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Comparison of Different Seeding Methods on Seed Yield and Net Return of Wheat in Low Lying Indo-Gangetic Plains of Eastern UP

V. K. CHANDOLA[1], RAMESH CHAND[2], A. K. JOSHI[3], SANT PRASAD[4]
Y. SINGH[1] AND S. R. SINGH[1]

[1]*Department of Farm Engineering, Institute of Agricultural Sciences, Banaras Hindu University Varanasi 221005, India*
[2]*Department of Mycology and Plant Pathology Institute of Agricultural Sciences Banaras Hindu University Varanasi 221005, India*
[3]*Department of Genetics and Plant Breeding,Institute of Agricultural Sciences Banaras Hindu University Varanasi 221005, India*
[4]*Krishi Vigyan Kendra, Mirzapur, Institute of Agricultural Sciences Banaras Hindu University Varanasi 221005, India*

Abstract

A participatory rural appraisal was conducted in the low lying Indo-Gangetic plains of Jamalpur block of district Mirzapur, UP. The main causes of low yield in this rice-wheat cropping system were delayed sowing, poor plant population, adoption of low yielding varieties and poor management practices. To address the problem of delayed sowing and poor plant population a trial was conducted on different seeding methods. The zero tillage method resulted in an advancement of wheat sowing by 2—3 weeks and average seed yield of 4.16 q/ha which was significantly superior to all the seeding methods. This was 29.19 and 18.85% higher than the farmers practices of tillage + seeding behind the plough and tillage + broadcasting respectively. The average cost of cultivation in zero tillage + practice was reduced by Rs 2,636 and Rs 1,686/ha over the traditional practices of seeding behind the plough and broadcasting respectively zero till (without ploughing resulted in an average BCR of 1.43 whereas the farmers practice of seeding behind the plough and broadcasting resulted in an average BCR of 0.77 and 0.71 respectively.

Key words : Seeding methods, Seed yield, Net return, Wheat.

The eastern UP falls under two agro-climatic zones-Indo-Gangetic plain zone and vindyan zone.The majority of the area of this region falls under Indo-Gangetic plain zone. Rice-wheat cropping system is mainly followed in this region. The Jamalpur block of mirzapur district is located in the south east part of eastern UP adjacent to Bihar. This block is mainly irrigated through canals. It is low lying area, having heavy textured clay soil. Survey conducted through participatory rural appraisal at Karhat village of this block revealed than sowing of wheat in this area is generally delayed due to late harvesting of paddy and adoption of inefficient conventional field preparation and sowing practices. This results in poor stand. The traditional system of sowing in this area is behind the plough or broadcasting which is performed after 3—4 field preparatory tillage. This further delays the wheat sowing. Late sowing of wheat affects the vegetative and reproductive growth of the wheat crop and thus the production is greatly affected. It has been reported that delayed sowing of wheat beyond 25 November results into a grain loss of 30 kg/ha per day (1). Moreover, the traditional practice of wheat sowing results in improper placement of seed and fertilizer. This also affects the yield badly. The average yield of wheat in this area is 23 q/ha which is below the UP state average of 27 q/ha. The late planting of wheat is the major cause of low yield in the low lying rice-wheat belts. The wheat yield potential is reduced by 1—1.55 per day if planting occurs after 20 November (2). Considering these in mind trials were conducted on different seeding methods at the farmers field to evaluate the suitable method for the low lying Indo-Gangetic plains of eastern UP.

Methods

A participatory rural appraisal was conducted in

Table 1. Response of seeding method on seed yield of wheat(tons/ha). *Two years pooled data.

	Treatments	Average seed yield (tons/ha)
1.	M_1 Ploughing + seeding behind plough	3.5
2.	M_2 Ploughing + broadcasting	3.22
3.	M_3 Ploughing + Zero tillage	3.82
4.	M_4 No tillage + zero till sowing	4.16
	CD at 5%	0.15

Table 2. Comparison of cost of cultivation in different tillage practices.

	Treatments	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	Benefit cost ratio
1.	M_1 Ploughing + seeding behind the plough	19764	15236	0.77
2.	M_2 Ploughing + broadcasting	18800	13400	0.71
3.	M_3 Ploughing + zero till drill	17714	20486	1.15
4.	M_4 No ploughimg +zero till drill	17114	24486	1.43

the low lying areas village Karhat of Jamalpur block of district Mirzapur, UP to find out the causes of low yield of wheat. The soil of the area was fine textured clay loam having poor drainage property. It was observed that the main causes of low yield in this rice-wheat cropping system were delayed sowing, poor plant population, adoption of low yielding varieties and poor management practices. To address the problem of delayed sowing and poor plant population a trial was conducted during 2005-06 and 2006-07 on different seeding methods viz., tillage + seeding behind the plough, tillage + broadcasting,tillage + zero till sowing , no tillage+zero till sowing. The trial was conducted in randomized block design with five replications. The size of each plot was kept at 125 sqm and the total area of the trial was 2, 500 sqm. The improved variety HUM 510 and a balanced dose of fertilizer (120 N : 60 P_2O_5 : 60 K_2O kg/ha) were used in all the treatments. Half of the nitrogen and full dose of phosphorus and potash were applied at the time of sowing and the remaining nitrogen in two equal splits at tillering (20–25 DAS) and jointing (40–45) DAS) stages. In zero till treatment without preparatory tillage the crop was sown immediately after harvest of rice crop whereas in other treatments the sowing was performed after three preparatory tillage. The crop was harvested during 1—2 week of April.

The observations on seed yield were collected and the data were analyzed statistically. The benefit cost ratio was calculated for each treatment by finding the ratio of net return to cost of cultivation.

Results and Discussion

Seed Yield and Yield Contributing Characters

The farmers practices of wheat sowing viz., broadcast sowing and seeding behind the plough after preparatory tillage resulted in seed yields of 3.22 and 3.5 tons/ha (Table 1) . To compare the farmers seeding practices with improved seeding methods, the wheat was sown by zero till device after full field preparation (three tillages) which resulted in significantly higher wheat yield of 3.82 tons/ha as compared to both the farmers practices. The enhanced wheat yield in zero tillage practice was due to uniform placement of seed and fertilizer which resulted in better growth and yield. The seeding by zero tillage without field preparation resulted in highest grain yield of 4.16 t/ha which was significantly superior to all the treatments. Singh et al. (3) reported that in rainfed wheat 3.0 tons/ha of grain yield could be obtained by zero tillage sowing which could be attributed to timely sowing and uniform placement at the moist zone.

Economics of Zero Tillage

Table 2 shows that sowing of wheat crop through zero tillage device (without ploughing) resulted in a highest average net return of Rs 24, 486/ha and a benefit cost ratio (BCR) of 1.43 as compared to the other treatments followed by zero till after preparatory tillage (average return of RS 20,486/ha and a BCR of 1.15). Among the farmers practices seeding behind the plough resulted in better net return (Rs 15,236/ha) and BCR (0.77). A comparison of cost of cultivation indicated that zero tillage without ploughing made a saving of Rs 1,686 and Rs 2,636 per hectare as compared to seeding behind plough and broadcasting methods respectively. This saving was mainly due to saving in cost of tillage and and irrigation. Mallik et al. (4) also reported that by zero tillage device a sav-

ing of Rs 2,000—2, 500/ha can be made in cost of cultivation. The highest BCR could be realized in zero till drill witout ploughing due to highest production and reduced cost of cultivation.

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