Simulating Harvest Schedule for Timber Management and Multipurpose Management in Teak Plantations


Abstract

Sustainable management of teak plantations in Java requires an improvement of the existing yield regulation method to optimize multiple benefits of the plantations at risk of stand destruction. This study was therefore aimed to formulate an alternative harvest scheduling model that integrates risk of stand destruction for supporting multipurpose management of teak plantations. The proposed model used a state-space planning model to simulate the dynamic of plantations due to timber harvesting and stand destruction, and then sought optimal solutions for two management scenarios, i.e. timber management that optimized total harvest volume and multipurpose management that optimized net present value (NPV) while increasing carbon stocks. Using a case study on a typical teak plantation, this study confirmed that increasing destruction rates reduced harvest volumes, NPV, carbon stocks, and resulted in imbalanced ending age-class structures. Reducing cutting-age limit increased harvest volumes and NPV, but it also reduced carbon stocks of the plantations. Although the multipurpose management generated lower financial benefit, it maintained carbon stocks and produced better ending age-class structures compared to timber management. The proposed harvest scheduling model provides a useful planning tool for managing teak plantations.