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Abstract:	With continuous cropping, gradual depletion of one or more nutrients collectively contribute to the yield decline and stagnation in the maizewheat and soybean-wheat cropping system in Alfisol. Depletion of organic pools is most likely to be the major concern. Active pools of C declined remarkably in the treatment with N and NP. The slow pools of POMC and POMN decreased significantly with concomitant decrease of C and N mineralization rate in the aggregates in N and NP treated a plot which leads to lower nutrient supplying capacity of the soils. Balanced NPK application either alone or in combination with FYM maintained active and slow pools of C and N at the surface (0–15 cm depth). This indicated that the organic pools of C-associated nutrients particularly N may be maintained in rhizosphere and thereby sustaining soil quality and productivity. Improvement of WSC and carbohydrates helped in improving soil nutrient dynamics and transformation through biological 140 means. Passive pools of C viz., HA and FA fractions remained unchanged. The pronounced effect of integrated plant nutrient supply system on the distribution of organic matter among labile and slow pools is an indication of greater impact on soil fertility improvement. Organic matter in the clay + silt fraction (<0.053mm) was relatively resistant having low decay rates. A positive effect of balanced fertilizer (NPK+lime or NPK+FYM) on crop yields led to positive effects on soil C and N fractions and aggregate size distribution. Lime+NPK increased the productivity of the cropping system but as far as the carbon storage and maintenance of soil health is concern, NPK+FYM was found to be better. Thus liming, organic manuring and inorganic nutrient use should go together for long term sustainability in Agricultural production. The relationship between SYI and soil quality parameters indicated that the total and active fractions of SOC ultimately support the productivity and their losses reduce the nutrient supplying capacity of soil in the long run. Hence, soil carbon sequestration is a natural; cost effective, and environmentally friendly process
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