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Research Article

# ANALYSIS OF YIELD PERFORMENCEAND YIELD GAP OF BIOFORTIFIED MUSTARD VARIETY PUSA DOUBLE ZERO MUSTARD-31 WITH THE SPECIAL REFERENCE TO ADOPTION IN DISTRICT BIJNOR UTTAR PRADESH, INDIA

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**Abstract:** Biofortified Mustard variety Pusa Double Zero Mustad-31 was disseminated through Front Line Demonstrations at farmer's field in Bijnor district. The demonstrations conducted during last three years (2018-19to 2021-22), were considered for the study. The adoption of Biofortified Mustard variety Pusa Double Zero Mustad-31 was significantly increased in farmers due to higher productivity, which ultimately resulted in more net return against existing farming technology.

**Keywords:** *Biofortified, Mustard variety, Yield gap, Performance and adoption*

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## Introduction

Rapeseed-mustard is an important group of oilseed crops in India. It contributes 24.7% and 29.4%, respectively, to total area and production of oilseeds during 2018-19. Further, considering 20% contribution from secondary sources and 20-25% from rapeseed-mustard; the projected demand for this crop would be around 16.4-20.5 m t by 2030 from the current production of 9.26 mt. from the level of production of 33.50 m t during 2019-20.

In India, the major rapeseed-mustard growing states are Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh, West Bengal, Assam and Gujarat accounting for 92.7% of the area and 95.8% of production during 2017-18 of which Rajasthan alone account for 36.6% and 40.9%, respectively, of the area and production [1].

In Bijnor district, Uttar Pradesh, India total area under Mustard is about 6000ha with average district yield 10.00 qt/ha. The choice of right varieties is one of the crucial points determining the yield and quality of Mustard. The yield and productivity of Mustard varieties is less or stagnant due to farmers unawareness about Biofortified and high yielding varieties and non-availability of varieties having significantly higher yield as compared to the existing varieties under changing climatic conditions.

Pusa Double Zero Mustard 31 is a pure line variety and contains low erucic acid (<2.0%) in oil and glucosinolates (<30.0 ppm) in seed meal. It has been released and notified in 2016 for Rajasthan (north and western parts), Punjab, Haryana, Delhi, western Uttar Pradesh, plains of Jammu and Kashmir and Himachal Pradesh. Its average oil content is 41.0 per cent, with a seed yield of 23.0 q/ha. It matures in 142 days and is suitable for timely sown irrigated conditions. This biofortified variety has been developed by ICAR-IARI, New Delhi [2].

The Krishi Vigyan Kendra, Bijnor (U.P.) were conducted 122 Front Line Demonstrations of Mustard variety Pusa Double Zero Mustard 31 during 2018-19 to 2021-22 at farmers field of district Bijnor for the study of its yield performance, yield gap and adoption in district

## Material and Methods

The Front-line demonstrations were conducted during 2018-19 to 2021-22 in Kotwali, Afjalgarh, Nehtor, Kiratpur, Haldaur, Dhampur, Seohara, Najibabad, Jalilpur, M. Devmal and Noorpur blocks of district Bijnor, at 122 farmers field for evaluation of performance, effectiveness and adoption of Pusa Double Zero Mustard 31in comparison to farmers' practice. The yield data from front line demonstration, as well as farmers practice were recorded by representative samples from different locations.

The following formulae have been used for estimation of technology gap, extension gap and technology index as per methods of Samui *et al*., (2000) [3] and Sagar and Chandra (2004) [4].

*Technology gap = Potential yield – Demonstration yield*
*Extension gap = Demonstration yield – farmers yield*
*Technology index = [(Potential yield – Demonstration yield) / Potential yield] x100*

## Results and Discussion

The field performance and yield gap of the Pusa Double Zero Mustard 31along with the local check were evaluated and data are given in [Table-1].

From the data given in [Table-1] it is quit clear that seed yield increased significantly in the range of 14.00 to 19.65 qt./ha in different blocks of Bijnor district, as compared to local check. Singh and Rana, (2006) [5] reported seed yield increase up to 20.70 qt. / ha by Pusa Barani Variety of mustard crop under irrigation condition. Singh *et al*., (2018) [6] reported seed yield in Wheat varietyHD-3059. The benefit cost ratio of Pusa Double Zero Mustard-31 was also higher in all the blocks in comparison to local check. It varied from 2.60to 3.45. In 2006, Hedge reported that mustard crop by nature is hardy and mostly grown under rainfed condition and can impart stability of production system under harsh condition [7,8]. The benefit cost ratio of HD-2967 was also higher in all the blocks in comparison to local check in district Saharanpur of Utter Pradesh [9]. Singh and Singh (2019) [10] also reported higher benefit cost ratio in timely sown Wheat varieties.

Table-1 *Economics and Technological Impact of Biofortified Mustard variety Pusa Mustard Double Zero-31*

| Name of Block | No. Of Trial | Avg. Yield (qt/ha) | | | % Yield increased | Cost of Cultivation (Rs/ha) | Gross Return (Rs/ha) | Net Return (Rs/ha) | Additional Net Return (Rs/ha) | BCR | Technology gap (qt/ha) | Extension Gap (qt/ha) | Technological index | Adoption % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | P | IP | FP | | | | | | | | | | |
| Kotwali | 18 | 23 | 16.45 | 10.95 | 50.22 | 28977.78 | 78826.39 | 60000 | 10151.39 | 2.70 | 6.55 | 5.55 | 28.47 | 60.25 |
| Afjalgarh | 8 | 23 | 16.2 | 11.6 | 39.65 | 29300 | 76600 | 47300 | 15710 | 2.60 | 6.80 | 4.6 | 29.56 | 35.00 |
| Nehtor | 10 | 23 | 15.8 | 11.2 | 41.07 | 28840 | 76000 | 47160 | 13736 | 2.62 | 7.20 | 4.6 | 31.3 | 40.00 |
| Kiratpur | 9 | 23 | 16.61 | 11.69 | 42.07 | 28933.33 | 81305.56 | 52372.22 | 19494.44 | 2.80 | 6.39 | 4.92 | 27.78 | 32.50 |
| Haldaur | 10 | 23 | 17.75 | 11.18 | 58.76 | 29100 | 87000 | 57900 | 12095 | 2.97 | 5.25 | 6.57 | 25.43 | 35.50 |
| Dhampur | 10 | 23 | 17.5 | 10 | 75 | 29250 | 85375 | 56125 | 14675 | 2.91 | 5.50 | 7.5 | 29.91 | 38.75 |
| Noorpur | 10 | 23 | 18.16 | 11.54 | 57.36 | 29215 | 89916.67 | 60701.67 | 21173.34 | 3.06 | 4.84 | 6.62 | 21.04 | 52.50 |
| Jalilpur | 10 | 23 | 15.91 | 11.33 | 40.42 | 29383.33 | 81041.67 | 51658.33 | 8691.66 | 2.75 | 7.09 | 4.58 | 30.82 | 28.00 |
| Najibabad | 10 | 23 | 14 | 10.2 | 21.56 | 28940 | 64800 | 35860 | 14650 | 2.23 | 9.00 | 3.8 | 29.13 | 30.50 |
| Seohara | 12 | 23 | 19.65 | 12.05 | 63.07 | 29420 | 102875 | 73455 | 30105 | 3.49 | 3.35 | 7.6 | 14.56 | 55.50 |
| M. Devmal | 15 | 23 | 19.35 | 11.35 | 70.84 | 29520 | 103125 | 73605 | 37645 | 3.48 | 3.65 | 8 | 15.86 | 35.50 |
| Mean | 172 | 23 | 17.03 | 11.19 | 50.91 | 29170.86 | 84260.48 | 56012.47 | 18011.53 | 2.87 | 5.96 | 5.84 | 25.80 | 40.36 |

*P = Potential yield,IP= Improved practice, FP = Farmers practice*

The result obtained clearly indicate the technology gap range between 3.35 to 9.00 with an overall mean difference of 5.96 qt. / ha. Kadian *et al.,* (1997) [11] reported that technology gap can be narrowed down only by location specific technology-based recommendations.

Adoption of Pusa Double Zero Mustard-31 has significant impact on seed yield vis a vis yield gap. Yield increased in demonstration field due to adoption of newly released variety. Adoption percentage ranged between 28.00 to 60.25 with a mean percent increase of 40.36 % as compare to local check. Rana *et al.,* (2002) [12] reported that the demonstration is quit successful in farmer practice. Singh *et al*., (2011) [13] also reported that the adoption of basmati variety Pusa Basmati-1401 in farmer's practice. Singh and Singh (2019) also reported higher adoption of timely sown Wheat varieties.

## Conclusion

The 122 demonstrations, conducted at farmers field during 2018-19 to 2021-22 resulted in higher yield and higher cost benefit ratio of PusaDouble Zero Mustard-31 led to higher adoption. The area under this variety has now spread to more than 3800 ha in just four years.

**Application of research:** Study shows the demand of quality seed of this variety is also increasing which has led to participatory seed production at farmer's field.

**Research Category:** Agricultural Extension

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**Study area / Sample Collection:** ICAR-Krishi Vigyan Kendra, Nagina, Bijnour, 246762

**Cultivar / Variety / Breed name:** Pusa Double Zero Mustard-31

**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.
Ethical Committee Approval Number: Nil

## References

[1] Agricultural Statistics at a Glance 2018 (2019a) *Directorate of Economics & Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi,* 468.
[2] Yadava D.K., Choudhury P.R., Hossain F., Kumar D. (2017) Biofortified varieties: Sustainable way to alleviate malnutrition. New Delhi: Indian Council of Agricultural Research; 2017.
[3] Samui S.K., Maitra S., Roy K., Mondal A.K. and Saha D. (2000) *J. Of Indian Society of Costal Agriculture Research*, 18(2), 180- 183.
[4] Sagar R.L. and Chandra G. (2004) *Indian J. Of Extension Education*, XXXX (3&4), 96-97.
[5] Singh T. and Rana K.S. (2006) *Ind. J. Agron*., 51(4), 267-270.
[6] Singh K.K., Singh D.P., Singh Narendra, Singh A.V., Yadav S. K., Singh Balraj, Yadav Vivek and Singh Rajendra (2018) *International Journal of Agriculture Sciences* 10(7), 5663-5664.
[7] Gupta N.K. and Sharma A.K. (2005) *Environ. And Ecol*., 23 (spl. 1) 198-193.
[8] Hedge D.M. (2006) *Oil seed crop diversification In : Extended summarise of National Symposium on Conservation agricultural and environment Oct. 26-28, 2006 held at Banaras Hindu University, Varanasi.*
[9] Singh K.K., Singh P.K. (2015) *New Agriculturist*, 26(2), 193-195.
[10] Singh K.K. and Singh D.P. (2019) *Journal of Community Mobilization and Sustainable Development*, 14(3), 435-438.
[11] Kadian K.S., Sharma R. and Sharma A.K. (1997) *Annals, Agril. Res*., 18(10), 40-43.
[12] Rana V.S., Malik A.C. and Midha L.K. (2002) *Haryana. Haryana J. Agron*., 18(1&2), 1148-1149.
[13] Singh K.K., Singh P.K. and Ashok (2011) *New Agriculturist*, 22(1), 41-43.
[14] Biswas J.K., Hossain M.A., Sarkar B.C., Hassan M. and Haque M.Z. (1998) *Bangladesh J. Life Sci*., 10, 47-52.