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For Andaman forests to recover, the intervals between repeat logging must be longer

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Discerning between evergreen and deciduous tree mosaics of the Andaman archipelago can be tough to the untrained eye in the wet season, but the patches clearly stand out in the dry season. In the dry season between January and April, deciduous forests lose leaves and it is easy to distinguish the leafless patches from the evergreen areas that are dark green.

Forests on these islands – that share a majority of their flora and fauna with South West Myanmar and Western Thailand – have a [long history](#) of human use going back to 20,000 years. Most of the forests have had a tryst with logging-associated disturbances starting in the 1800s with British rule in India. At present, selective logging in the Andaman Islands is practised only by the forest department.

Unlike clearing of forest, selective logging involves removing a few important timber trees such that diversity is retained and carbon recovers quickly, explained Akshay Surendra who set out to study the sustainability of the logging exercise, by sampling tree communities that were subjected to different logging treatments across deciduous and evergreen forests.

Akshay's goal was to understand if and how often one can go back to these forests to log for a second or third time, while still maintaining the integrity of the forest. The current working plan, set up in 2005, is planned at a 30-year cutting cycle: the same patch of forest is logged once every 30 years. The current plan focuses explicitly on diversity and caps logging intensity at up to three trees per hectare.

The authors say that regardless of the nature of logging, an interval of 10 years–25 years between logging events is not sufficient for forests in the Andaman Islands, especially deciduous forests, to recover from the first logging cycle. Deciduous forests may potentially require more strict extraction limits compared to evergreen counterparts, they note in a [study](#) published this year.

“We found that evergreen forests are quite resilient to logging compared to deciduous forests: deciduous patches, when logged twice, had less than half the carbon of intact deciduous forest,” said the study's corresponding author Akshay. “But this does not mean go ahead and log evergreen patches more! All it means that the current logging is tentatively okay.” He conducted the study while doing his Master's in Wildlife Biology and Conservation Program, National Centre for Biological Science, Bengaluru, India. He is currently a doctoral student based at the School of the Environment, Yale University, United States.

Andaman and Nicobar Islands comprise 572 islands with a total geographical area of about 8,249 sq km, 0.25% of the total geographical area of India. Of the 8,249 sq km, over 80% of the land (6,742.78 sq km) is recorded as forest land, which includes nine national parks, 96 wildlife sanctuaries and one biosphere reserve.

The India State of Forest [Report](#) 2019 states that the forestry practices in these islands have “undergone significant changes in the last more than 125 years of scientific forestry, influenced by major policy changes and socioeconomic situations. The current focus of forest management in the islands is towards biodiversity conservation along with sustainable use of forest produce for local inhabitants, to protect the environment for future generations”.

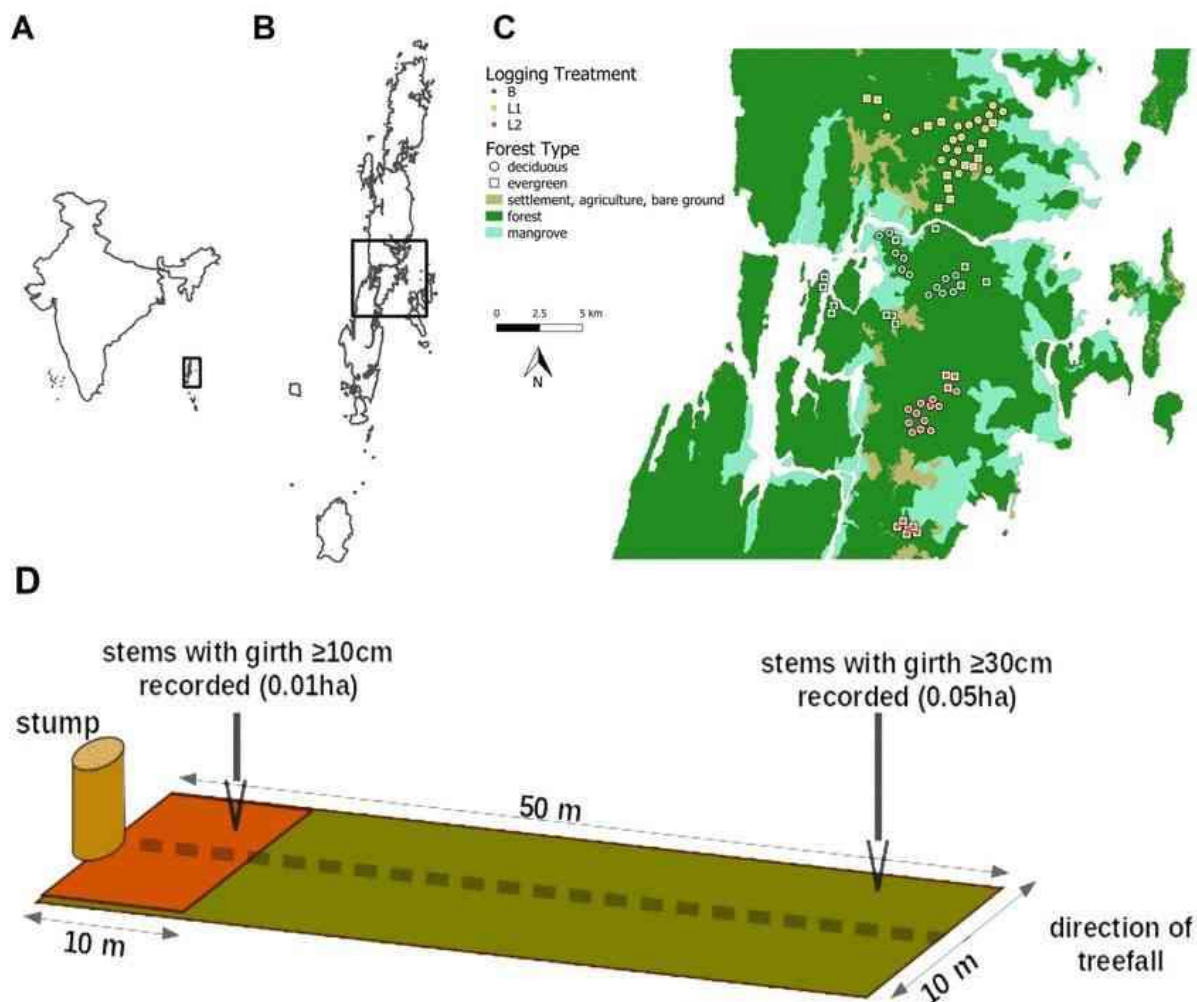


Figure 1 The study was conducted in the Andaman Islands, India (A, B). The scientists placed plots in the central archipelago, on near-contiguous islands in Middle Andaman and Baratang forest division (C: map prepared using National Remote Sensing Centre's BhuvanBhuvan Land-use land-cover data, 2015). Each plot (D) consisted of two nested plots that began at a logging stump and was aligned in the direction of treefall. Within each sub-plot, stems above plot-specific girth cut-offs were identified and measured. Photo credit: Surendra et. al.

Compared to the India State of Forest Report 2017, the forest cover in the region has increased by 0.78 sq km while the mangrove cover has decreased by one square kilometre. Experts have [reiterated](#) concerns over an increase in the anthropogenic activities in the region and their impact.

Akshay and colleagues at National Center For Biological Sciences examined responses of canopy cover, stem density, tree diversity, deciduous fraction and above-ground carbon, to logging frequency (baseline, once-logged and twice-logged) and asked how these responses differed across evergreen and deciduous patches. The Andaman forests are either dipterocarps-dominated evergreen types or are deciduous in nature, dominated by one species, the commercially important Andaman padauk (*Pterocarpus dalbergioides*).

For the study, worked forests were grouped into three categories – recent once-logged forests that were logged between 2007 and 2014, recent twice-logged forests that were harvested between 2007 and 2014 but also in the early 1990s and baseline forests, forests that have not been cut since at least the early 1990s – most of these patches have no record of logging since 1960.

The study was conducted between December 2017 and May 2018 in the Baratang and Middle Andaman Forest Divisions of the central Andaman Islands. Researchers used GPS-based maps from

post-2005 Working Plans and hand-drawn maps from pre-2005 Working Plans created by the Department of Environment, Forests and Climate Change, Andaman and Nicobar Administration to delineate logging treatment.

The research reveals that under the selective logging regimes followed in the Andaman Islands, once-logged forests were largely comparable to baseline forests in both evergreen and deciduous forest types. However, twice-logged evergreen forests had 22%-24% lower adult tree density and diversity compared to the baseline evergreen forests and twice-logged deciduous forests had 17%-50% lower canopy cover, pole density, adult species diversity and above-ground carbon stocks.

The researchers consistently detected a small but significant increase in the representation of deciduous species in the adult [tree](#) community of all logged forests, except twice-logged evergreen forests. M Rajkumar, a scientist at the Tropical Forest Research Institute in Jabalpur, who was not involved in the study, described this logging-induced deciduousness as a “matter of concern”.

“Although the interval between logging events considered in this study is short – 10 years to 25 years – it gives sufficient indication and evidence that the logging-induced deciduousness in the forests of Andamans, even with the current selective-felling practice, is a matter of concern,” Rajkumar told *Mongabay-India*. “It is a matter of concern because the increase in representation of deciduous species in the adult tree communities of both deciduous and evergreen forests under any logging condition will lead to further degradation and change in structure and function of this fragile island ecosystem.”



“The study opens new avenues for addressing species-specific research questions on soil-related water stress, especially in evergreen species,” Rajkumar added. “This is important because the evergreen mixed Dipterocarp forests support a substantial portion of the island’s biodiversity and ecosystem services.”

The authors recommend reducing logging frequency and tailoring limits by forest type to improve recovery. Akshay draws attention to maintaining low logging intensities (less than three trees/ha) and incorporating improved logging practices like reduced-impact logging to counter the detrimental effects of selective logging on the Andaman forests. Reduced-impact logging is a way to [maintain](#) timber production while minimising forest damage.

“Although it (reduced-impact logging) has a number of best practices, the common sense part of it is straightforward,” he explained. “Just remove fewer trees, give large gaps in time between logging events, reduce the damage when you remove those trees and try to bring back sensitive but functionally important species through active planting or restoration.”

All these measures are being practised by the forest department in the Andamans, except the time-gap, but that is because of a change in policy, he pointed out.

A new selective logging plan was put into practice in 2005, prompted by citizen activists who successfully petitioned the Supreme Court of India demanding a change in logging policies. There has been an official ban on any future logging in previously unlogged areas, while restricted low-intensity logging is practised in previously logged areas.

“In 2005, there was a clean-slate and redrawing of logging areas (called coupes),” Akshay notes, adding that it needs very small interventions by the forest department. “That was done irrespective of the logging history, so while some patches were being logged for the first time since independence, others were being logged in areas that were already logged before the new policy. This is a lose-lose scenario – timber yield is low and forest recovery is arrested. This problem will stop in the second cycle, but it’s best to correct it now.”

“The time gap between logging events can be extended by logging later in time, ensuring that ‘coupes’ that were logged just before the new working plan are logged later in the current plan, so they get more time to recover,” added Akshay.

Tropical Forest Research Institute’s Rajkumar says findings of this study, particularly that logging intensities and interval cause varying [impacts](#) among forest types and the detrimental effect of selective felling could be further reduced by practising “reduced-impact logging” need to be suitably incorporated in the Forest Working Plans of Andamans Islands. “Given the fact that there is hardly any spatial distinction in the occurrence of deciduous and evergreen patches in the Andaman Islands, this is going to be challenging,” he noted.

Illustrating with Karnataka as an example, TV Ramachandra, at Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, however, said, non-logging in the natural forests is the best option than selective logging.

“Selective logging is being practised by the forest department in Karnataka [Western Ghats region], which has led to the removal of natural vegetation, replacing the same with the monoculture timber species [teak etc in Uttara Kannada] that has escalated human-animal conflicts as animals were deprived of fodder and water,” Ramachandra, who was not associated with the study, told *Mongabay-India*. “Hence no logging in natural forests is the prudent management option than selective logging.”

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