

# Compaction and mulching effects on soil loss and runoff from two southwestern Nigeria agricultural soils

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## Abstract

Soil loss and runoff from two main agricultural soils in southwestern Nigeria were measured under different levels of compaction and mulching using rainfall simulator. The soil samples were subjected to simulated rainfall intensity of 100 mm/h for 1 h after compaction with 5, 10, 15 and 20 blows of a predetermined weight. Mulching at 0, 25, 50, and 75% areal ground cover were done with bamboo (*Bambusa* spp) leaves. The 5 blows and 0% mulch cover served as the control experiment.

The results showed that Apomu soil resulted in significantly lower dry density than Iwo under the compaction levels ( $P < 0.05$ ). The two soil types were significantly different in their runoff but were not significantly different in soil loss ( $P < 0.05$ ). Compaction level significantly increased runoff and decreased soil loss ( $P < 0.01$ ), while percent mulch cover significantly decreased both soil loss and runoff ( $P < 0.01$ ). Both soil loss and runoff had significant correlation ( $R^2 = 0.98$  and  $0.97$ ) with mulch cover and compaction level, using surface response analysis. Multiple regressions showed that a mulch cover of 50% and above would compensate for reduction in infiltration induced by compaction while at least 85% areal ground cover would be adequate to prevent erosion and runoff.

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**Keywords:** compaction; mulching; runoff; soil loss; simulated rainfall

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