Orangutan movement and population dynamics across human-modified landscapes: implications of policy and management

ABSTRACT

Agricultural expansion is a leading cause of deforestation and habitat fragmentation globally. Policies that support biodiversity and facilitate species movement across farmland are therefore central to sustainability efforts and wildlife conservation in these human-modified landscapes. We investigated the conservation impact of several potential management scenarios on animal populations and movement in a human-modified tropical landscape, focusing on the critically endangered Bornean orangutan, Pongo pygmaeus. We used an individual-based modelling platform to simulate population dynamics and movements across four possible landscape management scenarios for a highly modified oil palm-dominated landscape in Sabah, Malaysian Borneo. Scenarios that maximised the retention of natural forest remnants in agricultural areas through sustainability certification standards supported stable orangutan populations. These populations were up to 45% larger than those supported under development-focused scenarios, where forest retention was not prioritised. The forest remnants served as corridors or stepping-stones, increasing annual emigration rates across the landscape, and reducing orangutan mortality by up to 11%. Sensitivity analyses demonstrated that this outcome was highly contingent on minimising mortality during dispersal. Management that promotes maximising natural forest cover through certification, such as that promoted by the Roundtable on Sustainable Palm Oil, can maintain viable orangutan populations over the lifespan of an oil palm plantation and facilitate movement among otherwise isolated populations. However, minimising hunting and negative human–orangutan interactions, while promoting peaceful co-existence between apes and people, will be imperative to insure positive conservation outcomes.