

Name

Counterpart

Title

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B10

Rainforest transformation systems and assessment of their impact on water ecosystem services in Merangin Tembesi Watershed in Jambi

The impact of continuing rainforest transformation on hydrological functioning and other ecosystem functions in South East Asia remains uncertain. In our study area, which is one of the hotspots of Indonesia’s recent oil palm boom, residents believe that the increase in oil palm production has resulted in more frequent flooding in the rainy season and water scarcity in the dry season by the high surface runoff and subsequent decrease in groundwater discharge. We measured surface runoff in oil palm plantations, rubber monoculture, shrublands, agroforest and secondary forest. In addition, we measured hydrological parameters in a small-scale watershed experiment of two mitigation options: frond pile management and silt pit treatment. The results were used to parameterize a SWAT model with the aim of simulating a) the impact of oil palm expansion on surface runoff on the watershed scale, and b) the impact of mitigation options to reduce the surface runoff.

The results showed higher soil water infiltration (and therefore reduced runoff) with frond pile management (Fig. 2) and in combination with silt pit treatment. The SWAT model was successfully validated (Nash-Sutcliff efficiency of 0.8) and based on the SWAT simulation, frond pile management in combination with silt pit treatment significantly reduces runoff.



Figure 1. Low water table

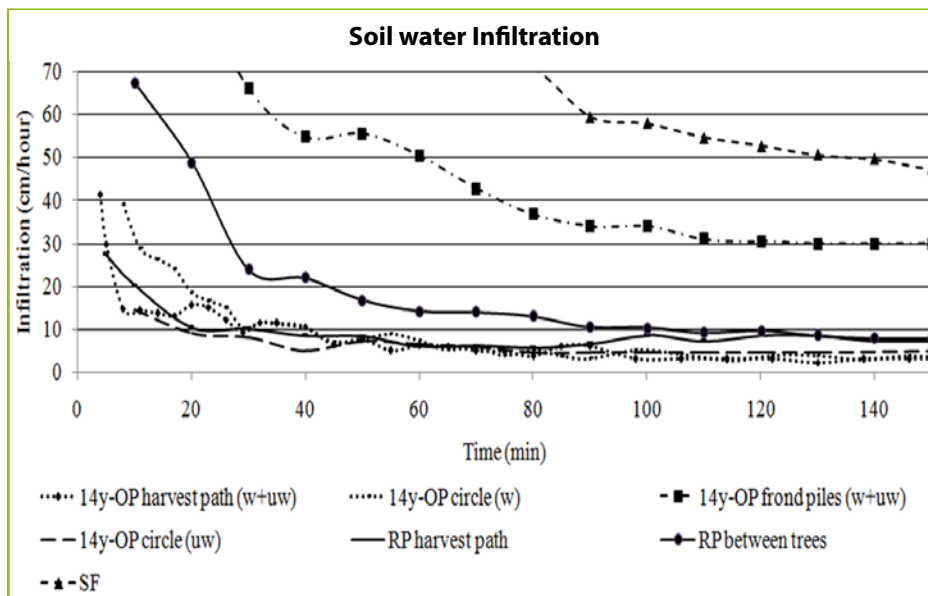


Figure 2. Infiltration in different forest transformation systems: OP – oil palm, RP – rubber monoculture, SF – secondary forest, w – weeded, uw – unweeded, 14y – 14-year-old.