CHAPTER 12
SUMMARY AND CONCLUSION

Trees are among the most conspicuous, the most functional and the most manipulable biophysical elements of the urban ecosystem. The literature review shows that receding green-cover significantly affects city’s environmental performance. Therefore, this research envisaged that improving the urban tree cover would enhance city’s environmental performance. In order to improve the urban green-cover, this research is proposed the framework using Chennai city as the case study area. That has been carried out in two steps; firstly the relationship between the green-cover change and Chennai city’s environmental performance is appraised. Secondly, the green-cover development strategy is formulated. By means of an index reflecting air filtration by the existing vegetative cover, surface runoff, ground water levels and the surface radiation, the environmental performance of the Chennai city’s has been evaluated between the years 1997-2001. The analysis indicated that, between those two years Chennai city lost as much as 99% of the green cover at some areas. Subsequently, environmental performance decreased up to 38% at some ward. The relationship between the Chennai city’s green cover reduction and environmental performance change is confirmed by the statistical correlation assessment.

To develop an appropriate planting strategy for the different scenario, Chennai city is divided into five environmental performance zones, namely excellent, good, fair, poor, worst zones. The excellent zone comprises the natural areas characterized by dense vegetation like
reserved forest, coastal vegetations, wet lands, with few buildings. The areas that having balanced built and vegetation covers are grouped as good zone, mostly they are isolated buildings surrounded by trees. Compare to previous one, area having less vegetation and significant amount of un-build spaces are grouped under fair category. Poor zones include dense built-up areas, having little open spaces and some amount of vegetations. Whereas the older part of the city characterized by dense populations, heavily built-up, completely paved surfaces and very less or no vegetations are graded as worst zone. Following that, the spatial strategies are developed to increase the tree cover at regional level, ward level, street level and plot level, through adapting the patch, corridor and matrix based ecological principles. Using these strategies, green cover plan has been proposed for the Chennai city at four levels namely city level, ward level, street level and plot level.

Then, the research demonstrates the implementation of the green cover plan through designing micro level tree-cover for the four environmental performance zones except the excellent zone. The micro level tree cover design involves three steps; they are study phase, analysis phase, and design phase. The study phase explored the existing conditions, challenges, conflicting urban activities and other limitations hampering Chennai’s tree cover at the four study area. In addition, areas for plantation both in the private and public properties are identified at the case study area. Then the analysis phase develops the locational criteria based on site conditions which are identified during the study phase, accordingly it then evolves the plant selection criteria. Together it proposes the design criteria for four zone of the Chennai city. From the observation at four case study area and its design criteria, the design schemes for the four zones are proposed separately. Using the design
criteria, the design phase proposed the planting design for the four case study area at ward level, street level and plot level.

In general, this research intends to restore city’s natural processes through increasing tree covered area using the ecological principles. Therefore, the intrinsic site factors such as soil character, water availability, land ownership and environmental conditions are consciously not dealt in this research because either cities are missing those elements altogether or they are not usable as such in its present condition. In addition to that the plantable space, which is the most critical resource in the urban area amongst all the required resources. Hence the entire research has been focused on option to improve the tree cover through identifying the various possibilities to overcome the shortage of space at various spatial scales ranges from plot to city scale. From the onsite observation across the Chennai city, three potential options are proposed to enhance Chennai city’s tree cover. First and foremost is recovering the unutilized, under utilized and encroached public spaces and convert them into tree covered area. Second, internalizing the unutilized and underutilized private spaces for plantation, such as, gap sites, vacant lands, waste lands, and building setbacks. This could be achieved through educating and encouraging the people by means of providing some incentives like tax reduction etc. to increase and maintain the tree covered area in their property. Third, safeguarding existing tree covered area, by means of development check. Finally it estimated the benefits from the proposed tree cover in the four case study areas namely, T.Nagar, Kalaivanar Nagar, Kumaran Nagar, and Umarpulavar Nagar. It has been found that nearly 20% to 25% of the environmental problems could be mitigated by increasing the tree-cover in the Chennai city. However, the benefits will increase if the
tree-cover in the zone one (umarpulavar nagar) and zone two (kumaran nagar) is increased. That requires detail urban renewal study to identify the required plantable sites.

Lastly, to get the intended benefits from the proposed green cover plans as well to prolong them for longer periods, this research also proposed the green cover management plan for the five environmental performance zones of the Chennai city. Three major goals as been set for the management plan. They are 1. Maximize the tree stocking in the Chennai city 2. Reduce the recurring tree maintenance cost and tree related hazardous 3. Improve the in-transience of the urban tree cover. To protect the trees from various urban stresses at different stage of its growth the intermediated goals are developed with different time frames ranges from short term to long term. Adopting those goals tree cover management plan was proposed separately for each environmental zones of the Chennai city. However, the successes of the management plan depends on the effectiveness of ordinance, therefore it is suggested that to form the tree cover ordinance committee to formulate Chennai city’s green cover ordinance. Proposing tree-cover ordinance is beyond the scope of this research, which could be the potential area for future research.

The technical part of the tree planting in the urban area is another critical aspects not dealt in this research. They are size of the pit, soil character, enhancing deep root system, tree root protection, methods to control the uprooting and required construction detail of pavements and near by concrete structures. It is another potential area for the future research to solve the below ground problems associated with urban trees.