O 28. MAINTENANCE AND PROTECTION OF URBAN TREES

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ABSTRACT: Trees are the backbones of nature and help urban life to become more sustainable. Also, trees are significant indicators that define the quality of urban life due to their aesthetical, ecological, psychological, hygienical and multifunctional aspects. Therefore, tree culture in urban life becomes an important area of activity for local authorities. The benefits of trees reflect the real and irreal values of planting in landscape projects. The real value of growing a tree is determined by the cost made in the beginning for a certain period. However, aesthetical, ecological, sociocultural, psychological and hygienical irreal value is greater and more important than the real. The values which could be calculated according to some approach, were indicators of the purpose of urban tree culture.
In this study, it was aimed to demonstrate the functions of urban trees in cities, protection, evaluation and appraisal approach.

Keywords*: Sustainable environment, Planting, Urban landscape*

1. INTRODUCTION

Urban trees in traffic islands, parks, gardens, picnic spots, recreational areas and along roads are the most essential elements that contribute to the enrichment of visual quality. Without greenery; a city with impressive architectural structures does not have the characteristics of a site worth living in. Trees are thought to be one of the most important fundamentals that create enjoyable places for people to live in. In urban and rural landscape architecture, trees have multifunctional contributions such as preventing air and noise pollution, minimizing the negative impacts of wind and dust particles, helping the city's image become more dynamic, defining axes for transportation, erosion control, improving the climate conditions, enrichment of the visual quality. Urban planting arrangements especially roadside planting practices require a high level of precision regarding the selection of tree species, planting technique and maintenance process. If the three criteria mentioned are not considered, negative impacts may occur in roadside planting (Krulıc, 2004; Turna et al., 2012). Planting arrangements entail extensive and long term maintenance practices due to the fact that trees require proper care such as pruning, watering, disease control. Maintenance of urban trees particularly is a necessity (Turna, 2017). Cities have characteristic ecosystems, therefore, urban trees cope with intense conditions of urban life, unlike the rural trees (Dirik, 1991; Dirik, 1997). The hardships of urban conditions must be identified and precautions must be taken regarding urban tree care. Specifically in roadside planting, pruning of trees is the most important maintenance practice.

2. MAINTENANCE AND PROTECTION OF URBAN TREES

Domination of conditions against human nature in inauthentic spaces created without the consideration of the connection between humans and nature is inevitable. Thus, the benefits gained from green areas play an important role in building our future (Dirik, 2008). Trees support nature (Konijnendijk, 2003) and ensure sustainability in urban life. In recent years, trees are thought to be the significant elements that help assess the standards of urban life due to their aesthetical, ecological, psychological, hygienical and functional contributions. Therefore, tree culture in cities is an important area of activity for local authorities.

Figure 1. Roadside planting in Frederiksberg (URL-1)

3. FUNCTIONS AND IMPORTANCE OF URBAN TREES

Urban trees have sociocultural, aesthetical, ornamental, psychological, ecological and economic contributions. The assessment of trees is made in accordance with their functions.

3.1. Sociocultural Contributions

Trees are known to be a cultural symbol. Trees have been symbols of life, continuity and cosmic power and cherished since the Ancient Greeks (Pardo, 2005). The idea of trees representing beauty, courage, resistance and strength in life has been shared internationally (Musselman, 2003; Albian and Berwick, 2004).

3.2. Aesthetical and Ornamental Contributions

Trees mute the harsh lines of geometric structural forms and create contrast and variety of textures in cities in terms of aesthetical contribution. When planted solitarily, trees create focal points and become ornamental elements. Especially in streets and boulevards, trees along roads establish a sense of depth and perspective. When planted with other greenery, trees surround an area or an object and form a visual frame. Trees define spaces; connect the objects and areas; build a background effect and visual silhouettes; incorporate characteristics into spaces; block the unwanted or private; strengthen the topographical structure.

3.3. Psychological Contributions

Trees are the most important elements that meet society's psychological and sociocultural needs (Konijnendijk et al., 2004). Urban green areas build a connection between humans and nature by helping people interact with nature and observe the changes in nature. People who are disconnected from nature are likely to experience loss of concentration, aggression, depression and mental breakdowns. Many research shows that accommodation and walking about in green areas can treat cardiovascular and nervous system disorders.

3.4. Ecological and Functional Contributions

Trees and plants are the backbones of nature. They transform spaces into places worth living in by establishing climate control, infiltration of air, reduction of carbon sequestration, management of soil-water balance, enrichment of water quality, preventing pollution. Trees minimize the harsh conditions in heat islands by shading, balancing out the climate. Climate control ensured by trees helps in the cost reduction of houses' heating/cooling systems therefore, fossil fuel use is decreased (Dirik and Ata, 2005).

3.5. Economic Contributions

People's tendency to spend higher amounts of money in buying a property in green areas and the effort put in growing trees or plants within the property indicate the humans' eternal desire to live in green spaces. The surveys made for real estate agents, building contractors and users confirm this demand. 80% of the real estate agents in the U.S. points out the fact that the sale rate of properties with trees on is 20% higher than the ones without trees on.

4. MAINTENANCE OF URBAN TREES

Urban trees cope with many difficult environmental conditions, Thus, maintenance and protection operations towards urban trees have a significant role in landscape design practices.

- Completion
- Pruning
- Fertilization
- Watering
- Grubbing
- Clearing

4.1. Requirement and Purpose of Pruning The Urban Trees

Pruning is a practice of removal of dead or unwanted branches. Pruning of urban trees has positive impacts on the plant's quality, aesthetic and disease resistance (Ata, 2017). Urban trees do not grow in their natural habitat, therefore; pruning is a necessary step for healthy growth, desired shape and form in specific time periods. If not pruned, the limbs tend to break or fall over and cause accidents. A tree must be pruned from an early age and the pruning should continue systematically (Erdogan, 2014). If not pruned at a young age, pruning as compensation may cause pest development. Pruning ensures the plant's healthy growth, forms its shape and increases the number and quality of flowers (Ata, 2017).

Figure 2. Improper pruning

Figure 3. Pruning practice in Kars

Pruning is a crucial step in the maintenance of urban trees. Pruning regarding the maintenance of trees includes dead branches, branches with problems or branches that damage each other. Also; pruning is executed for separation of the crown, tree forks, regeneration, gathering of water sprouts. Employment of experienced staff and the use of proper materials lead to a successful practice of pruning, therefore; healthy and productive trees in desired forms.

4.2. Grubbing and Cleaning

Grubbing and Cleaning practices break the capillary pipes that are formed in the summertime in soil and prevent water loss. These practices stop the competition of nutrients and water between the plants and weeds, thus, maximize the plants' gain. According to climate conditions, grubbing can be performed once or twice a year. The first grubbing of the plants is delicate, shallow and outwardly to prevent the damage of root throats. In the second and third years following planting, grubbing is performed inwardly (Erdogan, 2014).

Figure 4. Cleaning (URL-2)

4.3. Watering

Water transports various nutrients into plants' tissues and evaporates from the leaves hence releases the heat. Therefore, water is essential for plants' lives. Watering practices require extreme precision in the determination of the quality of water, timing and amount. In dry climates, the mistakes in watering cause the death of the plants. Especially in the summertime, watering should be performed on time (Erdogan, 2014).

Figure 5. Watering (URL-3)

4.4. Fertilization

Fertilizers are known to have physical, chemical and biological impacts on the characteristics of the soil. Fertilization increases the soil's capacity to contain water and helps the soil breathe. Also,

fertilizers lead to an increase in the amount of CO_2 and the formation of organic acids. Therefore, the acidity of the soil goes up and nutrients are dissolved for plants to use (Erdogan, 2014).

Figure 6. Fertilization sampling

5. PRINCIPLES OF URBAN TREE PROTECTION

It is possible to develop suggestions regarding the protection of urban trees by examination of the case studies abroad. In Geneva, there are 40.000 urban trees of 400 kinds and 2/3 of them are deciduous. In the 1980s, the Conservatory and Botanical Garden of the City of Geneva started the process of taking inventory and listing the trees in two parks "La Grange", "Les Eaux Viven". It is reported that there are 4.200 trees in 30 ha of the place. 30 characteristics are registered for each tree, therefore trees' current conditions and requirements are determined. Switzerland's Garden Association states that it is possible to estimate the economic value of every garden based on the evaluation of each tree. All trees in two parks mentioned before are worth 25 million Swiss Francs. The inventory practices ensure the sustainability of parks (planting, protection, maintenance) (Erdogan, 2014). It is stated that 84% of trees are healthy and 16% are growing old. The replacement schedule of trees is based on the information gathered from inventory data. The collaboration of Switzerland's Garden Association and the University of Geneva emphasize the importance of the urban trees (Erdogan, 2014).

6. DETERMINATION OF PROTECTION VALUES OF URBAN TREES

Though the development of ideas regarding the protection and conservation of urban trees is possible, protection values should be determined. Additionally, the determinations are based on subjective evaluations due to the fact that the health condition, visual quality and resistance level of a tree may differ according to the experts. However, the determination of the protection value plays an important role in the decision-making process. Trees that face intense hardships such as changing environmental conditions, poor soil characteristics, problems of neighbouring trees, negative impacts of infrastructural services must be protected and conserved. In such cases, the performance of the tree depends on total pressure, kind, age and resistance against pressure.

REFERENCES

Alban N, Berwıck C (2004) .Forêt et religion au Japon: d'une vision singulière de l'arbre à une gestion particulière de la forêt. Revue Forestière Française, vol. 56, no: 6, pp.563-572.

Ata C. (2017). Kent ağaçları https://www.plantdergisi.com/cemil-ata/kent-agaclari.html

Dirik H (1991). Kent Ağaçları. İ.Ü. Orman Fakültesi Dergisi, Seri: B, Cilt: 41,Sayı: 3-4, S: 69-81. 8.

Dirik H (1997). Kent ağaçlarının yönetimi. Kent Ağaçlandırmaları ve İstanbul 96 Sempozyumu.İ.Ü. Or. Fak. İstanbul Büyükşehir Belediyesi İSFALT Genel Müdürlüğü, İSFALT Yayın No:3 İstanbul. s:29-40. 9.

Dirik H, Ata C (2005) Kent ormancılığının kapsamı, yararları, planlanması ve teknik esasları. İ.Ü. Orman Fakültesi Dergisi, seri B, cilt 55, sayı 1, s. 1 – 14.

Dirik H (2008). Plantasyon (Bitkilendirme ve Dikim) Teknikleri. İ. Ü. Orman Fakültesi Yayın No: 490. ISBN 978-975-404-800-1. İstanbul.

Erdoğan,R. (2014). Kent Ağaçlarının İşlevleri, Koruma Önemi ve Değer Belirleme Yaklaşımları, https://www.yazreyhan.com/2014/11/kent-agaclarinin-islevleri-koruma-onemi-ve-deger-belirleme-yaklasimlari/

Harris RW, Clark, J R, Nelda, PM (2004) Arboriculture. integrated management of landscape trees, shruubs, and wines. Fourth Edition, Prentice Hall, Upper Saddle River, New Jersey 07458, ISBN: 0 – 13 – 08882 – 6, 580 p.

Konijnendijk C (2003). A decade of Urban Forestry in Europe, Forest Policy and Economics, Elsevier Science.

Konıjnendijk C, Sayaka S, Randrup TB, Schıpperıjn J (2004). Urban and peri – urban forestry in a development contex – strategy and implementation. Journal of Arboriculture, vol. 30, no: 5, pp. 269 – 276.

Krulıc B (2004) La fôret. Autrement Série Mutations, no 22, 1 p.

Pardo C (2005) Du rural à l'urbain. Intégrations, usages et gestions de l'arbre dans les paysages de la méditerranée nord-occidentale. Thèse presentée à l'Université Paul Valery – Montpellier III Arts et Lettres, Langues et Sciences Humaines et Sociales UFR III. Département de Géographie et d'Aménagement pour obtenir le grade de docteur spécialité: Géographie, Soutenue le: Décembre 2005., 606 p.

Musselman LJ (2003) Les arbres dans le Coran et la Bible. Perception des forêts Unasylva, no: 213, vol. 54, pp. 45 – 52.

Turna, İ, Yazıcı,F. İAtar F. (2017). İstanbul İlindeki Kent Ağaçlarında Budama Çalışmalarının Değerlendirilmesi, Bartın Orman Fakultesi Dergisi, 19(1): 1-10,

Url 1https://en.wikipedia.org/wiki/Frederiksberg_All%C3%A9

Url 2. http://www.urfastar.com/yerel/yol-boyu-fidanlarin-bakimini-yapiyorlar-h46021.html

Url 3https://www.mosssulama.com/hizmet-damla-sulama-sIstemlerI-7.html