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Conservation Agricultural Practices for Improving Crop Production and Quality

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In crop production, the conventional management of agroecosystems often leads to a reduction in soil quality and alters the soil processes involved in providing many ecosystem services. Intensive tillage, combined with high-mineral fertilization, increases the mineralization of organic carbon in the soil, thereby contributing to an increase in greenhouse gas concentrations in the atmosphere. Conservation agriculture (CA) may be the answer to these threats. CA is a crop and soil management practice for sustainable agriculture, defined by three related principles: minimum tillage and soil disturbance, permanent organic soil cover, and diversified crop rotations. Adherence to these principles improves soil quality, optimizes yields, and reduces production costs. Conservation practices help minimize soil erosion, directly increase CO_2 sequestration in the soil due to increased organic matter, improve the efficiency of water capture and use, stimulate internal C and N cycling, and mitigate greenhouse gas emissions. CA's success is driven by component technologies such as water, weed, and nutrient management strategies to support crops under reduced tillage conditions.

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