

EVALUATION OF TECHNOLOGY DISSEMINATION THROUGH DEMONSTRATION ON THE YIELD OF ONION, *ALLIUM CEPA* L.

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Abstract: Onion, *Allium cepa* L. is one of the most important bulb crops in India, which plays a major role in supplementing the income of small and marginal farmers of Rajsamand district in Rajasthan. One of the major constraints of onion farming is poor nursery and low productivity due to non adoption of recommended package of practices and improved varieties. To replace this anomaly, Krishi Vigyan Kendra, Rajsamand (Raj.) had conducted TDTD (Technology Dissemination through Demonstration) under National Horticulture Mission, Govt. of India, at adopted farmers' fields. Cultivation practices comprised under TDTD viz., use of improved variety/ season specific, nursery raising, soil/ seed treatment, transplanting, fertilizer application and control of pest and disease, showed that average percentage increase in the yield of onion ranged from 18.82 % to 29.96 % over local check during the course of study from 2008-09 to 2013-14. From the study, it revealed that over the years improved variety NA-53 performed superior over local check. The average gross returns (Rs. 221076/ha), net returns (175858/ha) and B:C (1:4.89) ratio were also recorded highest in demonstration's field compared to local check.

Keywords: Onion, Technology Dissemination, Demonstration, Productivity, Pest & Disease.

Introduction

Onion (*Allium cepa* L.) is one of the important commercial vegetable crops produced in India for both domestic consumption and export. Popularly it is also known as "*Poor man Kasturi*". In India onion occupies 105.2 million ha area with total production of 16.00 MT/ha (2012-13), which accounts for 16 per cent of the world's area and occupies the second position after China in production with a share of around 14 per cent (FAOSTAT, 2012-13). The productivity of onion is much low in India than the world average (Pandey, 2000 and Lawande, 2005). Onion is one of the major sources of income even to the marginal and small farmers in Rajsamand district. The district has a subtropical and temperate climate with high rainfall and humidity. Average temperature of the district varies from 30-48⁰C in summer and 5-35⁰C in winter. The annual rainfall is received during the month of May to September. The production and productivity of onion in Rajasthan are low compared to other onion growing states. The production and productivity of onion not only depends upon area and cultural

practices but also on genotype and environment of the crop. Unawareness of the farmers about suitable seasons, climate, soil and improved cultivation techniques are the main reasons, unawareness of the characteristic of the varieties, seasonalities and adoption of proper package of practices are also the reasons responsible for limiting the production and productivity of onion directly or indirectly (Pandey and Bhondey, 2002). The reasons for low productivity may be also traditional methods of cultivation practiced by the farmers. With the development of high yielding varieties and better management practices, there is a much scope for further increase in yield. The recommended production technologies which are proved to be superior over the existing ones need to be superior over the existing ones need to be demonstrated at farmers' field under the prevalent farming situation with the close supervision of KVK scientists to exploit their maximum potential and to get the feed back for wide scale diffusion are called Front Line Demonstration (FLD). The primary objective of this FLD is to spread the newly released high yielding variety of onion with improved production technologies at the farmers' field by exploiting their available resources and acquaint them with front line varietal as well as management technologies leading to wide scale adoption and diffusion of technology at farmers' level.

However, the technological break through has no doubt recorded greater strides in augmenting onion production and productivity. But the insufficient and improper extension activities are the major factors resulting in non-adoption of improved package of practices developed at research institutions. The improved technology packages were also found to be financially attractive. Yet, adoption levels for several components of the improved technology were low, emphasizing the need for better dissemination (Kiresur *et al*, 2001). Several biotic, abiotic and socio-economic constraints inhibit exploitation of the yield potential and these needs to be addressed (Singh *et al*, 2007). Rajsamand district has the sizeable area under onion cultivation but the productivity level is very low. Keeping the above point in view, the frontline demonstration on onion by using scientific crop production technology was started with the objectives of showing the productive potentials of the frontline demonstrations with improved variety and production technologies under real farm situation over the locally cultivated onion crop.

Material and Methods

Front Line Demonstration on HYV and improved production practices of onion was conducted by Krishi Vigyan Kendra, Rajsamand for six consecutive year viz., 2008-09 to 2013-14 in 20 villages of 4 blocks. The materials used for the study comprised of NA-53 as

well as local variety as check. In total, 60 demonstrations in 6.0 hectares area in different villages were conducted to convince them about potentialities of improved production technologies. In each demonstration, one control plot was also kept where farmer's practices were carried out. The results in both the cases were recorded and a comparison was made with respect to some related parameters. The soil of study areas was clay loam with pH ranging from 7.2 to 8.3. These soils were low in organic matter, medium in available phosphorous while high in available potassium. Materials for the study with respect to frontline demonstrations and farmers practices are given in Table A. The data on production cost and monetary returns were collected from frontline demonstration plots for working out the economic feasibility of improved variety. Beside this data on local practices commonly adopted by the farmers were also collected. The qualitative data were converted into quantitative form and expressed as percent increase in yield and was calculated by using following formula –

$$\% \text{ increased in yield} = \frac{\text{Demonstration' yield} - \text{Farmers' yield}}{\text{Farmers' yield}}$$

All the recommended package of practices were followed for improved variety. In demonstration plots, a few critical inputs in the form of quality seed, seed treatment, balance fertilizers, agro-chemicals, etc. were provided and non-monetary inputs like timely sowing in raised bed, transplanting were also performed. Traditional practices were maintained in case of local checks. The farmers involved in demonstration were facilitated by KVK scientist in performing field operations like nursery sowing, transplanting, irrigation, spraying, weeding, harvesting etc. during the course of training and visit.

Table 1. Particulars showing the details of onion production under frontline demonstration and existing practices

Operation	Existing practices	Improved practices demonstrated
Variety used	Local variety/ own seed	Improved high yielding and disease resistant
Seed treatment	No seed treatment	Seed treatment with Thiram @ 2gm/kg
Method of sowing	Broadcasting	Line sowing; Spacing- Row to row 15 cm and Plant to plant- 10 cm
Fertilizer application	Imbalanced application of fertilizer N:P:K @ 60:30:00 kg/ha	Application of recommended dose of fertilizer N:P:K @ 125:50:120 kg/ha

Weed management	Hand weeding	Spraying of Pendimethalin @ 1.0 kg/ha with one hand weeding at 45 DAS
Pest and disease management	Non-adoption of Integrated pest and disease management	Adoption of Integrated pest and disease management as recommended in PoP
Post harvest handling and quality improvement at farm level	Un-hygienic and improper practice	Adoption of improved post harvest handling and grading

The data on extent of adoption were collected using pre-tested structured schedule by personal interview method from 30 farmers under FLD. The extent of adoption of 8 important cultivation practices i.e. variety, seed rate, seed treatment, sowing method, sowing time, spacing, organic manures and plant protection measures, post harvest and storage were considered for the study.

Results and discussion

From the data presented in table 2, it is inferred that demonstration yield of NA-7 variety performed better than their respective local. The NA-7 variety of onion recorded average higher yield of 221.08 q/ha as compared to average local check (180.84 q/ha). The average per cent increase in yield over respective local was 22.40 for NA-7 variety of onion. The yield improvement in NA-7 variety is due to combined effect of high yielding and moderately resistance compared other local varieties. Such superiority of high yielding varieties over local check was similarly observed by Hiremath *et al.* (2007), Hiremath and Nagaraj (2010) and Hiremath and Hilli (2012). However, yield of onion varied in different years which might be due to the variations in soil moisture availability, rainfall, soil type and pest and disease occurrence as well as the change in the location of trials every year (Table 2). The results indicates that the improved technology has given a good impact over the farming community of Rajsamand district as they were motivated by the new agricultural technologies applied in the demonstrations field.

The year wise economics of onion production under frontline demonstrations were estimated and the results have been presented in Table 2. The economic analysis of the data over the years revealed that NA-7 variety recorded higher gross returns (Rs. 221076/ha), net returns (Rs.175858/ha) and B:C ratio (1: 4.89) compared to farmer's practice. These results are in line with the findings of Hiremath *et al.* (2007), Hiremath and Nagaraj (2010) and Hiremath and Hilli (2012). The present study observed that wide yield and management gaps exist between research recommendation and farmers practices. However, the yield levels

under FLD was better than the local varieties and performance of improved hybrid variety could be further improved by adopting recommended management practices.

Hence, it can be concluded from the study that increased yield was due to adoption of variety NA-7 and conducting front line demonstration of proven technologies yield potentials of crop can be increased to greater extent. This will subsequently increase the income as well as the livelihood of the farming community.

Conclusion

By conducting demonstrations of improved scientific technologies, yield potential of onion can be increased to a great extent. This will substantially increase the income as well as the livelihood of the farming community. There is a need to adopt multi-pronged strategy that involves enhancing onion production through improved technologies in Rajsamand district. This should be brought to the access of farmers through transfer of technology centers like KVK,s etc.

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Table 1. Productivity of onion cultivation in Rajsamand district var.- N-53

Year	Area (ha)	No. of demo.	Yield (Qt/ha)		% increase over local
			Demo.	Farmers practice	
2008-09	5.0	10	220.90	181.16	21.94
2009-10	5.0	10	224.76	183.20	22.69
2010-11	5.0	10	204.90	169.30	21.03
2011-12	5.0	10	233.00	196.10	18.82
2012-13	5.0	10	216.90	166.90	29.96
2013-14	5.0	10	226.00	188.40	19.96

Table 2: Economics of onion production under front line demonstrations in Rajsamand district (Mean over locations)

Year	Av. cost of cultivation (Rs./ha)		Average Gross Return (Rs./ha)		Average Net Return (Profit) (Rs./ha)		B:C Ratio (Gross Return / Gross Cost)	
	Demo.	FP	Demo.	FP	Demo.	FP	Demo.	FP
2013-14	41450	30500	220900	126812	179450	96312	5.32	4.15
2012-13	43500	30800	224760	128240	181260	97440	5.16	4.16
2011-12	44750	31550	204900	118510	160150	86960	4.57	3.76
2010-11	45600	32150	233000	137270	187400	105120	5.10	4.27
2009-10	47450	33560	216900	116830	169450	83270	4.57	3.48
2008-09	48650	34550	226000	131880	177440	97330	4.64	3.82

FP= Farmers practice

