

## ABSTRACT

A study was conducted to examine changes in soil fertility under different fallow periods in fields of smallholder farmers under contrasting soils and agro-ecologies in North West Zimbabwe. The study was a 4\*4\*6 factorial design replicated three times consisting three factors namely agro-ecological region (AER) (II, III, IV, V), soil texture (sandy clay loam, sandy loam, loamy sand and sand) and fallowing period in years (0–5, 6–10, 11–15, 16–20 and two controls). Soil samples were analysed for pH, soil organic carbon (SOC), soil KCl-extractable nitrogen (N), bicarbonate-extractable phosphorus (P) and exchangeable potassium (K) using standard methods. There was no significant three-way interaction ( $p > 0.05$ ) among AER, soil texture and the fallow period on the soil fertility properties except for soil pH. Soil KCl-extractable N was significantly influenced ( $p < 0.05$ ) by AER and soil texture and soil texture and period of fallowing. Interaction of AER and period of fallowing had a significant effect on SOC, bicarbonate-extractable P and exchangeable K. Across all the three factors, most cultivated fields and those with low period of fallowing ( $\leq 15$  years) had SOC, soil KCl-extractable N, bicarbonate-extractable P and exchangeable K contents below required recommendations for crop production, and soil pH was acidic. Natural fallowing has limited capacity to improve soil fertility status across different AER and soil texture in Zimbabwe on short to medium term as it takes more than 16–20 years to restore the nutrient status back to original fertility status. Therefore, with the increasing population and land shortage, other low input strategies known to improve soil fertility over a short period such as improved fallows are highly recommended.