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Greenhouse Gas (GHG) Emission from Tropical Peatland*

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Arable land is among one of the worlds most important resources that influences a nations wealth. In Sarawak, tropical peat/and is the last frontier of arable land available for industrial agriculture development. Being the last exploited land resources, it is the least researched soil type among the tropical soils and making it the most least understood. Tropical peats that co-existed with the tropical ecosystem are liken to mineral soils of the tropics and are quite different from temperate peats because they are formed under contrasting climatic (wet and dry seasons) and edaphic conditions. Temperate peats are mainly derived from the remains of low growing plants **(Sphagnum** *spp.,* **Gramineae** *spp. and* **Cyperaceae** *spp.) which are more cellulosic in nature. Tropical peats, on the other hand, are formed from forest species and hence tend to have large amounts of undecomposed and partially decomposed logs, branches and other plant remains which are more lignified. Recently, there has been an increasing trend in oil palm cultivations on tropical peat/and. Conversion of tropical peat/and into oil palm plantation in South East Asia has been assumed to enhance decomposition process* **via** *peat oxidation due to drainage and water management, which leads to the raising level of greenhouse gas (GHG) emission. It has also been postulated that this process will increase in time with oil palm cultivation. However, the management has its contributing factor towards GHG emission from an oil palm plantation and its after effect of climate change due to peat/and conversion. Drainage, compaction and water management formed a part of the development process for oil palm peat planting. To further understand the role of water table on soil carbon (C) flux in tropical peat/and, a study on GHG from three different ecosystems on tropical peat/and was commissioned i.e. oil palm plantation, secondary forest and tropical peat swamp forest for 12 months using a closed chamber method. The mean water table levels at these three ecosystems were -67. 6 cm, -14.7 cm and -3.9 cm, respectively. Mean soil CH_4 flux was lowest at the oil palm plantation (0.003 t CHjhalyr), followed by secondary forest (0.067 t CHjhalyr) and tropical peat swamp forest (0.179 t CHjhalyr). However, even though the mean water table levels in the three ecosystems differed by an average of 42.5 cm, the mean soil CO_2 fluxes were quite similar: oil palm plantation (32.89 t COjhalyr), secondary forest (41.10 t COjhalyr) and tropical peat swamp forest (45.08 t COjhalyr). These findings indicated that on tropical peat/and soil CH4 flux was highly influenced by water table but not soil CO_2 flux. Since the total soil CH4 flux was much lower compared with soil CO_2 flux, it was concluded that water table was not the most important factor influencing the soil* **C** *flux in tropical peat/and.*

Keywords: Carbon flux, water table, carbon dioxide (CO), methane (CH), closed-chamber method.