

## Quality of tropical river water in different catchments of canopy cover

### ABSTRACT

Despite various efforts taken by the Malaysian Government, water quality degradation in Malaysian rivers remains unsolved. There is an urgent need to conduct detailed studies on water quality condition from various land-use of Malaysia. A total of 756 water samples was collected from upstream, middle stream and downstream of river at each study area. Water quality was interpreted using National Water Quality Standard and Water Quality Index developed by the Department of Environment Malaysia and analysis implemented according to Standard Methods for the Examination of Water and Wastewater by APHA was followed. The physico-chemical variables of river water of dam (Bakun), oil palm plantations (Lawas II) and agricultural area (Lawas III) were under Class III (moderate water quality) status; while river water at logging area (Mukah) was under Class IV (slightly polluted). The most influential variables that cause the deterioration of water quality is moderately low dissolved oxygen; high concentration of ammonia nitrogen; biochemical oxygen demand; chemical oxygen demand; major ion and trace metals; and nearly acidic pH. This study also revealed that due to conversion of tropical forest into various land-use, water quality had deteriorated significantly as was evident from variation of water quality variables. Independent samples test (t-test) showed that the selected physico-chemical variables varied significantly from disturbed and undisturbed forest ( $\mu \pm < 0.05$ ); and found high at disturbed forest. Pearson correlation revealed the facts that all the physico-chemical variables of river water are correlated to in some ways. Any deterioration to one variable will cause deterioration to other variables. The PCA results revealed that 87.30% of the total variance was explained by five factors, that is, organic and inorganic (42.96%), salinity factors (22.11%), organic pollution (dissolved and suspended materials) (8.61%), THE MALAYSIAN FORESTER 129 waste water pollution from agricultural and organic load (7.07%) and erosion factor (6.56%) that represent total variance of water quality in the disturbed forest. Overall, these results highlight the sensitivity of river water towards quality changes which may be altered as a result of both, extensive land management and natural ecosystem disturbances.

**Keyword:** Water quality; Undisturbed forest; Disturbed forest; Land use; Oil palm