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Fire prevention in managed landscapes: Recent success and challenges in Indonesia

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Abstract

Indonesian fire events generate significant impacts on ecosystems, society, and climate regionally and globally. Following severe burning in 2015, Indonesia prioritized targeted fire prevention to reduce crop destruction, haze, forest degradation, and carbon emissions. We show that such efforts resulted in a qualified success. Fire activity during 2016–2019 averaged ~23% of expected levels across 627 target communities (11 Mha), waning to 70% during the severe 2019 fire season, which was delayed ~30–50 days despite relatively dry conditions. Small/medium-scale and agro-industrial landholdings targeted by fire prevention burned extensively and comparatively, yet they accounted for a relatively limited 12–22% and 18–26% of fire activity over 2013–2017 respectively upon considering fire ignition and dissemination patterns. Small/medium landholdings appeared as a net 'fire propagator', with up to half of associated fire activity affecting other lands. Conversely, agro-industrial lands appeared as net 'fire receivers', with up to half of their fire activity originating from adjacent degraded lands. Successful fire prevention represents a boon for Indonesian forest restoration and carbon-emission reduction schemes. However, more effective fire prevention must focus on degraded lands vulnerable to the agricultural incursion, from which ignition fires propagate comparably to small/medium landholdings and for which almost half of fire activity stemmed from ignitions thereon.