# Determination of the Soil Organic Carbon, Nitrogen, Available Phosphorus and the Combined Aboveground Plant Materials in the Semi-Arid Mbulu District, Tanzania

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**Abstract**
Soil of the semi-arid Mbulu District is part of the tropical soils, covered with sparse trees, shrubs or grasses in which domestic grazing animals have prevented the wide spread of vegetation cover. The study aimed at determining soil organic carbon (OC), total nitrogen (N), available phosphorus (P) and the combined aboveground plant materials. Six study sites were established in which soil samples were collected at the depths of 0–5, 6–10 and 11–20 cm. Soil samples were analysed for OC, N and P as well as the levels of N and P in the combined aboveground materials of Panicum coloratum and Hyparrhenia filipendula. The percentage concentrations of OC, N and P were high in the top soil than in the deeper soil horizons. However, analysis of variance showed significant differences of OC in some sites whereas no difference for N and P between soil depth classes. OC was highly related with N and P along soil depth classes. It was concluded that the availability of N and P was because of the decomposition of organic matter in the soil. Soil N and P were highly related with the same in the combined aboveground plant materials. It was concluded that the increased concentration of N and P in the soil resulted into availability of the same in P. coloratum and H. filipendula. There was a very high variation in N and P among sites with different levels of intensity of grazing. It was concluded that grazing animals contributes to the redistribution of soil elements in the rangelands because they graze upon plant parts but the excreta are dropped away from the grazed spot.

**Keywords**
Aboveground
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