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Characterization of soil resilience as influenced by organic management practices in perturbed vertisol

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Vertisols predominent in Central India, is problematic in nature having expansive clays possess low strength and undergo excessive volume changes. The crack and clod formation, not conducive for good agricultural practices is most common in these soils. An incubation study conducted with various management practices i.e., FYM, biochar and, poultry manure @ 25 t ha-1 and fly ash @ 1% weight of soil with and without Cu stress to characterize soil resilience as affected by organic amendments in Vertisol. Study showed that application of Cu stress significantly reduced the soil microbial biomass carbon (SMBC) and dehydrogenase enzyeme activity (DHA) from 0 to 6 week in case of unamended soil and from 0 to 4 week in case of soil amended with various amendments. Soil without any amendment showed the lower resistance, hence higher reduction in SMBC and DHA (40.20 and 46.13%, respectively) followed by other treatments (range 7.92–20.97 and 3.44–26.76 %) at the end of 4-6 weeks after incubation. The resistance capacity of the soil studied under Cu stress is found better in either biochar (0.66) or biochar + fly ash (0.67) treatment. The maximum soil resilience index was found under FYM + fly ash (0.74) followed by other treatments. The minimum reduction in SMBC and DHA value at 4 weeks after incubation was found in those treatments with biochar (7.92 and 14.39% for SMBC; 3.44 and 9.76% for DHA). However, the recovery from 4-10 weeks after incubation was highest under FYM + fly ash treatment (25.71 and 38.10% for SMBC and DHA, respectively) followed by poultry manure + fly ash treatment (22.02 and 31.66% for SMBC and DHA, respectively). Study suggested that organic amendments like FYM or poultry manure along with fly ash can be used for better resilience/resistance functions in Vertisols of Central India.

Biography

Ritesh Saha is presently working as Senior Scientist at Indian Institute of Soil Science, Bhopal. He has 15 years of experience in research and training in the field of soil physics, soil quality and physical health, rainwater harvesting, water conservation, land configuration and conservation agriculture. He published more than 15 peer reviewed research papers in international and 30 papers in national journals of repute beside other publications. He has received prestigious Golden Jubilee Commemoration Young Scientist Award of Indian Society of Soil Science, New Delhi in 2012 and the Associate Fellowship from National Academy of Agricultural Research in 2014 for his significant contribution in natural resource management.

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