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Evaluation of zero tillage in rice-wheat belts of India

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Rice-wheat (*Oryza sativa* L.-*Triticum aestivum* L.) rotation is the major production system in Asia, covering about 18 million ha. The rural population of India needs immediate relief measures through engineering for on farm trials of improved farm technologies and entrepreneurship development for employment opportunities. The zero till seed drills (single row and two row units) were identified and refined for size and weight reduction suiting to the requirements of farmers. Conservation tillage offers an economically attractive and ecologically sound system of improving internal resources, sustaining the system productivity and soil health. Since the total turnaround from rice to wheat is about one month, therefore any delay in previous operations will delay the wheat. Zero-tillage (ZT) along with drill-seeding has been promoted to overcome these problems. A 7-yr permanent plot study evaluated various tillage and crop establishment (CE) methods on soil physical properties with an aim to improve soil health and resource-use efficiency. Treatments included transplanting and direct-seeding of rice on flat and raised beds with or without tillage followed by wheat in CT and ZT soil. Bulk density (D_b) of the 10- to 20-cm soil layer was highest under puddled treatments ($1.74\text{--}1.77\text{ Mg m}^{-3}$) and lowest under ZT treatments ($1.66\text{--}1.71\text{ Mg m}^{-3}$). Likewise, soil penetration resistance (SPR) was highest at the 20-cm depth in puddled treatments ($3.46\text{--}3.72\text{ MPa}$) and lowest in ZT treatments ($2.51\text{--}2.82\text{ MPa}$). The yield varies under different treatments from 18.19 to 24.62 q/ha. Combining the factors of energy analysis, economic analysis and grain yield it can be concluded that zero tillage treatment is one of the energy efficient and cost effective conservation tillage machinery system followed by strip till drill treatment.

Biography

Vinayaka has completed BTech (Ag. Engg.) from College of Agricultural Engineering, UAS, Raichur. Presently he is pursuing MTech (Ag. Engg.) in the Dept of Farm Power and Machinery from the Tamil Nadu Agricultural University, Coimbatore.

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Comparative performance of rice transplanters in flat lands and slopy lands

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Paddy transplanting is highly labour intensive operation and requires around 238 man-h/ha. Shortage of manual labour led to introduction of paddy transplanters in the country. A self-propelled, riding type, 8 row self propelled rice transplanter was tested for its feasibility in flat lands as well as in slopy and terraced lands. The operation of the transplanter revealed that it needs fairly plain land where uniform depth of standing water could be maintained. There was the need of one hard pan in the field where transplanter could be operated smoothly. The operation of transplanter needed bigger plots of land for operation and in case of irregular shapes of lands like in terraces; lot of land was left un-transplanted with the machine, which needs to be filled by manual transplanting so that total area could be utilized for taking the crop. The performance of the mechanical transplanter was quite satisfactory. For the flat land operations, the field capacity, field efficiency and fuel consumption of the transplanter were 0.19 ha/hr, 78 per cent and 6.25 l/ha, respectively. Cost of mechanical transplanting was Rs.789/ha as compared to Rs.1625/ha in case of manual transplanting whereas for the operation in slopy lands, the field capacity, field efficiency and fuel consumption of the transplanter were 0.123 ha/h, 78 per cent and 6.5 l/ha, respectively. Cost of mechanical transplanting was Rs.1554/ha as compared to Rs.2675/ha in case of manual transplanting, provided the machines are used for their maximum usage of 90 hectares in a year. As the usage of the machine in terms of number of hectares/year decreases, the cost of operation increases. Grain yield in both manual and mechanical transplanting remained on par with mean grain yield of 41.4 and 34.8 q/ha, respectively.

Biography

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