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Productivity and Profitability Enhancement of Kharif Onion through Improved Production Technologies in Farmer's field

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Abstract

Realizing the importance of frontline demonstrations (FLDs) in transfer of Kharif onion production technologies, Krishi Vigyan Kendra, Maulasar, Nagaur- II has carried out FLDs on Kharif *onion* var. *Agrifound Dark Red covering an area of 8.0 ha of farmers' field to exhibit latest production technologies and compares it with farmer's practice. The study in total 40 frontline demonstrations were conducted on farmers' fields in villages* viz*., Bedwa, Rashidpura, Kurli, Alakhpura and Dabra of Nagaur district of Rajasthan during the period from 2018-19 to 2020-21, to demonstrate production potential and economic benefit of improved technologies comprising sowing method, nutrient management and weed control and adoption of whole package of practices for the crop. Yield attributes of both demonstrations and farmers practices were recorded and percent yield enhancement, technology gap, extension gap, technology index, were analyzed. The average three years data revealed that the demonstrated technology recorded a mean yield of 274.03 q/ha which was 21.11 % higher than obtained with farmers' practice (226.31 q/ha). The average of technology gap, extension gap and technology index were found to be 25.97 q/ha, 47.72 q/ha and 8.63 q/ha, respectively. Higher mean net income of Rs. 333001.33/ha with a Benefit: Cost ratio of 4.41 was obtained with improved technologies in comparison to farmers' practices (Rs. 262461.33/ha). The frontline demonstrations conducted on* Kharif *onion at the farmers' field revealed that the adoption of improved technologies increased the yield and net returns than the farmers' practices. So, there is a need to disseminate the improved technologies among the farmers with effective extension methods like training and demonstrations.*

Key Words: Demonstration, Economics, FLD, *Kharif* Onion, Technology dissemination

Introduction

Onion is an important crop of almost all landmasses and is commercially cultivated in several countries. It is crucial item in every kitchenette as vegetable and condiment in India. The Indian onions are famous for their pungency and are available throughout the year. India is the second major onion growing country in the world after China. The main Onion producing states are Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana and Telangana. Maharashtra hold ranks first in production with a share of 39% followed by Madhya Pradesh with a share of 17%. It is produced in three seasons *i.e., Kharif*, late *Kharif* and *Rabi* in our country. The 60 percent production comes from *rabi* season crop, while, *Kharif* and late *Kharif* crops contribute 20 percent each. The crop of onion is harvested in the month of April-May, while, *Kharif* and late *Kharif* crop is available in the market from October to December and January – February, months respectively. Major portion of rabi season crop is stored all over the country. This stored produce is available for domestic markets as well as for export from May to October. There is critical gap in supply of onion from October to December months in the country and as a result the prices shoot up. The *Kharif*

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crop plays an important role in fulfilling consumers' demand and stabilizing the prices of onion in the country (Tripathi and Lawande, 2008).

Besides providing an alternative source of income to farmers, *Kharif* onion also saves people from the sting of inflation when its prices skyrocket. This crop gives good returns to the farmer's, hence emerged as important vegetable crop in the Nagaur district due to available irrigation facility. It is primarily because the technology development with regard to superior varieties and other inputs have played imperative role in raising productivity. Front line demonstrations is one of the key extension tools for transfer of technology at grass root level that directly impact the horizontal spread of technology. It is a distinctive approach to provide a direct interface among researcher and farmers as the scientists are directly involved in planning, implementation and monitoring of the demonstrations for the technologies developed by them and obtain direct feedback from the farmers. The experiments conducted have yielded encouraging results. Realizing the importance of frontline demonstrations in transfer of *Kharif* onion production technologies, Krishi Vigyan Kendra, Maulasar, Nagaur-II (Rajasthan) made efforts to popularize the commercial cultivation of *Kharif* onion crop through front line demonstrations in the jurisdiction area.

Materials and Methods

The present study was conducted by Krishi Vigyan Kendra, Maulasar, Nagaur-II (Rajasthan) during the three consecutive *Kharif* season of 2018-19 to 2020-21 in the farmer's field of adopted village's *viz*., Bedwa, Rashidpura, Kurli, Alakhpura and Dabra to disseminate the improved technology of *Kharif* onion to the farming community. Total 40 frontline demonstrations were accomplished on farmers' fields and each demonstration was carried out in an area of 0.2 ha and 0.1 ha adjacent to the demonstration plot was kept as farmers' practices. The package of integrated crop management practices like nursery raising, transplanting, nutrient management, seed treatment and whole package were used in the demonstration plots. The soils of the cultivation areas where demonstrations were conducted were sandy to sandy loam, containing low organic matter, medium nitrogen and phosphorus in the soil. In case of farmer's practices (local check plots), existing practices being used by farmers were followed. Before conducting the demonstrations, training was imparted to partner farmers with respect to *Kharif* onion production technology *e.g.*, site selection of nursery, seed rate, seed treatment, nursery raising, time of sowing, method of sowing, plant protection methods etc. Other management practices were applied as per the package of practices for onion crop by Department of Agriculture, transitional plain of inland IIA Sikar. Data with respect to bulb yield from demonstrations plots and farmer practice plots were collected and evaluated. The inputs and outputs prices of commodities prevailed during the study of demonstrations were also taken for calculating gross return, cost of cultivation, net return and benefit: cost ratio. Different parameters as

Table 1: Demonstration package and farmer practice under FLDs in *Kharif* onion

Technology component	Demonstration plot	Farmer's practice
Variety	ADR-Agrifound Dark Red	Use of local/own seeds
Seed rate	8-10 kg/ha	15-20 kg/ha
Seed treatment	Seed treatment with *Tricoderma* @ 6 g/kg seed	No seed treatment
Nursery raising	Raised bed (3m x1m size, raised up to 20-25cm and covered with green shade net	Flat bed or direct seed sowing without shade
Method of seed Sowing	Broadcasting	Line sowing
Fertilizerapplication	Application of recommended dose of fertilizer FYM-30t /ha N:P:K @ 125:50:120 kg/ ha and micronutrients	Imbalanced use of fertilizers, FYM 10 t/ha, N:P:K @ 60:30:00 kg/ha
Weed management	Application of oxyfluorfen 23.5% EC@ 2 ml/l before planting + one hand weeding	Hand weeding
Plant protection	Adoption of integrated pest and disease management as recommended in PoP	Non-adoption of IPM Practices

suggested by Meena and Singh (2017) was used for gap analysis, technology index and calculating the economics parameters of Kharif onion. The details of various parameters and methods adopted for analysis are as under:

Technology gap
= Potential yield (kg/ha) –Demonstration yield (kg/ha)
Extension gap
= Demonstration yield (kg/ha) –Farmers yield (kg/ha)
Technology index (%)
= Potential yield – Demonstration yield/Potential yield x 100

Results and Discussion

The data regarding bulb yield of *Kharif* onion, technology gap, extension gap and technology index for onion crop for the demonstration years 2018-19 to 2020-21 were recorded and reported in table 2 and discussed under following parameters.

Bulb Yield

It is evident from results t hat under the demonstrations, performance of *Kharif* onion was sustainable higher than that in the farmer's practices (local check) in all the three years of the study. The variety Agrifound Dark Red (ADR) recorded higher average yield of 274.03 q/ha as compared to farmer's practices (226.31 q/ha). The per cent increased in yield over local was 21.11. The higher average onion yield in demonstration fields compared to farmer's field was due to superior varietal characters of ADR and integrated crop management practices. The findings confirm with the findings of Choudhary *et al*. (2021), Bhoi *et al*. (2020), Dubey *et al.* (2019) and Meena *et al.* (2016) who found more bulb yield in *Kharif* onion under FLD plots. Fluctuations in yield observed over the years were mainly on account of variation in temperature, rainfall, sowing time and pest and disease management.

Yield Gaps

Evaluation of findings of the study (Table 2) stated that an extension gap of 34.11 to 61.95 q/ha was found between demonstrated technology and farmers' practice and on average the extension gap was 47.72 q/ha. The extension gap was highest (61.95 q/ha) during 2020-21 and lowest (34.11 q/ha) during 2018-19. Such gap might be attributed to adoption of improved technology especially high yielding varieties, balanced used of fertilizers, weed management and appropriate plant protection measures in demonstrations which resulted in higher bulb yield than the traditional farmers' practices. The study further exhibited a broad technology gap during the investigation. It was lowest (10.63 q/ha) during 2020-21 and highest (45.89 q/ha) during 2018-19. The average technology gap of all the years was 25.97 q/ha. The difference in technology gap in different years is due to better performance of recommended variety

Table 2: Impact of Kharif onion in improved and farmer practices through front line demonstration at farmer's field

Year	Area (ha.)	No. of Demonstrations	Bulb Yield (q/ha) Potential	Demonstration	FP	% increase over control	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
2018-19	6.0	20	300	254.11	220.00	15.50	45.89	34.11	15.30
2019-20	1.0	10	300	278.60	231.50	20.35	21.40	47.10	7.13

Table 3. Impact of improved production technology on economics of onion under real farm situation

Year	Cost of production (Rs/ha)		Gross Return (Rs/ha)		Net Returns (Rs./ha)		BCR	
	IT	FP	IT	FP	IT	FP	IT	FP
2018-19	94500	87300	381165	330000	286665	242700	4.03	3.78
2019-20	98515	91200	417900	347250	319385	256050	4.24	3.81
2020-21	98975	97980	491929	386614	392954	288634	4.97	3.95
Average	97330.00	92160.00	430331.33	354621.33	333001.33	262461.33	4.41	3.85

IT= Improved Technology; FP- Farmer's practice

with different interventions and more feasibility of recommended technologies during the course of study. Similarly, the technology index for all demonstrations in the study was in accordance with technology gap. Higher technology index reflected the inadequate transfer of proven technology to growers and insufficient extension services for transfer of technology. On the basis of three years study, average 8.63 technology index was recorded, which was reduced from 15.30%, 7.13% and 3.45% during 2018, 2019 and 2020, respectively. Hence, it can be inferred that the awareness and adoption of improved variety with recommended scientific package of practices have increased during the advancement of study period. These findings are in the conformity of the results of study carried out by Choudhary *et al.* (2021), Gaharwar and Ughade (2018), Singh and Singh (2018), Ojha and Singh (2013), Karabhantanal *et al*. (2015) in onion Meena and Singh (2017) in green gram.

Economic Analysis

Economic parameters are presented in table 3. The inputs and outputs prices of commodities prevailed throughout the study of demonstrations were in use for calculating gross return, cost of cultivation, net return and benefit: cost ratio. The data revealed that, monetary returns were directly influenced by the market price of onion bulbs and cost of production during the successive years of demonstrations. During all the years of demonstrations, the increased gross monetary return, net monetary returns and Benefit: Cost ration were obtained in the demonstrated technology over local check of farmers. An increased average net monetary returns of Rs 333001.33 and B:C ratio 4.41 was obtained in the demonstrated technology over farmers check with Rs 262461.33and B:C ratio 3.85. The higher returns were due to higher bubs yields obtained in the demonstrated technology over check plots. The results are in confirmation with the findings of Choudhary *et al.* (2021), Gaharwar and Ughade (2018), Dhemre and Desale (2010) and Rajput *et al.* (2018) in Kharif onion.

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