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A REVIEW MANAGEMENT OF CEREAL CROP RESIDUES FOR SUSTAINABLE RICE-WHEAT

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ABSTRACT

The Indo-Gangetic Plains' rice-wheat (RW) farming pattern has contributed significantly to India's food security. However, owing to declining soil quality, increasing strain on natural resources, and looming climate change concerns, the long-term viability of this key agricultural system is in jeopardy. Conservation agriculture, which includes zero- or minimal-tillage and crop residue management (CRM) technologies to prevent straw burning, should help farmers achieve sustainable production while reducing fertilizer and water inputs and reducing climate change risk. The irrigated RW system's high yields have resulted in massive amounts of agricultural wastes (CRs). Rice straw burning is widespread in India's northwestern states, resulting in nutritional losses and severe air quality issues that endanger human health and safety. Mulch is an excellent alternative for managing rice residue throughout the wheat crop, particularly if no tillage is used. Mulch may boost production, water economy, and profitability while also lowering weed pressure. The leftover wheat crop residue may be put into the paddy fields with no negative impact on rice production. In anaerobic flooded soil, residue breakdown significantly increases methane emission compared to residue removal. Long-term residue recycling studies have shown increases in soil's physical, chemical, and biological health. Because CRs contain large amounts of plant nutrients, their continued use will improve fertilizer management in the RW system. Another viable CRM alternative is to utilize a part of excess residue to make biochar (and co-produce bio-energy) for use as a soil amendment to enhance soil health, boost nutrient usage efficiency, and reduce air pollution. The authors of this paper addressed existing problems and potential solutions for managing CRs in the RW cropping system.

KEYWORDS: *Bioenergy, Crop Residues, Decomposition, Rice-Wheat System, Straw Mulch.*

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