Forest Planning of Japanese Cedar (*Cryptomeria japonica*) and Taiwania (*Taiwania cryptomerioides* Hayata) Plantation Forests for Domestic Timber Production Prediction in Taiwan

Po-Jung Chen[1] & Su-Ting Cheng[1,*]

[1]School of Forestry & Resource Conservation, National Taiwan University, TAIWAN
r04625009@ntu.edu.tw (P. J. Chen)
[*] Corresponding author, chengsuting@ntu.edu.tw (S. T. Cheng)

Abstract

The Forest Bureau of Taiwan has announced an improvement on the supply of domestic timber in 2017, and expected to increase the timber self-sufficiency ration to 1.2%. Given that more than half of the total forest stockings in the Forest Bureau-owned plantation forests were occupied by a total of 7204.9 hectare of the non-native Japanese cedar (*Cryptomeria japonica*), this study aims to provide potential domestic timber production prediction based on converting available Japanese cedar plantation forests into Taiwania (*Taiwania cryptomerioides* Hayata) ones, assuming a successful regeneration process. For this purpose, we constructed a system dynamics model using STELLA Architecture to provide a timing framework for potential timber production prediction by age class. In the model, we considered the available plantation areas, standing volume, harvested timber volume, mortality rates, and unit stocking transformation coefficient from 2009 to 2030. Presumed cutting was operated on 31-40 age-class for both species, with very limited reforestation, current total stocking for both species showed a declined trend. On the other hand, after harvesting, if reforesting the Japanese cedar plantation areas (about 438 hectare available areas) into Taiwania, it would contribute to an increase of the total Taiwania stocking of 4,738 m^3. The model can also be applied to predict other species' timber stockings if detailed data can be provided. As a result, this model can serve as a decision tool to meet the current policy needs in providing important information like regeneration status and potential stocking in a dynamic manner in time for sustainable and effective forest planning.