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Developing a Multiple Criteria Decision Making Model for Selecting the Best Roadside Tree Species in Different Urban Environmental Settings in Colombo District, Sri Lanka**Dissanayake C.T.M.^{1,2*}, Bandara W.A.R.T.W.**¹*Department of Zoology and Environmental Management, University of Kelaniya, Dalugama, Sri Lanka*²*School of Technology, Sri Lanka Technological Campus, Padukka, Sri Lanka***mahanamadissanayake@gmail.com***Abstract**

Roadside trees help to mitigate air pollution by serving as a sink for gaseous air pollutants. However, in Sri Lanka roadside tree selection mechanism remains uncertain due to the absence of selection criteria and lack of scientific research. The present study was designed with the objective of developing a multiple criteria decision making model which includes Air Pollution Tolerance Index (APTI) values, leaf carbon content, leaf area, canopy structure, plant type and economic value to select the most suitable tree species for road side planting. Five roadside tree species were selected; *Terminalia catappa* (Kottamba), *Cassia fistula* (Ehela), *Pongamia pinnata* (Karanda), *Madhuca longifolia* (Mee), and *Peltophorum pterocarpum* (Kaha Mara) as they are mostly abundant in roadsides of Colombo district. Air Pollution Tolerance Index (APTI) was calculated using four biochemical parameters; pH, ascorbic acid content, relative water content and total chlorophyll content on leaves. The study was conducted at two environmental settings identified as least polluted and highly polluted in Colombo, Sri Lanka. Environmental settings were identified based on SO₂, NO₂ and PM 2.5 level in ambient air. Five tree species with ten replicates at each site were evaluated using standard methods and the grades were allotted to develop the model. Standard One-way Analysis of Variance (ANOVA) followed by Tukey's pairwise comparison was done to determine whether there is a significant difference in multiple criteria values between five selected roadside tree species for both sites separately. According to the multiple criteria decision making model *Pongamia pinnata* (Karanda) was recorded as the most suitable tree species for planting along roadside in both environmental settings. The suitability for road side planting varied as follows in least polluted site; *Pongamia pinnata* (Karanda) > *Peltophorum pterocarpum* (Kaha mara) > *Cassia fistula* (Ehela) > *Terminalia catappa* (Kottamba) > *Madhuca longifolia* (Mee). In highly polluted site the suitability pattern varied as follows; *Pongamia pinnata* (Karanda) > *Peltophorum pterocarpum* (Kaha mara) > *Cassia fistula* (Ehela) > *Terminalia catappa* (Kottamba) = *Madhuca longifolia* (Mee). It is recommended to follow this procedure for other roadside tree species in the Colombo district and expand to other urban cities. Rather than selected biological and socioeconomic criteria in this study, other main criteria such as stem carbon content, leaf roughness, pest and disease resistance can be simultaneously incorporated into selection criteria.

Keywords: Air Pollution Tolerance Index, Road side trees, Air pollution, Multiple criteria decision making model