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Impacts of Technological Change on Crop Residue Management and Livestock Feeding in the Indo-Gangetic Plains

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Abstract

The slow-down in yield growth of rice and wheat in the Indo-Gangetic Plains of South Asia has been linked to soil degradation. Conservation Agriculture based Resource Conserving Technologies have been identified as suitable interventions. Especially zero-tillage in winter wheat has already found wide-spread adoption in more progressive areas of northwestern India and is actively promoted elsewhere. However, year-round zero-tillage systems demand more residue retention in the form of mulch than conventional systems to improve soils. This might affect livestock feeding, which relies heavily on residues as the most important feed component over most of the year, with wheat straw being preferred in the Northwest and rice straw in the East. Results from smallholder farming systems surveys indicate the importance of harvesting technologies, mainly the increased use of combine harvesters for both cereals, in regard to availability and management of residues. In contrast to traditional manual harvesting and stationary threshers, combine harvesters spread straw over the field making it more difficult to collect the straw for feeding. Thus, machines for collecting wheat straw from the field and chopping it are becoming popular, indicating the continued importance of straw as livestock feed. Still, many farmers burn the remaining stubble and mulch during land preparation even when using zero-till drills. This indicates that currently farmers are not yet satisfied with the prevailing technology when seeding into significant residue amounts. While the mechanisation of cereal harvesting is a major determinant of changes in straw management, the level of residue retention in wheat fields as mulch is further influenced by the availability and perception of suitable zero-till seeding technology. In regard to straw feeding, the use of straw collection machinery implies additional costs and presents trade-offs in terms of straw recovery and quality, but so far there is little evidence that this has altered feeding patterns.

Keywords: Conservation agriculture, crop-livestock interactions, India, residue management