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Impact of TDTD on integrated crop management in Kharif Onion (*Allium cepa* L.)

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ABSTRACT
Technology Dissemination through demonstrations (TDTD) on Integrated Crop Management (ICM) in onion with farmer participation was conducted in Khargone & Ratlam district of Madhya Pradesh for three years during 2014-15, 2015-16 and 2016-17. Results indicated that the average technology gap was highest in farmer practice (57.33q/ha) compared to Integrated Crop Management demonstration plot (37.66q/ha) with an extension gap of 19.66 q per ha. The average technology index was lower in Integrated Crop Management plot (12.0 to 22.22 q/ha with an average of 16.74 q/ha) compared to the check plot. Whereas, average adoption index was higher in Integrated Crop Management plot (79.17%) compared to the check plot (45.83). The impact of Integrated Crop Management module on thrips population was ranged from 5.15 to 6.73 with an average of 5.91 per plant was recorded in demonstrated plot as against farmer practice or check plots (14.83 thrips/plant). Similarly, the purple blotch disease incidence was severe in check plot (22.43 PDI) compared to demo plots (11.62 PDI). Average yield recorded in Integrated Crop Management in onion under TDTD was 187.33 q per ha which was more than check plot (167.66 q/ha).The increment in yield over check was 11.73 per cent. Improved practice (Integrated Crop Management) recorded higher net profit of Rs. 203700 with benefit cost ratio of 3.63 as against farmer practice wherein, the net profit was Rs. 176266.66 with B: C ratio was 3.33 for every rupee investment.
Keywords: *TDTD demonstration, onion, purple blotch, rain fed, thrips*

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INTRODUCTION

Onion is an important commercial crop of India with 10, 87,000 ha with production of 175, 11,000 MT and productivity of 16.1 t/ha (Anon, 2012a). In Madhya Pradesh onion is grown in an area of 1, 11,730 ha with a production of 2691000 mt and with a productivity of 24.09 t/ha (Anon, 2012b). The yield of onion crop in Madhya Pradesh is decreasing due to several abiotic and biotic factors. Among abiotic factors, crop nutrition and among biotic factors insect pests like thrips (*Thrips tabaci*) and disease like purple blotch (*Alternaria porii.*) are the major constraints to enhancing production and productivity of onion crop. In recent years, farmer

Incomes have been declining particularly due to the rising costs of inputs for plant protection. In India, unscientific and discriminate use of insecticides is common among onion growers. Yet, despite several sprays, crop losses are very common. Hence, there is an urgent need of the hour to demonstrate the all proven technologies in the farmers. Field to reduce overall cost of cultivation of the farmers. The technological breakthrough right from mid sixties has no doubt recorded in greater strides in augmenting agricultural production and productivity. Yet, the same has to be continued further to meet the demands of growing population in a geometric ratio. The most feasible way by which this could be achieved is by demonstrating the recommended improved technology on the farmers fields through front line demonstrations with the objectives to work out the input cost and monetary returns between front line demonstration and farmers methods, to identify the yield gaps between farmers practices and front line demonstrations to estimate the adoption of improved technology and to identify the reasons responsible for non adoption of proven technologies.

MATERIALS AND METHODS

This Integrated Crop Management (ICM) package was demonstrated with the farmer participation in *Kharif* onion through NHRDF, Indore for three years during *kharif* 2014-15, 2015-16 and 2016-17 under rain fed situation. Each demonstration was conducted in an area of 0.25 ha and adjacent to the demonstration plot a check plot (farmer practice) of 0.25 ha was maintained for the comparison. The demonstrations were conducted in different villages of Khargone & Ratlam district of Madhya Pradesh with 36 farmers (in 09 ha land) for a period of three years. Each year prior to the implementation of programme, all selected farmers were trained on Integrated Crop Management in onion in the NHRDF and these selected beneficiaries were provided with all the essential inputs. Data on pest and diseases, yield and yield parameters were recorded from both the demonstrated and check plot for the comparison. Each year 12 demonstrations covering 3 ha of land under different onion varieties *viz*., Agrifound Dark Red. The problems were identified through structured questionnaire. The need based practices were selected in consultation with the farmers, through field experience and also by consulting the horticulture and agriculture experts in the department. The technologies intervened are

I) ICM - Integrated crop management practices: includes improved *Kharif* onion variety like Agrifound Dark Red use of vermicompost @ 5q/acre and use of recommended fertilizers.

ii) IPM - Integrated pest management practices like growing of Maize or sorghum around the onion crop as border crop, Two sprays of hexaconazole (200 ml/acre) for purple blotch disease, Two sprays of spinosad (350ml/acre) or acetamaprid (50g/acre) for thrips management and Two sprays of boran (1ml/l) as disease prevention or resistant/ prophylactic measure induced mechanism in the crop. The data collected from the farmers regarding production cost, inputs used and monitory returns etc for working out the economic fees ibility of the recommended technology at the experimental station to work out the technology and extension gaps, technology index, the following formulae have been used (Eswaraprasad *et al*.,1993).

i) Technology gap = (Potential yield) - (Demonstration yield)

ii) Extension gap = (Demonstration yield) - (Farmers yield)

iii) Technology index (TI) $\frac{(Yi^* - Yi)}{Yi^*} \times 100$

Where, Yi* - Potential yield of i th crop

Yi - Demonstration yield of i th crop

The lower the value of the index higher the level of adoption of technology The adoption of technology in front line demonstrations was studied through technology index

Adoption index (AI) = $\frac{Ai}{Pi} \times 100$

Where. A i =Adoption score obtained by the farming community for ith crop

P i = Possible maximum score of the crop

Here the information on list of technologies developed for the crop was collected and each one was assigned a score of one.

List of technologies used for assessment

i) Improved *kharif* onion variety like Agrifound Dark Red/ N-53,
ii) Use of vermicompost @ 5 q/acre
iii) Recommended fertilizers.
iv) Growing of Maize or sorghum around the onion
v) Sprays of hexaconazole (200 ml/acre) for purple blotch disease
vi) Sprays of Spinosad (350ml/acre) or acetamaprid (50g/acre) for thrips management
vii) Sprays of boran (1ml/litre)

RESULTS AND DISCUSSION

Yield of the Technology Dissemination Through demonstrations trails and potential yield of the crop was compared to estimate the yield gap, which were further categorized into technology and extension gaps. The average technology gap was highest in farmer practice (57.33q/ha) compared to ICM plot (37.66q/ha) with the extension gap of 19.66q/ha (Table 1). This could be due to the lack of awareness about the improved crop management technologies in onion under rain fed situation. This has to be highlighted to educate the farmers. The adoption of technology in TDTD was studied through technology index and similarly the recommended practices followed by the farmers were analyzed through adoption index. Table 2 revealed that the average technology index was lower in ICM plot (12.0 to 22.22 with an average of 16.74) under both the demonstrated variety (Agrifound Dark Red) compared to the check plot, wherein the technology index was varies from 20.44 to 29.77% with an average of 25.47%. Whereas, average adoption index was higher in ICM plot (79.17%) compared to the check plot (45.83%). The

higher adoption index is due to fact that the beneficiaries were given pre season training provided with timely supply of inputs in time to the beneficiaries and regular visit, monitoring and advisory services management of pest and disease advice by the extension scientist to the demo farmers may be reason for higher adoption index. The results are in line with the results of Suryavanshi and Mahindre Prakash [6] and Arun kumar *et al.,* [3] who have reported that the adoption of recommended practices in frontline demonstration trials in oilseeds and in hybrid cotton have shown increased yield over respective check plot.

Table 1. Potential yield and yield gaps of *kharif* onion under TDTD.

Year	Variety	Potential Yield (q/ha)	Demonstration Yield (q/ha)		Technology gap (q/ha)		Extension gap
			ICM plot	Check plot	ICM plot	Check plot	
2014-15	Agrifound Dark Red	225	198	179	27	46	19
2015-16	Agrifound Dark Red	225	189	166	36	59	23
2016-17	Agrifound Dark Red	225	175	158	50	67	17
Average		**225**	**187.33**	**167.66**	**37.66**	**57.33**	**19.66**

Table 2. Technology index and adoption index of *kharif* onion under TDTD

Year	variety	Technology in		Average adoption score by		Possible Maximum		Adoption index (%) score		Technology Adoption (%)
		ICM Plot	Check plot	ICM plot	Check plot	ICM plot	Check plot	ICM plot	Check Plot	Increase over check
2014-15	Agrifound Dark Red	12.00	20.44	05	03	08	08	62.5	37.50	66.67
2015-16	Agrifound Dark Red	16.00	26.22	06	04	08	08	75.00	50.00	50.00
2016-17	Agrifound Dark Red	22.22	29.77	07	04	08	08	87.50	50.00	75.00
Average		**16.74**	**25.47**	**5.67**	**3.67**	**8.00**	**8.00**	**79.17**	**45.83**	**63.89**

Pest and disease incidence

The impact of IPM module on thrips and purple botch disease incidence is given in table 3. The thrips population was ranged from 5.15 to 6.73 with an average of 5.91 per plant was recorded in demonstrated plot as against farmer practice or check plots, wherein thrips population was ranged from 13.40 to 17.60 with an average of 14.83 per plant. Similarly, the purple blotch disease incidence was severe in check plot (22.43 PDI) compared to demo plots (11.62 PDI). However, the incidence was varied from 10.83 to 12.4 PDI in ICM plot and 20.2 to 24.3 PDI in check plot. The severity of pest and disease in check plot may be due to fact that many farmers have a tendency to use pesticides indiscriminately at higher dose, it might have caused pest outbreak in check plot.

Table 3. Impact of IPM schedule on thrips and purple blotch incidence in *kharif* onion under TDTD

Year	Variety	Percent ICM plot	Disease Check plot	Index No. of ICM plot	thrips/ plant Check plot
2014-15	Agrifound Dark Red	5.87	13.40	10.83	24.3
2015-16	Agrifound Dark Red	5.15	17.60	12.40	22.8
2016-17	Agrifound Dark Red	6.73	13.5	11.64	20.2
Average		**5.91**	**14.83**	**11.62**	**22.43**

Onion bulb yield and cost economics

Average yield recorded in ICM in onion under rain fed situation was ranged 175 to 198q per ha with an average of 187.33q per ha which was more than check plot wherein, the yield was varied from 158 to 179q per ha with an average of 167.66q per ha (Table 4). The increment in yield over check was ranged between 10.75 percent (in 2016-17) to 13.85 percent (2015-16) with an average of 11.73 percent. The total cost of cultivation was higher in demonstrated plots (Rs. 77300/ha) compared to check plot (Rs. 75233.33/ha). This is due to additional application of vermicompost to the soil at the time of sowing. The comparative profitability of onion crop has been studied by estimating the net profit and benefit cost ratio (Table 4). Highest gross returns, net returns and additional returns were recorded in improved practices over farmers practice. Improved practice (ICM) recorded higher net profit of Rs. 203700 per ha. With benefit cost ratio of 3.63 as against farmer practice wherein, the net profit was Rs. 176266.66 per ha with B: C ratio was 3.33 for every rupee investment. In addition, bulbs harvested in the ICM plots were uniform, round and more attractive compare to the bulbs harvested from check plots. It can be concluded

from the study that increased onion bulb yield was due to the adoption of improved technology. The study further reveals that the fluctuation in yield is the major cause for the fluctuation in the output. Hence, the fluctuation in yield has to be controlled to bring in stability in the output [5].

Table 4. Impact of Integrated Crop Management technologies on yield and economics of *kharif* onion under TDTD

Year	Variety	Yield		Increase in yield Over check (%)	Gross return (Rs/ha)		Cost of cultivation		Net return (Rs/ha)		BC Ratio	
		ICM	Check		ICM	Check	ICM	Check	ICM	Check	ICM	Check
2014-15 2015-16 2016-17	ADR ADR ADR	198 189 175	179 166 158	10.61 13.85 10.75	297000 283500 262500	268500 249000 237000	79200 77400 75300	77300 75600 72800	217800 206100 187200	191200 173400 164200	3.75 3.66 3.48	3.47 3.29 3.25
Average		**187.33**	**167.66**	**11.73**	**281000**	**251500**	**77300**	**75233.33**	**203700**	**176266.66**	**3.63**	**3.33**

REFERENCES

1. Anon, (2012a). *Annual Report.* 2011-12.Directorate of Onion and Garlic, Rajguru Nagar, Maharashtra, India.
2. Anon,(2012b). District wise and taluk wise statastics of major horticultural crops in Karnataka state 2011-12.*WWW.horticulture.kar.in.*139 pp.
3. Arunkumar, B., Jayaprakash, T. C., Gowda, D. S. M. and Karabhantanal, S. S. (2005). Evaluation of Front Line Demonstration Trials on Cotton in Haveri District of Karnataka, *Karnataka Journal of Agricultural Sciences,* **18**(3): 647-649.
4. Eswaraprasad, Y., Manohar Rao, M. and Vijayabhindana, B. (1993).Analysis of on farm trials and level of technology on oilseed and pulse crop in Northern Telangana zone of Andra Pradesh. *Indian Journal of Agricultural Economics,* **48**: 351-356.
5. Kaushik, K. K., (1993). Growth and instability of oilseeds production. *Indian Journal of Agricultural Economics*, **48**:334 -338.
6. Suryawanshi, S. D. and Mahindre prakash.(1993). Impact of viable technology for promoting oilseeds in Maharastra. *Indian Journal of Agricultural Economics*, **48**: 420

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