Strategy to improve the residual diametric structure of Cedrela odorata for a new cutting cycle

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Lack of analysis has led to misconceptions about "sustainability" in the management of natural tropical forests. When forest management in tropical areas considers neither the rate of extraction nor the growth or diameter structure of a target species, this may compromise the production capacity for the next cutting cycle. This failure to incorporate key information may even result in underestimation of production. Cedrela odorata is a species of great economic value to the state of Acre in the Amazon region, Brazil. Exploitation undertaken without considering these key factors can reduce the potential for extraction in the next 30-year cycle, even within the limit of 30 m³ha-1 for all species included in the forest management plan, as specified by Brazilian law. This paper presents strategies for optimizing the residual diameter structure after the first cut, in order to improve the exploited volume for the second cycle. The proposed system is based on the differences in increment for trees in different diameter classes. It uses data from permanent plots and a survey of 100% of the trees from an assessment of forest structure. The system was developed by applying a specific algorithm for the diameter classes which will produce useful volume for the next cycle. The minimum sustainable volume was determined based on the productive size classes. Different extraction rates within diameter classes were also simulated with the aim to produce more volume. The diameter increment averaged 0.85 cm.ano-1 for C.odorata with DBH between 25 and 115 cm. Diameter increment was highest for the 45 cm diameter class (1.2 cm.ano-1), and decreased at with higher DBHs. Regarding the trees to be reserved to the next cycle, it was found that the volume produced by trees above 95 cm DBH class would be negative when compared to their initial volume, mainly because of great mortality and low increment rates. It was observed that different areas with C. odorata show different diameter-class distributions, without a definite pattern. Simulation showed that trees in one area could recover the initial volume for the second extraction, without any modification of the first cut. Trees in two other areas (with recoveries of 33% and 61% of the initial volume after the first cut) would require modification of the first cut to ensure sustainable volume to the second cycle. The proposed procedure would ensure 100% to 105% of the minimum sustainable volume in the second cycle.