

## Essential Elements and Trace Metals on a Continuously Cultivated and Fertilised Field

**Authors :** Pholosho M. Kgopa, Phatu W. Mashela

**Abstract :** Due to high incidents of marginal land in Limpopo Province, South Africa, and increasing demand for arable land, small-holder farmers tend to continuously cultivate the same fields and at the same time, applying fertilisers to improve yields for meeting local food security. These practices might have an impact on the distribution of trace and essential elements. Therefore, the objective of this investigation was to assess the distribution of essential elements and trace metals in a continuously cultivated and fertilised field, at the University of Limpopo Experimental Farm. Three fields, 3 ha each were identified as continuously cultivated (CC), moderately cultivated (MC) and virgin fields (VF). Each field was divided into 12 equal grids of 50 m × 50 m for sampling. A soil profile was opened in each grid, where soil samples were collected from 0-20; 20-40 and 40-60; 60-80 and 80-100 cm depths for analysis. Samples were analysed for soil texture, pH, electrical conductivity, organic matter content, selected essential elements (Ca, P and Mg), Na and trace elements (Cu, Fe, Ni, and Zn). Results suggested that most of the variables were vertically different, with high concentrations of the test elements except for magnesium. Soil pH in depth 0-20 cm was high (6.44) in CC when compared to that in VF (5.29), but lower than that of MC (7.84). There were no distinctive vertical trends of the variables, except for Mg, Na, and K which displayed a declining trend at 40-60 cm depth when compared to the 0-20 cm depth. Concentrations of Fe, Cu, Zn, and Ni were generally low which might be due to their indirect relationship with soil pH. Continuous cultivation and fertilisation altered soil chemical properties; which could explain the unproductivity of such fields.

**Keywords :** over-cultivation, soil chemical properties, vertical distribution, spatial distribution

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