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Effect of long-term conservation tillage on soil quality and productivity in China

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Traditional farming systems in China are characterized by conventional cultivation, mouldboard plows and rotary hoes, and the removal of crop residues from the fields for animal fodder and household fuel. To support the nation's population of over 1,300 million, the pressure on farmland to maintain high productivity has been increasing at a phenomenal rate. Conversely, the area of farmland available for production has been decreasing due to the fast growing economy and urbanization. This pressure, coupled with harsh conventional cultivation practices, has led to soil, water and nutrient losses, and degraded soils with low organic matter. The drylands became the most affected areas; they constitute 52% of the nation's total land area and are occupied by 43% of the nation's population. These lands are inherently fragile due to their low soil fertility and low annual rainfall that can cause low productivity in most years.

The severe land degradation and serious environmental problems have led the Chinese government to emphasize the need for the implementation of farming practices which contribute to the conservation of soil and water, with tillage as an important component of these practices. A vital approach is the use of conservation tillage, defined as "All conservation farm practices that leave a minimum of 30% of crop organic residues in the field". The studies in China and world have shown that conservation tillage can improve soil chemical properties, reduce wind and water erosion and increase crop yields. This paper investigates the impacts of long-term conservation tillage on soil quality and productivity in several typical farming areas and discusses the development conservation tillage in China.