

Estimation of Carbon Losses in Rice: Wheat Cropping System of Punjab, Pakistan

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Abstract : The study was conducted to observe carbon and nutrient loss by burning of rice residues on rice-wheat cropping system. The rice crop was harvested to conduct the experiment in a randomized complete block design (RCBD) with factors and 4 replications with a net plot size of 10 m x 20 m. Rice stubbles were managed by two methods i.e. Incorporation & burning of rice residues. Soil samples were taken to a depth of 30 cm before sowing & after harvesting of wheat. Wheat was sown after harvesting of rice by three practices i.e. Conventional tillage, Minimum tillage and Zero tillage to observe best tillage practices. Laboratory and field experiments were conducted on wheat to assess best tillage practice and residues management method with estimation of carbon losses. Data on the following parameters; establishment count, plant height, spike length, number of grains per spike, biological yield, fat content, carbohydrate content, protein content, and harvest index were recorded to check wheat quality & ensuring food security in the region. Soil physico-chemical analysis i.e. pH, electrical conductivity, organic matter, nitrogen, phosphorus, potassium, and carbon were done in soil fertility laboratory. Substantial results were found on growth, yield and related parameters of wheat crop. The collected data were examined statistically with economic analysis to estimate the cost-benefit ratio of using different tillage techniques and residue management practices. Obtained results depicted that Zero tillage method have positive impacts on growth, yield and quality of wheat, Moreover, it is cost effective methodology. Similarly, Incorporation is suitable and beneficial method for soil due to more nutrients provision and reduce the need of fertilizers. Burning of rice stubbles has negative impact including air pollution, nutrient loss, microbes died and carbon loss. Recommended the zero tillage technology to reduce carbon losses along with food security in Pakistan.

Keywords : agricultural agronomy, food security, carbon sequestration, rice-wheat cropping system

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