


Tropical Peatland Ecosystems

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Groundwater in Peatland

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Abstract

In a tropical peat-forest in Central Kalimantan, Indonesia, massive drainage canal excavation led to a significant groundwater table decrease and to peatland degradation due to wildfires. To assess how to maintain a high groundwater table in tropical peatlands, groundwater levels and canal water levels were monitored by drilling 32 shallow wells, 6 deep wells and 13 canal sites in the Block-C North area of the Ex-Mega Rice Project area. A static GPS survey was done to determine the altitudes of all observation sites, and contour maps of the ground surface and of the shallow groundwater table were made at three different times. From these results, the regional characteristics of the shallow and deep groundwater movements were clarified. Furthermore, to examine the present and the past groundwater condition in this area and also to predict a future one, we established a numerical simulation model based on the MODFLOW. According to the calibrated model, the groundwater level in the peat layer dropped to more than 2 m below the surface near Kalampangan Canal during the 2009 drought period when a severe wildfire occurred. Before the Mega Rice Project (MRP), the groundwater potentials were higher than they are at present. If several proposed dams are constructed along the Kalampangan Canal, the dam efficiency needed to maintain a high water level in the peat layer is estimated to be more than 10 cm within 400 m of the canal in the 2009 drought period.

Keywords

Tropical peatland, Groundwater level, Canal water level, Groundwater simulation mode, Dam efficiency

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