

Infrastructure Expansion and the Indonesian Borneo Tropical Forests

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Abstract Indonesian Borneo (Kalimantan) houses ~41 million hectares of tropical forest with global environmental significance. Currently, numerous infrastructure expansion projects are occurring in the region aiming to boost economic growth. We spatially analyzed the potential impacts of this infrastructure expansion on tropical forests and agro-economic development in the region. We found that many routes will entail numerous detrimental ecological impacts, including limiting faunal movement, reducing habitat connectivity, creating isolated forest patches, fragmenting current intact forests, substantially increasing forest edge effects, and reducing core forests habitat area. Furthermore, several routes will dissect a number of current protected areas, potentially undermining Indonesian efforts to achieve the Aichi target 11 of the Convention on Biological Diversity (CBD) i.e. 17% terrestrial protected area connectivity by 2020. These infrastructure expansions are likely to facilitate the further development of extractive industries, namely, mining, logging, and oil palm estate agriculture but they are highly unlikely to generate the envisioned agro-economic development. Our study suggests that the current increasing trend of infrastructure expansion- ignoring the environmental values at the core of the approach- sharply increases the likelihood of serious ecosystem decay in the tropical forests of Indonesian Borneo.

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Why did the elephant cross the road? Roads and megafauna in Peninsular Malaysia

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Terrestrial megafauna – with their large spatial requirements – are particularly sensitive to the negative impacts of roads, which destroy their habitats, constrain their movements, and may increase mortality risk. Here we present ongoing work to understand the impact of a road that bisects prime Asian elephant (*Elephas maximus*) habitat in the Belum-Temengor Landscape, northern Peninsular Malaysia. We used GPS telemetry and a mechanistic modelling framework to analyse the response of 17 wild elephants to the road. Elephants crossed the road on average 3.9 ± 0.6 times a month, mostly (81% of times) at night, and crossing was not evenly distributed in space. The road caused a strong and consistent barrier effect for elephants, reducing permeability an average of 79.5%. Elephants, however, were attracted to the proximity to the road. We also analyzed the micro-histological plant content of 30 fresh elephant dung piles from the roadside (10 dung piles) and from the forest far away from the road (20 piles). These analysis showed very different diet of elephants living by the road, compared with elephants staying in the forest. Roadside elephants have a grass-dominated diet while other elephants have a more diverse diet and consume few grasses. Abundant food (grasses, early succession plants) seems to be what attract elephants to the roadsides. Given that risk of mortality (from poaching and vehicle collisions) increases near roads, roads may, therefore, create attractive sinks for elephants. We provide specific recommendation to mitigate the impact of this particular road on elephants and conclude the talk speculating with the potential impact of roads on elephants' ecological function and the risk that expected Belt and Road Initiative developments will bring to terrestrial megafauna in Southeast Asia.

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