



Research Article

YIELD GAP ANALYSIS IN ONION UNDER FRONT LINE DEMONSTRATIONS AT SHIVPURI DISTRICT OF MADHYA PRADESH, INDIA

PUNEET KUMAR¹, SINGH PUSHPENDRA^{1*} AND SINGH SURENDRA²

¹ICAR-Krishi Vigyan Kendra, Shivpuri, 473551, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, 474002, Madhya Pradesh, India

²Bramanand PG College (BNV College), Rath, 210431, Hamirpur, 210 431, Bundelkhand University, Jhansi, 284128, Uttar Pradesh, India

*Corresponding Author: Email - psinghkvk@gmail.com

Received: May 05, 2018; Revised: May 11, 2018; Accepted: May 12, 2018; Published: May 15, 2018

Abstract: Adoption of recommended production technology and per se performance of variety is the crucial factors in production of onion. Increasing cost of cultivation in onion leading to reducing the net profit of onion growing farmers is the major challenge. The vigor of the variety is one of the major constraints in production of onion. After evaluation of onion variety Agri found Dark Red over locally available seed grown onion, the front-line demonstration of Agrifound Dark Red variety was carried out during 2014-15 to 2016-17 in different locations of Shivpuri district of Madhya Pradesh. The demonstration was focused on maximum productivity per unit area and feedback of farmers on performance of variety. The variety produced higher yield (average 221.33q/ha) over locally available variety but remain behind to touch its potential yield (300q/ha). The gross returns, net returns and B: C Ratio were recorded higher in Agrifound Dark Red as compared to local. Further the technology index and its adoption index were also highest in variety Agrifound Dark Red.

Keywords: Onion, Front Line Demonstration, Extension gap, Technology gap, Technology index

Citation: Puneet Kumar, *et al.*, (2018) Yield Gap Analysis in Onion under Front Line Demonstrations at Shivpuri District of Madhya Pradesh, India. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 9, pp.-5980-5981.

Copyright: Puneet Kumar, *et al.*, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Introduction

Onion (*Allium cepa* L) is an important vegetable crop for internal consumption as well as highest foreign exchange earner among the fruits and vegetable crops. It covers an area of about 1064 thousand ha, with production of 15118 thousand tons. During 2011 -12, the export of onion was 13,09,863.26 thousand tons which pulled a value of Rs 1,722.85 crores. Only after China, India is the 2nd largest producer of onion in the world but the productivity of onion in India is very low i.e. 14.21 tons/ ha, as compared to many other onions growing countries. The area under onion cultivation in Madhya Pradesh is 58300 ha with production of 1021500 MT and productivity 17.5MT/ha. Shivpuri district covers an area of 1250ha with the production of 19500 MT [1]. The productivity of onion is much low in India than the world average [2, 3]. Even in Shivpuri district of Madhya Pradesh, yield levels are also low than the state average. However, the technology break through has no doubt recorded greater strides in augmenting onion production and productivity. But insufficient and improper extension activities result in non-adoption of improved package developed at research institutes. Further the replacement ratio of traditional varieties with improved varieties and non-availability of sufficient quantity of quality seeds of improved variety in a time, are the major constraints in onion cultivation. Hence, variety Agrifound Dark Red was evaluated with local variety under front line demonstrations to improve the production of onion. Thus, on the basis of results obtained on farmers' fields the front line demonstrations are effective tools in introducing new technologies to the farmers.

Materials and Methods

Krishi Vigyan Kendra Shivpuri conducted front line demonstrations of onion from 2014-15 to 2016-17 in eight different locations of the district to introduce onion variety Agrifound Dark Red. Each demonstration was comprised of 0.4 ha, local variety was grown for comparison.

The recommended package of practices was followed for the crop [4]. The data on yield, cost of cultivation, monetary returns, technology gap and adoption index were collected and analyzed to determine the economic feasibility of the recommended technology [5].

Technology gap = (Potential yield) – (Demonstration yield)

Adoption index = $(A_i/P_i) \times 100$

Extension gap = Demonstration yield – yield under existing practice

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$$

Where,

A_i =Adoption score obtained by the farming community for i^{th} crop and P_i = Possible score of i^{th} crop

Results and Discussion

Yield levels of varieties under front line demonstrations trials and their potential yield was compared to estimate the yield gap. The technology gap shows the gap in the demonstration yield over the potential yield and it was highest in Agrifound Dark Red variety compared to local variety during all the years i.e., 2014-15 to 2016-17 [Table-1]. This may be attributed to dissimilarity in the soil fertility status, weather condition and unawareness of the farmers more and more about the improved variety and its production technology to reach maximum yield potentiality. The adoption index was found higher in Agrifound Dark Red variety compared to local. The technology gap and technology index were maximum during 2016-17 in variety Agrifound Dark Red. This may be attributed to high yielding ability and moderately disease resistance for purple leaf blotch with good quality parameters and better market preference compared to local [Table-3].

Table-1 Potential yield, yield gap and adoption index of onion

Year	Variety	Potential yield	Demonstration yield	Technology gap	Technology index	Extension gap	Adoption Score by Respondent (A)	Possible Score (Pi)	Adoption index
2014-15	Agri found dark red	300	244	56	18.66	79	5	7	71.42
	Local	200	165	35	17.5	-	3	7	42.85
2015-16	Agri found dark red	300	235	65	21.66	58	4	7	57.14
	Local	200	177	23	11.5	-	2	7	28.57
2016-17	Agri found dark red	300	185	115	38.33	43	3	7	42.85
	Local	200	142	58	29	-	2	7	28.57
Average	Agri found dark red	300	221.33						
	Local	200	161.33						

Table-2 Impact of improved variety Agrifound dark red on yield and economics of onion over local Check

Year	Variety	No of Demon	yield (qt/ha)	% Yield Increase over Local	Cost of Cultivation (Rs/ha)	Gross Returns (Rs/ha)	Net Returns (Rs/ha)	B:C Ratio
2014-15	AFDR	8	244	47.87	46200	146400	100200	3.16
	Local		165		42500	99000	56500	2.32
2015-16	AFDR	8	235	29	45300	141000	95700	3.11
	Local		177		44150	106200	62049	2.4
2016-17	AFDR	8	185	21.5	46700	148000	101300	3.16
	Local		142		43100	113600	70500	2.63

The variety Agrifound Dark Red has shown increased yield over local variety. These findings are in line with the results of [6-8]. The increment in yield ranged between 21.5 to 47.87 percent [Table-2]. The percent increase in yield over local check was higher (47.87%) during 2014-15 compared to local while net return was highest during 2016-17 due to better prices. However, variations in the yield of onion in different years might be due to the variations in soil moisture availability, rainfall, and soil type as well as change in the location of demonstrations every year. The gross return, net returns and benefit cost ratio was recorded higher in improved variety compared to local check [Table-2]. The economic analysis reveals that by adoption of improved variety Agrifound Dark Red with minimal additional cost results in higher additional net returns over local showing its profitability. A Similar result on profitability of onion was observed by [6, 7 & 9].

Table-3 Biometric observation on yield and yield attributes of onion as influenced by variety under farm condition (Meanover 3 years)

SN	Particulars	Variety	
1	Growth parameters	AFDR	Local
	Plant height (cm)	53.6	46.2
	No. of leaves per bulb	8.7	7.4
	Leaf length (cm)	52.2	44.6
	Leaf breadth (cm)	0.97	0.86
2	Yield parameters		
	Bulb diameter (cm)	6.83	4.88
	Bulb weight (gm)	62.8	42.4
3	General appearance	Deep red, attractive, uniform and globe shape	Medium red, non uniform size
4	Disease reaction to purple leaf blotch	Tolerant	Susceptible
4	Keeping quality	Medium	low
5	Market preference	Higher price(15%)	Lower price

Application of research: This research is important for assessment of onion variety with package of production technology. It will be helpful for increasing yield of onion and hence improving income of farmers.

Research Category: Front line demonstrations in onion

Acknowledgement / Funding: Author thankful to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, 474002, Madhya Pradesh, India and ICAR-ATARI Zone-IX, Jabalpur.

***Research Guide or Chairperson of research: Dr Puneet Kumar**

University: Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, 474002, Madhya Pradesh, India

Research project name or number: KVK FLDs

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

References

- [1] Anonymous (2013) *Director Horticulture Madhya Pradesh. Bhopal.*
- [2] Pandey U.B. (2000) *National Symposium on onion and garlic, production and post.*
- [3] Lawanda K.E. (2005) *National Symposium on current trends in onion, garlic and seed spices- production, marketing and utilization, held at NRCOG, Rajagurunagar, Pune during 25-27 November, 2005, 1-11.*
- [4] Anonymous (2007) *Package of practices or Horticultural crops. University of Agricultural Sciences, Dharwad, University of Agricultural Sciences, Bangalore and Department of Horticulture, Bangalore.*
- [5] Eswaraprasad Y., Manohar Rao M. and Vijaya Bhinandana B. (1993) *Indian journal of Agriculture Economics*, 48, 351-356.
- [6] Heremath S.M., Nagaraj M.V. and Shashidhar K.K. (2007) *National seminar on appropriate extension strategies for management of rural resources, held at University of Agricultural Sciences, Dharwad during 18-20 December, 2007, pp. 100*
- [7] Hiremath S.M. and Nagaraja M.V. (2014) *International Journal of Scientific Research*, 3(10).
- [8] Rajput S., Jain V. and Verma S.K. (2016) *J. Krishivigyan*, 5(1), 74-76
- [9] Rajput Savita, Rajput A.S., Jain Vijay and Verma S.K. (2018). *Int.J.Curr.Microbiol.App.Sci.*, Special Issue-7: 4104-4108.