

DEVELOPMENT OF A MOBILE GEOGRAPHIC INFORMATION SYSTEM FOR SIDE-WALK TREE MANAGEMENT

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Abstract:

Taiwan Forestry Bureau (TFB) is in charge of forest management in Taiwan. Requirements of the Kyoto Protocol are the major issues which TFB has tried to develop an optimum greenhouse policy response for several years. Two large programs have been performed this year namely, large-scale tree planting on farm land and side-walk tree management of more than 300 townships in Taiwan. Side-walk tree management was not a job that TFB has to take care but it now does. TFB is now more like a supervisor of side-walk trees in all townships in Taiwan. The major ingredients are to prescribe what kind of jobs should be done based on the actual condition of a given block of road, village, township, and even a county. The first step is to create island-wide side-walk tree data bases which consist of attributes of side-walk trees. The objective of this paper is to bring site maps and large-scale digital color orthophoto maps into its data bases. In the mean time, a mobile GIS was developed to verify those attributes investigated by local government employee in the data bases. Integration of attributes, maps, and images can make side-walk tree management more efficiently and more acceptable for technician who are in charge of daily management of side-walk trees in town and county government. More than 3000 sheets of digital color orthophoto maps at a scale of 1:5000 were created every year at TFB. It is a set of half meter resolution color orthophoto maps and every sheet of maps has a file size of more than 144 MB. Remote sensing techniques play a very important role to generate and verify attributes such as tree species, tree crown size, tree height, site condition and what kind of management prescription would be needed. A mobile GIS was developed not only used commercial GIS as its basic component but also implemented visual Basic and embedded visual Basic for data base manipulation, image format conversion, field work editing, and attributes updates. PDA is the major device for field operations and hand-held GPS devices can work with PDA directly. The free and open image compression standard, enhanced compression wavelet (ECW) was chosen as the major orthophoto map format. Image mosaicing, color balancing, image processing, and overlay with vector site maps were easily and faster enough for practical implementations of half meter resolution orthophoto maps. A small city located at northern Taiwan was investigated with orthophoto maps at scale of 1:5000. A township was tried with 20 centimeters resolution color digital orthophoto maps. The results indicated that digital orthophoto maps at scale of 1:5000 cannot provide all detail information for side-walk tree management. But

side-walk tree management can take great advantage of remote sensing, GIS, and GPS. Customized and personalized mobile GIS modules can be developed for side-walk tree management in Taiwan.