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RESEARCH ARTICLE :

Adoption of true potato seed (TPS) technology by the potato farmers of Tripura state

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SUMMARY : The study was carried out in all the erstwhile 4 (four) districts namely South Tripura, West Tripura, Dhalai and North Tripura with 240 potato farmers to ascertain adoption level of recommended practices TPS technology by the potato farmers, find out the relationship between personal characteristics of TPS farmers and adoption of TPS cultivation practice and reasons for non-adoption of TPS technology by the potato farmers. Out of 240 potato farmers 186 potato farmers have adopted the TPS technology fully (75 nos.) or partially (111 nos.). As per overall adoption, 40.32 percent of TPS farmers had high adoption behavior on TPS cultivation practices followed by medium adoption behaviour (33.33 %). Category wise, 48.00 per cent of the total marginal farmers (131 nos.) and 36.67 per cent of the total small farmers (75 nos.), 16.00 per cent of the total medium farmers (31 nos.); and 1.33 per cent of the total big farmers (3 nos.) have adopted TPS technology fully. The adoption of TPS cultivation technology was found to be positively and significantly correlated with their education, social participation, innovativeness, scientific orientation, economic motivation, knowledge at 1 per cent level of significance and mass media participation and contact with extension agency at 5 per cent level of significance. Different TPS cultivation practice wise maximum adoption were found in time, spacing and depth of seed sowing in nursery bed. Reasons for non-adoption of TPs technology by different categories of potato farmers showed that complexity in nature of technology, scarcity in skilled labour, lack of technical skill, risky technology and non-economical, no knowledge and lack of awareness were the major reasons for non-adoption of TPS technology in the study area.

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BACKGROUND AND OBJECTIVES

India is the second largest producer of potato in the world after China and both the countries put together contribute nearly one third of the global potato production (Scott and Suarez, 2012). India in particular and Asia in general are showing rapid growth in potato production. In Tripura, potato is the most remunerative cash crop being cultivated in an area of 6905 ha with production of 1.23 lakh ton with overall average productivity of potatoes is 13.99 to 17.81 t/ ha in Tripura which is low as compared to the leading states like Gujarat 29.7 t/ha and national average 21.8 t/ha (Horticulture Database, 2011). The major constraints of potato production in

Tripura are non-availability of quality seed tuber, incidences of potato diseases mainly late blight and viruses etc. Certified quality seed tubers often brought from outside the state is expensive, perishable, bulky and difficult to transport to distance areas hence, potato demands a heavy investment. The potato farmers in Tripura are, therefore, compelled to use low quality seed tubers either available in the market at a cheaper rate or produced by them over several generations using the same seed stock. In Tripura, true potato seed (TPS) could be an alternative technology to increase productivity and reduce the cost of potato production.

Owing to aforesaid vitalities of TPS technology, there is a mandatory need to adopt the TPS technology by the potato growers, for its increasing productivity. Though enormous programmes have been taken up but the potato farmers are not adopting TPS technology as expected. Therefore, the present study was undertaken with the specific to ascertain adoption level of recommended practices TPS technology by the potato farmers, find out the relationship between personal characteristics of TPS farmers and adoption of TPS cultivation practice and reasons for non-adoption of TPS technology by the potato farmers in order to facilitate subsequent pertinent policy formulation.

RESOURCES AND METHODS

The study was carried out in the Tripura. Erstwhile 4 (four) districts namely South Tripura, West Tripura, Dhalai and North Tripura were selected purposely on the basis of maximum area under potato crop. 8 (eight) Agri. sub-divisions of 4 (four) districts at the rate of 2 Agri. Sub-Division each selected districts were selected purposely for having maximum area under potato crop. 16 (sixteen) Gram Panchayats @ 2 (two) Gram Panchayats from each Agri. sub-division were selected purposely on the basis of proportionality of area under potato cultivation. The Gram Panchayat with the highest area under potato crop in each of the 8 (eight) Agri. sub-divisions were selected for the present study. After the selection of Gram Panchayat, from each Gram Panchayat, 15 respondents were selected systematic sampling, making a total sample size of 240 from 16 Gram Panchayat. The scale developed by Sengupta (1967) and followed by Singh *et al*. (2010) was used to measure adoption behaviour of the potato farmers in respect of the TPS cultivation practices. Thirteen recommended practices were used for measuring this adoption. Against each of the practice, there were two columns representing adoption and not adoption with weightage of 1 and 0, respectively. The minimum and maximum score a respondent could get on this scale were 13 and 0, respectively.

The data were collected by personally interviewing the sample respondent with the help of well-structured interview schedule.

OBSERVATIONS AND ANALYSIS

The findings of the present study as well as relevant discussion have been presented under following heads.

Potato farmers' category wise adoption of TPS technology :.

As per the data collected the category wise potato farmers were tabulated below based on adoption of TPS technmology by the potato farmers.

It is found from the Table 1 that out of 240 potato farmers 186 potato farmers have adopted the TPS technology fully (75 Nos) or partially (111 Nos) .However 54 potato farmers have not adopted the TPS technology at all.

It is also revealed that 48.00 per cent of the total marginal farmers (131 Nos) and 36.67 per cent of the total small farmers (75 Nos), 16.00 per cent of the total medium farmers (31 Nos) and 1.33 per cent of the total big farmers (3 Nos) have adopted TPS technology fully.

Table 1 : Category wise adoption of TPS technology by the potato farmers **(n=240)**

Category of potato farmers	Fully adopted		Partially adopted		Not adopted		Total	
	No	%	No	%	No	%	No	%
Marginal farmers	36	48.00	62	55.86	33	61.11	131	54.58
Small farmers	26	36.67	36	32.44	13	24.07	75	31.25
Medium farmers	12	16.00	11	9.90	8	14.82	31	12.92
Big farmer	1	1.33	1	0.90	0	0.00	3	1.25
Total	75	100	111	100	54	100	240	100

Similarly, 55.86 per cent of the marginal farmers and 32.44 per cent of the small farmers and 9.90 per cent of the medium farmers have adopted TPS technology partially .

Further, 61.11 per cent of the marginal farmers and 24.07 per cent of the small farmers and 14.82 per cent of the medium farmers have not adopted TPS technology at all .

Among all the respondents 54.58 per cent belonged to marginal farmers, 31.25 per cent belonged to small farmers, 12.92 per cent were medium farmers and 1.25 per cent were big farmers category.

Extent of overall adoption on recommended practices of TPS technology by the TPS farmers :

The adoption scores on recommended cultivation practices by the adopters of TPS farmers, so computed, were classified into low, medium and high categories of adoption of TPS farmers.

Extent of overall adoption of recommended practices TPS technology :

The adoption scores on recommended cultivation practices by the adopters of TPS potato growers, so computed, were classified into low, medium and high level of adoption of TPS potato growers.

The results show that 40.32 per cent of TPS farmers had high adoption behaviour on TPS cultivation practices followed by medium adoption behaviour (33.33%) and only 26.35 per cent of them had low level of adoption behaviour (Table 2). So it reveals that a majority of the respondents (73.65%) were found to possess medium to high adoption behaviour. This result in the line with finding of Khatana *et al*. (1996) and Singh and Varshney (2011).

Adoption of TPS cultivation practices by TPS farmers:

Some of the individual were adopting package of practices in full, or not adopted at all was also recorded. The results are presented in Table 3. The practice wise adoption level of TPS potato growers on TPS technology was assessed under the following thirteen major aspects.

Time, spacing and depth of seed sowing in nursery bed :

It was found that majority of the respondents

Table 2 : Extent of overall adoption of recommended practices of TPS technology (n=186)

Extent of overall adoption	No	Percentage
Low (< Mean – SD)	49	26.35
Medium (Between Mean + SD)	62	33.33
High (> Mean + SD)	75	40.32
Total	186	100

Table 3 : Adoption of TPS cultivation practices by TPS farmers (n =186)

Sr. No.	Practices	Adoption		Non-adoption	
		No	%	No	%
1.	Time, spacing and depth of seed sowing in nursery bed	183	98.38	3	1.62
2.	Seed bed preparation	179	96.24	7	3.76
3.	Land preparation of main field	176	94.62	10	5.38
4.	Spacing in main field	170	91.40	16	8.6
5.	Sowing/transplanting in main field (time of sowing/transplanting)	176	94.62	10	5.38
6.	Manuring and fertilization (quantity and time of application)	127	68.28	59	31.72
7.	Intercultural operation (activities, time and interval)	156	83.87	30	16.13
8.	Weed management	103	55.37	83	44.63
9.	Water management	171	91.94	15	8.06
10.	Benefit of haulm cutting in case of seedling tuber production	150	80.64	36	19.36
11.	Plant protection measures	139	74.73	47	25.27
12.	Harvesting (time)	179	96.24	7	3.76
13.	Storage(Pre- storage treatment and storing materials)	134	72.04	52	27.96

(98.38%) were adopting proper time of sowing in seed bed, spacing and depth of seed sowing in nursery bed for production of potato seedling or tuberlets.

Seed bed preparation :

96.24 per cent adopted raised nursery beds (6 inches or 15 cm), prepared to good tilt with finely powdered dry cowdung and provide shed for seedling production and prepared beds.

Land preparation for main field :

94.62 per cent TPS growers adopted making ridges and furrows in east - west direction to prevent the young seedling from scorching sunshine to some extent and stagnated water during irrigation.

Spacing in main field :

Proper spacing was adopted by 91.40 per cent of the TPS farmers.

Sowing/transplanting (time of sowing/transplanting in the main field) :

94.62 per cent of TPS growers adopted proper time of sowing /transplanting in the main field when the seedlings were ready for transplanting (25 to 28 days).

Manuring and fertilization (quantity and time of application) :

68.28 per cent adopted the proper time and quantity application of fertilizers, manures etc. 31.72 per cent TPS growers did not apply proper quantity of manures and fertilizers, the reasons may be due to lack of knowledge, high cost of fertilizer and also lack of interest.

Earthing up was the main intercultural operation:

83.87 per cent of the selected TPS farmers adopted earthing up was done after 30-35 days after transplanting in such a way that the plants come up on top of the earth. All the respondents were found adopting mechanical method of intercultural operations like spade, hand hoes etc.

Weed management :

55.37 per cent of the TPS farmers followed weed management schedule.

Water management :

91.94 per cent of TPS farmers practiced the improved practice of irrigation time in their TPS fields. But the rest did not adopt the recommended irrigation time due to non-availability of water at right time.

Benefit of haulm cutting in case of seedling tuber production :

80.64 per cent of the TPS growers adopted cutting the haulms at 85th day and stop irrigation for hardening of the tuberlets in the field.

Plant protection measures :

Only 74.73 per cent TPS farmers had adopted plant protection measures as per need and the rest did not adopt any plant protection measures for disease control in their TPS field.

Harvesting (time) :

96.24 per cent TPS farmers adopted harvesting for tuberlets when matures after 90-95days after sowing in the seed bed.

Storage (pre-storage treatment and storing materials) :

72.04 per cent TPS were found adopting ordinary method of storage and ripening. None of them adopted pre-storage treatment boric acid and, however, used perforated bags before sending to cold store to enhance the keeping quality and shelf-life.

Conclusion :

Out of 240 potato farmers 186 potato farmers have adopted the TPS technology fully (75 Nos) or partially (111Nos). However, 54 potato farmers have not adopted the TPS technology not at all.

Analysis of overall adoption on TPS practices revealed that 40.32 per cent of TPS farmers had high adoption behaviour on TPS cultivation practices followed by medium adoption behaviour (33.33%) and only 26.35 per cent of them had low level of adoption behaviour. So it reveals that a majority of the respondents (73.65%) were found to possess medium to high adoption behaviour. This result in the line with finding of Khatana *et al.* (1996) and Singh and Varshney (2011).

Different practice wise showed maximum adoption were in time, spacing and depth of seed sowing in nursery bed followed by seed bed preparation, time of harvesting, land preparation for main field, sowing/transplanting (time of sowing/transplanting in the main field), water

management, spacing in main field, intercultural operation (activities, time and interval) earthing up, benefit of haulm cutting in case of seedling tuber production, plant protection measures, storage (pre-storage treatment and storing materials, manuring and fertilization (quantity and time of application) and weed management.

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