

## **Constraints Faced by the Practicing Farmers in Adoption of Zero Tillage Technology in Punjab**

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### **ABSTRACT**

The present study was undertaken to know the constraints faced by the farmers in adoption of Zero Tillage Technology. A sample of 180 practising farmers was randomly selected from the six purposively selected districts of the State. The data were collected personally with the help of an interview schedule. The findings of the study reveal that loose straw left behind in the paddy harvested fields and its management was the major technical constraint faced by majority of the respondents. Lack of training on ZTT to meet the information needs was observed as the most serious training and educational constraint followed by availability of adequate extension literature about ZTT. Among the financial constraints, lack of adequate financial incentives by way of insurance of the crop sown with Zero Tillage Technology and availing of subsidy only by high profile farmers were reported as the major constraints by 20-28 per cent of the respondents. Among the psychological constraints, the look of the field before and after the sowing by ZTT was reported as constraint by the majority of the respondents.

The emerging dominance of rice-wheat system in the northern belt of the country has recently resulted in decelerating total factor productivity and environmental degradation, which urgently demand technology to address such issues. Zero tillage technology is considered important from these angles. ZTT refers to the planting of wheat and other crops with minimum soil disturbance in paddy harvested fields. Zero tillage can reduce the cost of tillage operations and lower down the cost of production especially in wheat crop. In addition to this it eliminates the need for number of tillage operations, reduced planting time and saves fuel and labour cost. The ZTT has the potential to give higher productivity too. At present a great deal of emphasis is being laid on to increase the area under ZTT. The Government of Punjab has been encouraging rapid adoption of the area under ZTT by giving 25 per cent of subsidy for buying Zero till drill. Despite multifarious advantages and Government efforts, at present only 11.86 per cent (4.13 lakh hectares) area is under Zero tillage technology (Anonymous, 2006). Therefore, there is need to examine the factors that are

jeopardizing the rapid adoption of this technology. Keeping in view these point, the present study was undertaken with the specific objective to study the constraints faced by the practising farmers in adoption of Zero tillage technology.

### **METHODOLOGY**

The present study was conducted in the six purposively selected district of Punjab state, three of which having maximum area under zero tillage namely Patiala, Ludhiana and Sangur labeled as Region-I and three with minimum area under zero tillage technology viz. Faridkot, Mansa and Muktsar labeled as Region-II. From each selected district, six villages where ZTT was in practices were further selected purposively. Thus in all thirty six villages were selected. Five practising farmers were further purposively selected from each of the selected village. Thus a total of 180 farmers were contacted for the purpose of the present study. The data were collected personally with the help of an interview schedule.

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**RESULTS AND DISCUSSION**

The constraints were classified into four categories namely technical constraints, training and educational constraints, financial constraints and social/psychological constraints. The important constraints faced by the practising farmers in adoption of ZTT have been listed in Table 1 to 4.

**Technical constraints**

The data presented in Table 1 revealed that loose straw left behind in the paddy harvested fields and its management was the major constraint faced by majority of the respondents (83.33% Region-I & 63.33% Region-II) followed by the presence of standing crop stubbles (44.44% Region-I & 35.56% Region-II). These two constraints were found to be dominant in both the regions.

**Table 1. Distribution of the respondent according to the Technical constraints faced in adoption of ZTT**

Sr. No.	Technical constraints	Region I (N=90)	Region II (N=90)	Z value	Overall (N=180)
1.	Non availability of the quality seed drill.	4 (4.44)	0 (0.00)	0.023*	4 (2.22)
2.	Poor quality material used on subsidized drills.	8 (8.89)	3 (3.33)	1.556	11 (6.11)
3.	Loose straw management is problem.	75 (83.33)	57 (63.33)	3.034*	132 (73.33)
4.	Problem of standing stubbles.	40 (44.44)	32 (35.56)	1.217	72 (40.00)
5.	Difficulty in bund making.	10 (11.11)	12 (13.33)	0.455	22 (12.22)
6.	Difficulty to judge the proper moisture level.	21 (23.33)	14 (15.56)	1.318	35 (19.44)
7.	Higher populatin of weeds at the time of sowing.	7 (7.78)	15 (16.67)	1.820	22 (12.22)
8.	Problem of rats.	20 (22.22)	22 (24.44)	0.352	42 (23.33)
9.	Problem of termite	5 (5.56)	12 (13.33)	1.784	17 (9.44)
10.	Late emergence of wheat seedlings.	15 (16.67)	22 (24.44)	1.291	37 (20.56)
11.	Every third successive season one have to shift to the conventional tillage for the sowing of wheat due to soil compactness and reduction in the yield.	23 (25.56)	30 (33.33)	1.145	53 (29.44)
12.	Problem of sowing of wheat in Pusa 44 fields due to high density of stubbles.	22 (24.44)	29 (32.22)	1.158	51 (28.33)

\* Multiple response \*Significant at 0.05 level

Note: Figures in parentheses indicates percentages

Among the technical constraints the least felt constraint were the non-availability of good quality seed drill, poor quality of material used on subsidized seed drills, excessive intensity of weeds at sowing time, problem of termite infestation as well as difficulty in making the bunds for irrigation purpose in the field sown by a Zero till drill. The percentage of the respondents in this respect varied from 5-15 per cent. A further look at the data reveals that the differences among Region-I & Region-II were statistically significant with regard to the availability of the good seed drill as well as the obstruction caused in the

operation of Zero till drill due to the presence of loose straw left behind in the combine-harvested fields.

### Training and Educational constraints

Regarding the training and educational constraints, as evident from the data presented in Table 2, inadequate training o ZTT to meet the information need was observed as the most serious constraint (38.89% Region-I & 24.44% Region-II) followed by availability of adequate extension literature about ZTT (22.22% Region-I & 7.78% Region-II).

**Table 2. Distribution of the respondents according to the Training and Education constraints faced in adoption of ZTT**

Sr. No.	Training and Educational constraints	Region I (n=90)	Region II (n=90)	Z value	Overall (n=180)
1.	Inadequate training programmes/facilities regarding zero tillage technology	35 (38.89)	22 (24.44)	2.228*	57 (31.67)
2.	Inadequate extension literature on Zero Tillage Technology	20 (22.22)	7 (7.78)	2.714*	27 (15.00*)
3.	Less coverage by the mass media	10 (11.11)	17 (18.89)	1.461	27 (15.00)
4.	Lack of knowledge regarding calibration of the seed drill	12 (13.33)	9 (10.00)	0.697	21 (11.67)

\*Multiple response \*Significant at 0.05 level

These constraints were more prominent in Region-I. The differences between the two regions with respect to above mentioned constraints were statistically significant at 0.05 level. However less coverage of ZTT by mass media as a constraint was reported by a small percentage of the practising farmers i.e. 15 per cent.

### Financial constraints

Among the financial constraints, lack of adequate financial incentives by way of insurance of the crop sown

Note: Figures in parentheses indicate percentages

by Zero Tillage Technology and availing of subsidy by high profile farmers were reported as the major constraints by a significant number of the respondents i.e. 20-28 per cent in both the regions. Furthersome, these constraints were more serious in Region-I as compared to Region-II. The differences were statistically significant at 0.05 level as indicated by Z-value in Table 3. This obviously would required some measures to be taken so that the benefit of subsidy could be availed by the farmers of all categories irrespective of their socio-economic status.

**Table 3. Distribution of the respondents according to the Financial constraints faced in adoption of ZTT**

Sr. No.	Financial constraints	Region I (n=90)	Region II (n=90)	Z value	Overall (n=180)
1.	Subsidy usually availed by high profile farmers	18 (20.00)	9 (10.00)	1.879	27 (5.00)
2.	Higher cost of zero till drill	10 (11.11)	7 (7.78)	0.765	17 (9.44)
3.	Inadequate funds due to purchase of other inputs	11 (12.22)	6 (6.67)	1.274	17 (9.44)
4.	Lack of incentives or any insurance policy	25 (27.78)	4 (4.44)	4.258*	29 (16.11)

\*Multiple response \*Significance at 0.05 level

Note: Figures in parentheses indicates percentages

To sum up, the necessary incentives and services with respect of ZTT need to be continued for spread of the Zero Tillage Technology in all the areas under paddy-wheat cropping system.

The other financial constraints as reported by a small percentage of the respondents were inadequate funds for purchase of different crop inputs (12.22% in Region-I & 6.67% in Region-II) and relatively higher cost of zero till drill (11.11% in Region-I & 7.78% in Region-II).

**Table 4. Distribution of the respondents according to the Social/Psychological constraints faced in adoption of ZTT**

Sr. No.	Social/psychological constraints	Region I (n=90)	Region II (n=90)	Z value	Overall (n=180)
1.	Lack of the cooperation among fellow farmers to share their experiences on Zero Tillage Technology	37 (41.11)	22 (24.44)	2.382	59 (32.78)
2.	Poor field appearance	58 (64.44)	62 (68.89)	0.632	120 (66.67)
3.	Hearsays and rumours about ZTT	9 (10.00)	15 (16.67)	1.316	24 (13.33)
4.	Community pressure	39 (43.33)	18 (20.00)	3.365*	57 (31.67)

\*Multiple response \*Significant at 0.05 level

Note: Figures in parentheses indicate percentage

The other social/psychological constraints which stood in the way of adoption of Zero Tillage Technology were lack of co-operation among fellow farmers to share their experiences and peer/community pressure which discouraged the adoption of Zero Tillage Technology. It is worth mentioning that peer/community pressure was also the most felt constraint for significantly higher percentage of the respondents from Region-I (43.33%) than Region-II (20.00%) as indicated by Z value i.e. 3.365. Hearsays and rumours were the other social/psychological factors, however its influence was observed on a significant number of practising farmers of both the regions.

These findings are supported by the findings of Malik *et al* (2006), Singh and Pandey (2006), Kumar *et al* (2006), Singh and Kumar (2006) and Cummins (2002), who reported that higher cost of zero till drill, non-availability of quality seed drill and less coverage about ZTT by the mass media as the constraints in adoption of ZTT.

### Social/Psychological constraints

The data presented in Table 4 contain information about social/psychological constraints impinging upon the adoption of Zero Tillage Technology. A close look at the data reveals that among the most serious psychological constraints, the look of the field before and after the sowing by Zero Tillage Technology was reported as a constraint by majority of the respondents i.e. 64.44% of Region-I & 68.89% of Region-II.

### CONCLUSION

As the management of loose straw and problem of choking the tynes with standing stubbles appear to be the most serious constraint faced by the adopters of this technology so there is need to develop suitable equipments and practices for collecting loose straw left in the paddy fields. Alternately improved designs of seed drills such as Happy Seeder that can plant into loose rice stubbles after combine harvesting of paddy to overcome the major constraints need to be introduced to provide a push to ZTT.

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