

Greenhouse Gas Emission from Tropical Peatland of Sarawak, Malaysia

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INTRODUCTION

- Tropical peatland are important sources and sinks of atmospheric methane (CH₄) and major sources of carbon dioxide (CO₂) and nitrous oxide (N₂O)
- Recently large areas of tropical peatland are being developed for agriculture plantations in Southeast Asia whereby drainage is a prerequisite



RESULTS

OBJECTIVE

- To evaluate the greenhouse gas emissions (GHG) from tropical peatland by considering its total global warming potential (GWP)

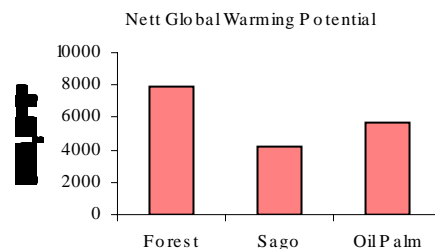
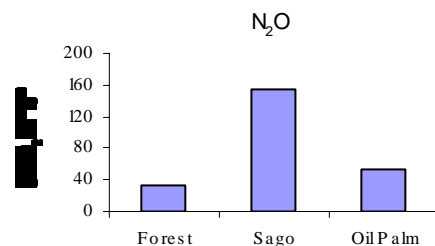
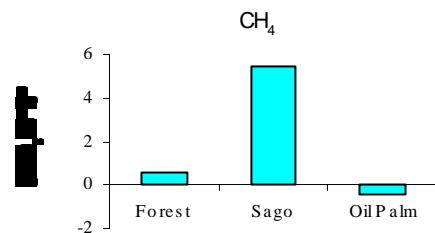
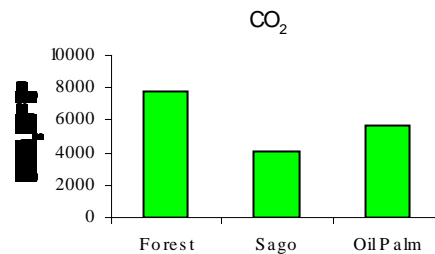
MATERIALS AND METHODS

Study Sites

- The experimental sites were all located in the Mukah Division of Sarawak, Malaysia representing three ecosystems namely mixed peat swamp forest, sago (*metroxylon sago*) plantation and oil palm (*elaeis guineensis*) plantation.
- The climate of the study sites are equatorial characterized by high, even temperatures and heavy rainfall without a distinct dry season.
- Taxonomically, the peat soils were classified as Typic Tropofibrin in the USDA soil classification system and Fibric Histosols in the FAO classification (FAO-UNESCO, 1974)

Ecosystem	Forest	Sago	Oil Palm
Site code	F	S	P
Peat thickness (cm)	480	650	555
Humification value ^a	H3 - H2	H4 - H2	H3 -H2
Bulk density (g/cm ³)	0.15	0.16	0.2
Annual rainfall (mm)	2163	2928	2471 ^b
Watertable (cm)	45.3	27.4	60.2

Ecosystem	Forest	Sago	Oil palm
Soil pH (1:2.5)	3.6	3.6	3.4
Loss of ignition (%)	98.65	98.78	99.09
Pyrophosphate solubility index	69.56	30.09	29.97
Total C (%)	47.81	44.59	44.69
Total N (%)	1.77	1.99	1.96
C: N	27.24	22.63	23.43
NH ₄ ⁺ -N (mg/kg)	54.93	37.49	58.21
NO ₃ ⁻ -N (mg/kg)	78.77	102.24	198.44
CEC (cmolc kg ⁻¹)	47.19	42.33	44.52
Base saturation (%)	22.92	30.09	32.32



CONCLUSIONS

- The new GWP of the three ecosystems on tropical peatland was dominated by the CO₂ flux
- This implies that on a global scale tropical peatland function as a significant source for atmospheric CO₂.