provide financial and technical assistance for the establishment and management of city trees and develop Federal training programs for the care of city trees (Gene and Frederick, 1986).

The urban forest includes all woody vegetation within the environs of all populated places, from the tiniest village to the largest cities. In this sense it includes not only trees within city limits but trees on associated lands that contribute to the environment of populated places—for example, green-belts, municipal watersheds, recreation sites, and roadsides.

Thus, in New York State, the urban forest enlarge from rows of street trees and clusters of park trees in New York City to ever-broadening greenbelts in contiguous suburbs, to coalensce in the forests of the Catskills, Adironacks, and Allegheny Highlands (Andresen, 1975). Along some highways, particularly those maintained by countries or states, tree situations are similar to those along streets. However, federal highways (often
called interstates, freeways, or traffic ways) generally involve large land areas where trees, shrubs, and other landscape plants have been planted (Gene and Frederick, 1986).

1.3. ANCIENT SRI LANKA WAYSIDE TREES LANDSCAPING AND ATTITUDES

Fig. 1.7. The historic village "Kada Mandiya" adjacent to road and natural vegetation. Source: www.lankapura.com

The village was identified with the tank and the tank was mostly named in association with a tree. The tank associated with Palu trees (*Mimusop hexandra*) was named as Palu-gas wewa, with the divul trees (*Limonia feronia*) as Divul-gas wewa, with the Kon trees (*Sclerichera olesa*) as Kon-gas wewa etc. Some times also the village associated with a large tree was identified by the name of a tree, i.e. Katugahamulla, Muratagaahmula, Dompe, Ampe, Nape etc (Fig. 1.7). When the village was identified with a grove of trees, the following terms were used with the name of the tree, Aramba, Damana, Patana, Landa, Vinna, Hinna, Deniya, Pola etc. When a village is identified with a forest, the following terms were used with the name of the tree type, Ana, Kuduwa, Kela, Wala, Gomuwa, Gola etc. (De Silva, 1996).

The historical evolution of street planting in Sri Lanka the present day situation and what measures can be recommended to preserve and enhance the urban environment by tree
planting in the future need to given special attention. An urban tree can’t be compared to a person in a prison cell- with its restricted root spread and restrained spread of its branches (Chandradasa, 1995). In Sri Lankan tradition, it is believed that there are divine spirits living in association with large trees and villagers still have the habit of respecting large trees and also lighting oils lamp in respect of the 'Wruksha Devata' or the Deity living in association with the tree. All these religio-cultural practices have influenced Sri Lankan society in respecting trees and nature. In ancient city planning in Sri Lanka, it is possible to identify the planning principles adapted in creating a built environment, while integrating and enhancing the aesthetic of nature in creating an architectural landscaping embracing the natural elements and vegetation. The proper understanding of these Sri Lankan traditions, plant species, their growth patterns, socio cultural uses and aesthetics are necessary in creating a health landscape environment (De Silva, 1996).

1.4. HISTORY OF GREEN SPACE WITH WAYSIDE TREES IN SRI LANKA

1.4.1 ANURADHAPURA AND POLONNARUWA KINGDOM

In natural sloping lands and in hills, different levels were reached either by walking along the slopes or creating steps to climb at pre-identified places. Creating terraces or slopes in landscaping and the construction of buildings by using retaining walls and earth embankments were a common feature found in Sri Lankan Architecture and landscape. Paths were commonly flanked by rows of irregularly planted trees. The monasteries such as Sigiriya, Arankele, Ritigala are among the examples found in Sri Lanka (Fig.1.8 and 1.9).

In the royal park at Sigiriya, shallow reflecting ponds, elongated ponds and water fountains were found on either side of the main axial path and side path which were almost certainly carefully tree-shaded enhancing the leisure and beauty. In planning urban settlements of the early historic periods, the city planning practices in India would have echoed specially in the establishment of Anuradapura, the city that continuously served as the seat of governments for a period of more than thirteen hundred years. Anuradhapura was established on the Western bank of Kahamba Nadi, and with the construction of large irrigation reservoirs on to the West and South-West of the city.
provided the required water for cultivation throughout the year and a green cool environment. (De Silva, 1996).

Fig. 1.8 The main path ways of Ritigala long dress curb stones, some neatly paved paving and closely shaded by the tress of the dry zone rain forest. Credit: Gunasinghe W.K.D.

Fig. 1.9 These stone paved paths are laid down for kilometers in straight and curved forms at Ritigala. Credit: Gunasinghe W.K.D.

With the help of existing ruins of buildings, caves, terraces, flight of steps, retaining walls, etc., it is possible to visualize Mihintale as a large forest monastery with an excellent utilization of natural hill slopes, boulders, streams, ponds, terraces, and intergrated with trees in the forest. Coolness of the shady trees and the ponds around, the irregular and formal flights of steps and paths laid winding round the boulders and the trees, passed through gaps and arches found by the leaning rocks, went climbing on the rocks, creating levels, terraces and vistas and exploiting the breeze on the edges of the silent forest would have created a fascinating surrounding for the meditating monks (De Silva, 1996).
The Arankele is located in hilly area with stones and boulders, washed by streams and covered with thick green forest creating an ideal environment for meditation. The main axial pathway paved neatly with well dressed stones started from a building complex with common facilities. Meditation halls etc. were connected with curved foot paths defined with curb stones. The path ways leading to these buildings surrounded by water originated from main axial path and as at Sigiriya and Mihintale together with the subsidiary path derived much of their characters and amenity from the shade of the adjoining forest and with three temples mark with their Bo trees creating points of special emphasis. Path junctions were often enlarged to form a stone circle or a stone square demarcated with curb stones and some times had stone seats for the monks rest as also at Ritigala. The overall design of the monastery complex was beautifully guided by the topography of the forest, the terraces, streams, rocks and naturally grown trees in the forest (De Silva, 1996). The description of King Parakramabahu I(1153-1186 AD) on establishing the city of Polonnaruwa as given in Culawamsa, carries a detailed description of the laying out of the Nandana and Dipuyyana gardens, landscaping of the city and landscaping of the palace garden (De Silva, 1996).

Fig 1.10. Abayagiriya Dagaba and its surrounding vegetative environment, tree-shaded foot paths linking the city’s monasteries and dagobas. Source: www.lankaenews.com
There were settlements which possessed many attributes of urban life in Ancient Ceylon thousands of years ago. Ancient cities like Anuradapura, Polonnaruwa, Yapahuwa, and Kandy were large settlements, widely distributed over the country with communal defenses containing street buildings and city walls. Sri Lanka has an urban landscape history of about 2000 years (Fig.1.10). Cities like Anuradapura, Polonnaruwa and Sigiriya exhibit a series of parks and gardens in the urban plans, (Pilipitiya, 2007). There were four gate ways to the city of Anuradhapura and planted Banyan trees (*Ficus benghalensis*) along them. It is believed that there were structures built on the Banyan trees to worship the trees. A special occasion when tree planting and honoring trees was when, a branch of the sacred Bodhi was brought to Sri Lanka and established in Anuradhapura and is been looked after and worshipped to the present day. The 'Chulawamsa' notes that in Poonnaruwa, the gardens of King Parakramabahu, Nandana Uyana and the Dipuyyana previously mentioned had many types of fruiting and flowering trees and these were watered through channel. Among the trees there were many tree-surrounded ponds of different forms and sizes filled with water for bathing and other pleasure activities. These gardens had small pavilions to relax, with beautifully designed pathways and water filled ponds, shaded with systematically planted trees.

1.4.2 SIGIRIYA KINGDOM

![Fig. 1.11 Sigiriya Rock surrounded by the green terrain of the dry rain forest and which provided shade to all parts of its complex. Credit: Gunasinghe W.K.D.](image)

At the 5th Century water gardens in Sigiriya pathways were laid according to the Concepts of "Giridurga", "Jaladurga" and "Wanadurga" century old traditions of town
planning (Fig. 1.11). The king’s pedestrian’s circulation paths were located within the palace premises include water garden, pleasure garden and so on. The historians consider Sigiriya, as one of the oldest and best preserved landscaped places city complex in Asia. It has been created with an axial symmetry along an East-West axis but bringing symmetrical and asymmetrical balance utilizing the natural elements, the topography, creating terraces, pathways, water ways, city walls, moats, open space and planted trees (De Silva, 1996) (Fig. 1.12).

The whole garden was planned on a grid along the main axis in the East-West direction forming mirror image plans on the two sides. Further here would have been systematically planted ornamental and shady trees bearing beautiful tropical flowers and fruits enhancing the charm of the gardens. A serpentine stream shallow, and were made out of lime stone slabs and curbs to carried a thin sheet of water that brought movement and reflection on either side of the king’s private garden enclosure along the western approach. This large area of land was covered with buildings, terraces and ponds creating a specially designed environment to collect the seasonal rain water, and the structures to withstand the stormy wind. The trees selected to plant on the summit
gardens would have provided a the shady and pleasing environment. The stone or timber bridges that crossed moats and streams also have defined the width of the pathway. The 5th century fortified city of Sigiriya is considered the best preserved landscape city not only in Sri Lanka but in the whole world. In some places the width of the terrace was reduced to the width of the pathway creating side space for buildings and trees (Fig. 1.13), (De Silva, 1996).

Fig. 1.13 The way side trees in Sigiriya, adjacent to inner moat surrounding the lower and western palace complex.

In laying out paths and walk ways, the traditional landscape has mostly followed the topography of the land, keeping in harmony with the levels, rock and boulders, watercourses etc. But in some landscape, define axial paths have been created in the layout imposing a discipline but with great expect to the natural elements and their organic forms. The width of the path was mostly defined by placing curb stones on either side, having walls on either side, by paving the path way or by the width of dressed stone steps laid when changing levels from one terrace to another.
1.5. URBAN WAYSIDE TREE LANDSCAPING THE LATTER KINGDOMS OF SRI LANKA.

1.5.1 SRI JAYAWARDANAPURA KOTTE

Fig. 1.14 Jayawardanapura Historical City.
Source: Sri Lanka New Capital-SriJayawardanapura- UDA

Today Kotte, or SriJayawardanapura as it is officially referred to, is the political capital of the Sri Lanka. It was also, from 1411A.D. to 1588 A.D. - a brief interlude within the long time span of Sri Lanka's history- the capital of the last great kingdom of the Sri Lankans. King Rajasinghe of Sethawaka (1581-1592 A.D.) waged war against the Portuguese and destroyed the whole city of Sri Jayawardanapura. Within a short period of time the city was covered with jungle. The "Diyawanna Oya" and surrounding wetlands according to folklore of Diyawanna Oya dates back beyond the era of King Rawana. They are important historical landmarks. The city of Kotte had full natural security because of the surrounding water ways and marshy land. The old historic 'Konthagastota' the doorway to the Diyawanna Oya had been close to the present bridge on the Sri Jayawardanapura Mawatha. Kotte was renamed as Sri Jayawardanepura when it was declared as the official capital of Sri Lanka in 1982. Today Sri Jayawardanapura, especially the area around the Parliament is perhaps one of the most beautiful places in Sri Lanka, with alternating patterns of space and water, foliage and sky (Fig. 1.14).
1.5.2. KANDY

The city of Kandy, features the most sacred of all Buddhist shrines- the temple of the Tooth or the 'Dalada Maligawa'. The main natural attraction of the city of Kandy is the lake which is surrounded by greenery. The Lake in the heart of the city give the city an intermediate sense of place, and creates a picturesque atmosphere to visitors (Fig.1.15 and 1.16). The near by natural forest reserve of Udawattakale is rich in rare species of plants and animals. The Colombo road at Kandy directly view the Udawathakele as it's surrounded in the Colonial period (Fig. 1.17). The surrounding tree-covered slope of kandy give it is valley side much of its essential character, and include much wayside tree planting. As the city expands it is important that this character is not lost.

Fig.1.15  Town and lake at Kandy, 1870s Source:www.lankapura.com

Fig.1.16  Fig.1.13 Kandy Lake and surrounding landscape, 1800c. Source:www.lankapura.com

Fig. 1.17 Colombo Street at Kandy, in 1925. Source:www.lankapura.com
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