Transpiration on the rebound in lowland Sumatra

Publons ID	(not set)
Wos ID	WOS:000471356600015
Doi	10.1016/j.agrformet.2019.04.017
Title	Transpiration on the rebound in lowland Sumatra
First Author	
Last Author	
Authors	Roll, A; Niu, F; Meijide, A; Ahongshangbam, J; Ehbrecht, M; Guillaume, T; Gunawan, D; Hardanto, A; Hendrayanto; Hertel, D; Kotowska, MM; Kreft, H; Kuzyakov, Y; Leuschner, C; Nomura, M; Polle, A; Rembold, K; Sahnerq, J; Seidel, D; Zemp, DC; Knohl, A; Holscher, D;
Publish Date	AUG 15 2019
Journal Name	AGRICULTURAL AND FOREST METEOROLOGY
Citation	24
Abstract	Following large-scale conversion of rainforest, rubber and oil palm plantations dominate lowland Sumatra (Indonesia) and other parts of South East Asia today, with potentially far-reaching ecohydrological consequences. We assessed how such land-use change affects plant transpiration by sap flux measurements at 42 sites in selectively logged rainforests, agroforests and rubber and oil palm monoculture plantations in the lowlands of Sumatra. Site-to-site variability in stand-scale transpiration and tree-level water use were explained by stand structure, productivity, soil properties and plantation age. Along a land-use change trajectory forest rubber-oil palm, time-averaged transpiration decreases by 43 +/- 11% from forest to rubber monoculture plantations, but rebounds with conversion to smallholder oil palm plantations. We uncovered that particularly commercial, intensive oil palm cultivation leads to high transpiration (827 +/- 77 mm yr(-1)), substantially surpassing rates at our forest sites (589 +/- 52 mm yr(-1)). Compared to smallholder oil palm, land-use intensification leads to 1.7-times higher transpiration in commercial plantations. Combined with severe soil degradation, the high transpiration may cause periodical water scarcity for humans in oil palm-dominated landscapes. As oil palm is projected to further expand, severe shifts in water cycling after land-cover change and water scarcity due to land-use intensification may become more widespread.
Publish Type	Journal
Publish Year	2019
Page Begin	160
Page End	171
Issn	0168-1923
Eissn	1873-2240
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:000471356600015
Author	AFIK HARDANTO, S.TP, M.Sc., Ph.D