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Viable Alternatives to the Rice-Wheat Cropping System in Punjab

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On-farm experiments conducted on alluvial soils of Punjab with diverse crop rotations of different water requirement showed that at Nawanshahar, mean yield of wheat was similar for rice-wheat system (RWS; 4.0 Mg/ha) and maize-wheat system (MWS; 4.3 Mg/ha). Mean yield of maize was also similar in the MWS (4.4 Mg/ha) and maize-rapeseed system (MRS; 4.4 Mg/ha). Although output in gross returns (GR) and return on variable expenses (ROVE) were higher for RWS in Nawanshahar district, substituting maize for rice in the monsoon season is preferred because of savings in water. In Faridkot district, the monetary returns were higher for the cotton-wheat system (CWS), which makes judicious use of groundwater as compared to the non-traditional RWS. Soil organic carbon (SOC) concentration at Nawanshahar increased from a mean initial level of 0.44% to 0.50% when both rice and wheat residues were burned; 0.51% when rice straw was incorporated but wheat straw was removed; and 0.57% when both rice and wheat straw were incorporated. At Faridkot site, the SOC concentration increased from a mean initial level of 0.39% to 0.49% when both rice and wheat straw were incorporated. The positive effect of straw incorporation on soil quality was more pronounced in the

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