Water Use, Water Consumption and Water Balance of a Large Oil Palm Plantation in South Sumatra Province, Indonesia

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Water use, water consumption and water balance of a large plantation of 12 000 ha and a palm oil mill in South Sumatra Province of Indonesia was studied. Water use is the water abstracted from surface water and ground water sources by the plantation and the mill. Water consumption is water that is consumed by the plantation and mill activities and is no longer returned to the initial water catchment area. Water consumption is calculated using the Water Footprint model developed by Hoekstra et al. in 2011. Water balance is calculated by comparing the water input and output in the plantation and palm oil mill. Water input is total rainfall plus water in the streams and rivers that flows into the plantation. Water output is total water consumption of the plantation and mill.

The result shows that total water use of the plantation is relatively small at 684 857 m^3 compared to the total water consumption of 178 730 069.12 m^3 during the study period from 01 January 2016 to 31 December 2016. The majority (72%) of water consumption is coming from green water consumption due to crop evapotranspiration. Blue water consumption (surface and ground water consumption) for plantation and mill activities constitute only 0.3 per cent of total water consumption. Grey water consumption or water required to dilute pollutants from the plantation and mill make up the rest (28%) of the water consumption. Water balance calculation showed that the plantation is water positive meaning cultivation of oil palm in that area is sustainable in terms of water consumption.

The water use, water consumption and water balance information helps plantations to identify hotspots in its water use and consumption and enable the management of the plantations to take steps to reduce water use and consumption. The management strategies are described in the paper.

Keywords: Water use, water consumption, water balance, water footprint, oil palm, Green water, Blue water, Grey water.