

Carbon and Biodiversity Loss Due to Forest Degradation – a Cambodian Case Study

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Abstract

Tropical forests are diverse in terms of stand and age structures, commercial and biodiversity values of individually trees, and dependency of local communities. Monitoring forest degradation in the tropics remains a challenge despite increasing global interests in reducing carbon emissions from deforestation and forest degradation and safeguarding biodiversity and local benefits. Monitoring forest degradation and related carbon emissions require understanding of selective logging practice and its decision in felling the trees. Based on data from 179 sample plots across three provinces in Cambodia, this study discussed the process of forest degradation and related carbon emissions in selectively logged forests. Data were analyzed for forest health quality and timber grades according to DBH size class (10-19, 20-29, 30-39, 40-49, 50-59, and 60+ cm), as timber harvesting under unplanned logging is typically based on these variables.

Mean tree density and aboveground carbon stocks were estimated at 334.3 trees/ha and 360.2 MgCO²/ha, respectively. In terms of carbon stocks, 36.8%, 44.9%, and 18.3% are respectively in forest health quality A, B, and C, suggesting forest condition is still good. Large trees in quality A and B are likely to be harvested as they have high commercial values. If all large trees (DBH>40 cm) are harvested, 45.6% of carbon stocks are gone and will gradually emit CO² depending on how the harvested wood is used. Carbon in branches, wood wastes onsite and offsite will be released immediately. Timber grades will also influence the decision making of the loggers because of the prices. Trees in luxury grade are more expensive and most of those tree species are classified as critically endangered by the IUCN. Despite progress in remote sensing technology, monitoring the loss of such valuable trees remains a challenge unless methods to link canopy cover with individual tree species are developed, and the relevant users are trained.

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