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Assessing Soil Quality Using Minimum Data Set Under Prevalent Cropping Systems in Low Hills Subtropical Zone of Himachal Pradesh

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ABSTRACT

The cropping system is an essential part of every agriculture operation, which is defined as either the sequence in which different crops are produced during a certain period of time or the specific types of land on which various crops are cultivated. The productivity and durability of any agriculture system depend on environmental conditions, soil quality, and effective management methods. For this study, four cropping systems viz., cereal – cereal, cereal – oilseed, vegetable – vegetable and fodder- fodder cropping systems were compared to assess the effect of cropping systems on soil quality. Therefore, in order to choose the best soil quality indicators and learn more about the state of the soil under various farming methods in the region, research was carried out. Principal component analysis (PCA) was used to obtain the smallest possible data set. Soil samples were taken from the surface layer (0-15 cm) of fields using a variety of prevalent cropping systems, and their physical, chemical, and biological properties were analyzed. The principal components with eigen values > 1 were eliminated during PCA. Finally, based on soil quality index (SQI) values, the four cropping systems were ranked in the following order: vegetable-vegetable (0.89), cereal-cereal (0.77), cereal-oilseed (0.67), and fodder-fodder (0.57).

Keywords: cropping system, soil quality, soil quality index, principal component analysis

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