

Customizing i-Tree Eco to estimate ecosystem services provided by street trees in Kyoto, Japan

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ABSTRACT

i-Tree Eco is a flagship tool in i-Tree software suites that quantifies urban forest structure and its ecosystem services. Although the use of i-Tree Eco is expanding from the United States to Canada, Australia, Mexico, Europe, and other countries, there still are limitations in applying the US-based ecosystem service and associated benefit quantification to other countries. In this study, parameters for monetarization of the ecosystem services including carbon storage and sequestration, building energy savings, air pollutant removal and associated adverse health mitigation, and avoided runoff were greatly customized to better fit the i-Tree Eco analyses to street tree benefits in Kyoto, Japan. Using the field measurements of 1,200 street trees as well as building, weather, and air pollution data freely available in Japan, the ecosystem services by street trees were quantified in Kyoto, Japan for the first time using i-Tree Eco.

BIOGRAPHY

Satoshi Hirabayashi is an Environmental Modeler with 16 years of experience in solving urban environmental issues with computer- and GIS-based models as well as several analytical techniques such as statistical, sensitivity and time-series analyses.

Currently with the Davey Institute, based at the USDA Forest Service in Syracuse, NY, his primary responsibility is the development of core computer models of i-Tree software suite, including biogenic emissions, air pollution removal, precipitation interception, public health benefits, and human thermal comfort provided by trees.

He is also engaged in the US nationwide as well as various international assessments of air quality improvement by urban forests. His recent interest includes application of i-Tree's ecosystem service models and concepts in his home country, Japan.

He published many research papers on environmental modeling and GIS applications in technical journals in the US and Japan. He earned a Ph.D. and Master of Science degrees in Environmental Resource Engineering from the State University of New York College of Environmental Science and Forestry, and a Bachelor of Science degree in Electronics and Communication Engineering from Tokyo City University in Japan.

Xiaoyang Tan is currently a Ph.D. student in the Graduate School of Global Environmental Studies of Kyoto University under the supervised by Prof. Shozo Shibata, Her doctoral research is about the

evaluation of performance and ecosystem services of street trees in Kyoto city. Her research has been supporting by the Ministry of Education, Culture, Sports, Science and Technology of Japan. Prior to joining Kyoto University, she worked at Ningbo Ningbo municipal construction safety and quality supervision institution as an administrator of landscape projects for two years.