



## **Tropical peatland management for prevention of peat fire**

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Tropical peatlands contribute significantly to the terrestrial carbon storage with their thick peat deposits accumulated over centuries to millennia in particular. Due to its high porosity, tropical peat in its natural condition is more susceptible to burning under prolonged drought condition. In some parts of Malaysia especially Sarawak where most peat areas occur in the coastal lowlands, the utilization of peat for agriculture cultivation due to the limited arable land. Hence, the Government together with the associated agencies is compelled to develop a solution for managing peatland to prevent peat fires and carbon emission problems affiliated with peat development. This approach comprises soil processes, synergy between agro-management and environmental factors in which the key features are established from the principle of drainage, mechanical compaction and water management.

Under natural conditions (without drainage), capillary rise of water in tropical peat is minimal due to its high porosity. As a consequences, peat becomes very dry and the risk of fire is higher during the dry season due to the high evaporation process at the surface. Therefore, drainage, mechanical compaction and peat consolidation are prerequisite to achieve the higher soil bulk density in managed oil palm plantation (OPP) compared with that of forest and un-compacted OPP. As a result, smaller soil pores enhance the capillary rise of water and thus increase the moisture content of the peat soil above the water table. Thus, it moistens the peat to prevent the occurrence of fire. Based on the satellite data, hotspot count in Malaysia was among the lowest in Southeast Asia over the past ten years, noting that Malaysia has the second largest peat areas in the region. Simultaneously, the lower porosity condition leads to a lower rate of nutrient leaching resulting in better growth and yield of crops. This has also been proven by our study where the fresh fruit bunch (FFB) increased with water-filled pore space (WFPS). Overall, our findings demonstrate that agro-environment management practices (drainage and compaction) is the most suitable precautionary measure which can reduce susceptibility of peat fire outbreaks and associated haze problem that have affected socio-economy, environment and health in the region and also act as an exemplary model for future responsible agriculture development.