

S-E Asia's majestic trees face threats and uncertainties

These include deforestation, climate change shrinking areas they can grow in, habitat loss

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Dipterocarps, the leafy giants of tropical rainforests in South-east Asia, face an uncertain future, according to a new study.

Habitat loss and climate change are shrinking the areas where the majestic trees can grow.

Deforestation is an immediate threat.

Researchers from the National University of Singapore (NUS) found that the conversion of forests into plantations or for other uses in the Philippines has

shrunk suitable habitats for dipterocarp trees by 67 per cent.

Even within protected areas, land use change has resulted in a 37 per cent loss of suitable habitat for dipterocarps.

The researchers compared maps showing dipterocarp distribution in the Philippines with those charting changes in the use of land.

They discovered that large parts of forest land suitable for dipterocarp growth were located outside protected areas.

The future of these sentinel species becomes murkier when climate change is factored in.

If planet-warming emissions continue unabated, suitable habitat

for dipterocarp trees could shrink by another 27 per cent both in and out of protected areas by 2070.

Warmer temperatures and shifting rainfall patterns due to climate change will also change the places where dipterocarps can grow.

The researchers used computer models and discovered that, while suitable habitats for dipterocarps shrank at elevations below 400m above sea level, they are likely to increase at altitudes between 600m and 900m.

These changes in suitable habitats could mean that, in the future, the trees will also likely be found outside protected areas, and continue to face the threat of the chainsaw.

The study's lead author, NUS Applied Plant Ecology Laboratory doctoral student Sean Pang, said: "Gains here refer to gains in suit-

able habitat, areas where the environment would be suitable in the future. But we cannot expect actual gains to occur."

Dipterocarp trees have low dispersal ability and take decades to mature. Their seeds have wing-like structures and are carried by the winds, although studies have found they usually go no farther than about 35m away.

"Even if these new suitable habitats pop up, it is near impossible for them to be colonised in the next several decades. Essentially, we will likely be only seeing losses with climate change," said Mr Pang.

Dipterocarp trees are icons of South-east Asian rainforests, and are known for their towering heights. They account for one-fifth of all trees in tropical rainforests in the region – a sizeable proportion

for a habitat characterised by high diversity but low dominance.

While the study focused on 19 dipterocarp species native to the Philippines, the trends are likely generalisable across the tropical regions of South-east Asia, say the authors.

And if these iconic trees go, so will the wildlife that depend on them.

The study was published last month in the journal *Scientific Reports*.

It could inform protected area planning in the tropics, said Mr Pang.

"The objective of protected areas is to protect what remains," he said.

"Often, these could help protect the stands of forests remaining after past deforestation, but in this study, we propose that they could also help protect the forests that remain after climate change."

Asked to comment on the findings, conservation groups in the Philippines said the study could inform the local authorities on future areas for protection.

"It's important to note that dipterocarps can serve as proxies for what happens to the habitat," said Dr Gregorio de la Rosa Jr, a manager at the Haribon Foundation for the Conservation of Natural Resources.

"While the study identifies dipterocarps, the scenarios can cover all tree species, and to some extent some birds, amphibians, and others," he added.

The rufous-headed hornbill, for instance, is endemic to the islands of Negros and Panay in the Philippines.

"They eat the seeds of dipterocarp trees and use holes in the trunks as nests to raise the next generation of hornbills in these areas," said Dr de la Rosa.

Dipterocarp forests are not just homes for birds.

At Mindoro Island in Southern Luzon, Ms Grace Diamante, executive director for the Mindoro Biodiversity Conservation Foundation, pointed to the tamaraw – a small hoofed mammal found only on the Philippine island – as being threatened by the encroachment of farms, extensive logging and uncontrolled forest fires.

She said: "These assessments of the changes in land use and in critical habitats of key species ultimately provide information that is important for monitoring and evaluating the effectiveness of strategies and interventions that aim to conserve species and their habitats."

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