

4th Annual Congress and Expo on

BIOFUELS AND BIOENERGY

April 27-28, 2017 Dubai, UAE

Forest biomass recovering and soil respiration rate

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Forest biomass is used for renewable energy and it also plays a significant role in soil nutrients, to influence soil respiration. This study was conducted to investigate the rate of soil respiration from a recovering forest biomass of the tropics and its relationship to changes in the environmental factors after years of deforestation. Soil respiration measurement was conducted using the continuous open flow chamber technique connected to a multi gas-handling unit and infrared gas analyser while the forest biomass and soil properties were directly measured and further quantified using the Kjeldahl method and Walkley-black wet oxidation technique. The average mean soil respiration rates were 341.23, 383.07, 340.30, 308.12, 286.07, 256.05 mg m⁻² h⁻¹ between June and December and the recovering forest biomass was found to host an estimated Total Above Ground Biomass (TAGB), Below Ground Biomass (BGB), Soil Organic Carbon (SOC) and Soil Organic Carbon stock (SOC stock) of 1.8 x 10³, 1.0 x 10³, 2.4 x 10³ mg and 52.28 mg ha⁻¹ respectively. Soil respiration exhibited a variation pattern that was similar to soil temperature pattern and the occurrences of forest carbon input from biomass and soil properties as they were found to be significantly correlated with soil respiration to provide nutrients for microorganism to emit soil CO₂. The remarkable soil CO₂ emission from the recovering forest biomass was attributed to changes in environmental factors as the forest was recovering from deforestation. The correlation and multiple regression model proved forest biomass and environmental factors to influence the high rate of soil CO₂ emission, indicating a strong positive relationship (0.94; p<0.01). These results suggest that, forest recovering could still emit considerable percentages of soil CO₂ due to impact from deforestation, which could have a great implication on environmental factors and the atmospheric carbon balance.

Biography

Mande K H obtained his PhD degree from the University Putra Malaysia. He did his Post-doctoral research at the Institute of Tropical Forest, University Putra Malaysia. His expertise is in climate change, CO₂ efflux and deforestation. He modified an improved portable CO₂ efflux measuring chamber with a total measurement of below and above biomass. Presently, he is a Senior Lecturer in the Department of Environmental Management, Head of Environmental Management department, Co-ordinator of Projects and Research of the Department, Chairman of Research and Publication Committee of the Faculty of Environmental Science, Kaduna State University, Nigeria and Deputy Director at the University College of Basic Studies. He has published over 24 papers in reputed impact factor journals, book chapters and has presented 21 papers in international conferences. He has also won three international research grants.

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