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# Evaluation of Basmati Rice Varieties for Yield Performance and Economics under Farmers Field Situation in Muzaffarnagar District, India

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## A B S T R A C T

The KVK conducted On Farm Trials and Frontline Demonstrations to test the adaptability of Basmati varieties under farmers' field condition. The varieties tested were Pusa Basmati-1121, Pusa Basmati-1509, Pusa Basmati-1612 and Pusa Basmati-1 as check. The results indicated that yield increase of Basmati varieties ranged between 7.95 to 26.75 percent over farmers practice. The variety Pusa Basmati-1612 gave highest yield of 52.60 qt/ha with net return of Rs 105625.00 and CB ratio of 1:5.08.

## Introduction

In district Muzaffarnagar rice is cultivated on 22302 ha area with average 25.07 qt/ha productivity. The basmati rice is known for its typical fragrance when cooked. They also fetch a premium price in the local and regional market, besides having considerable export potential. The basmati is promising foreign exchange earner (Singh *et al.,* 1997). The fine grain, soft texture and extra elongation with least breadth-wise swelling on cooking endow 'Basmati' rice a special place in domestic and international market (Siddiqi, 1990). Basmati rice of Indian subcontinent is high priced in international market for its unique quality.

The traditional basmati varieties are tall, prone to lodging, diseases, photoperiod and temperature sensitive and very low yielding.

In present study the basmati varieties namely Pusa Basmati-1509, Pusa Basmati-1612, Pusa Basmati-1121 and Pusa Basmati-1 (Farmers Practice) were selected for assessment and performance, as these varieties are high yielding and semi dwarf in nature.

## Materials and Methods

The trial and demonstration were conducted at farmers' field during Kharif-2015 and 2016. Four basmati varieties alongwith farmers practice, namely Pusa Basmati-1509, Pusa Basmati-1612, Pusa Basmati-1121 and Pusa Basmati-1(Farmers Practice) were used for analysis, the seed yield and net returns data of the varieties were analysed.

For the estimation of technology gap, extension gap and technology index, the formulae were used as per method of Samui *et al.,* (2000) and Sagar and Chandra (2004)

Technology Gap = Potential Yield – Demonstration Yield

Extension Gap = Demonstration yield-Farmers Yield

Technology Index = Potential Yield-Demonstration Yield/Potential yieldX100

## Results and Discussion

The potential, productivity and economics of the basmati varieties along with local check were evaluated and data are given in Table 1 and 2.

From the data presented in Table 1 it is quite clear that the percent increase in the yield over local check was 16.50, 26.75, and 7.95 for Pusa Basmati-1509, Pusa Basmati-1612 and Pusa Basmati-1121, respectively.

The seed yield increased significantly in the range of 44.80 to 52.60 qt/ha in basmati varieties as compared to farmers practice (41.50 qt/ha).

This indicated that field demonstrations are quite successful in bridging up yield gap between improved and farmers practices

(Rana *et al.,* 2002). Singh and Rana (2006) reported seed yield increase up to 20.70 qt/ha by Pusa Barani variety of mustard crop. Biswas *et al.,* (1998) also reported varietal differences of grain yield in scented rice. Kusutani *et al.,* (2000) and Dutta *et al.,* (2002) reported that the genotypes which produced higher number of grains per panicle also showed higher grain yield in rice.

The economics of demonstrations shown in Table 2, indicated that the additional return of basmati varieies over farmers practice, ranged from Rs. 8480.00 to 27520.00 Rs./ha. It was high in Pusa Basmati-1612 (Rs. 27520.00). The gross return of basmati varieties ranged between Rs. 112000.00 to 131500.00 rs./ha and net return Rs. 86585.00 to 105625.00 Rs./ha also. The highest net return of Rs.105625.00/ha of basmati variety Pusa basmati-1612 was in line with the finding of Singh and Rana (2006), who reported about 13149.00 Rs/ha of net return in mustard crop.

The cost benefit ratio (Table 2), of basmati variety Pusa Basmati-1612 ranked first (1:5.08) followed by Pusa Basmati-1509 (1:4.74) and Pusa Basmati-1121 (1:1.41). Hedge (2006) reported that mustard crop by nature is hardy and mostly grown under rainfed condition can impart stability of production system under harsh condition.

Technology gap (Table 1) ranged from 5.2 to 7.40 qt/ha, with an overall mean difference 6.41 qt/ha. This gap is minimum in Pusa Basmati-1121(5.2) and maximum in Pusa Basmati-1612(7.40) noticed under study.

The yield gap between potential and frontline demonstrations was due to climatic, edaphic, socioeconomic and management practices. Kadian *et al.,* (1997) reported that technology gap can be narrowed down only by location specific technology based recommendations.

**Table.1** Productivity, yield gap and extension gap of basmati varieties

| Varieties | No. of Demonstration | Duration of Study (Years) 2015 & 2016 | Avg. Yield (Qt/ha) | | | %Increased Yield | Technology gap(qt/ha) | Extension gap (qt/ha) | Technological Index (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | | P | IP | FP | | | | |
| PB-1509 | 15 | 02 | 55 | 48.35 | 41.50 | 16.50 | 6.65 | 6.85 | 12.09 |
| PB-1612 | 15 | 02 | 60 | 52.60 | 41.50 | 26.75 | 7.40 | 11.1 | 12.33 |
| PB-1121 | 15 | 02 | 50 | 44.80 | 41.50 | 7.95 | 5.2 | 3.3 | 10.4 |
| Mean | | | | 48.58 | 41.50 | 17.06 | 6.41 | 7.08 | 11.60 |

P= Potential Yield, IP= Improved Practice, FP= Farmers Practice

**Table.2** Economics of basmati rice varieties

| Varieties | Grain Yield(qt/ha) | Cost of Cultivation(Rs/ha) | Gross Return(Rs/ha) | Net Return(Rs/ha) | CB Ratio | Additional Yield over check | Additional Net Return over check |
|---|---|---|---|---|---|---|---|
| PB-1509 | 48.35 | 25500.00 | 120875.00 | 95375.00 | 1:4.74 | 16.50 | 17270.00 |
| PB-1612 | 52.60 | 25875.00 | 131500.00 | 105625.00 | 1:5.08 | 26.75 | 27520.00 |
| PB-1121 | 44.80 | 25415.00 | 112000.00 | 86585.00 | 1:4.41 | 7.95 | 8480.00 |
| Mean | 48.58 | 25596.66 | 121458.33 | 95861.66 | 1:4.74 | 17.06 | 17756.66 |
| Check | 41.50 | 25645.00 | 103750.00 | 78105.00 | 1:4.04 | - | - |

Table 1 showed that the extension gap ranged from 3.3 to 11.1 qt/ha, with an overall mean difference 7.08 qt/ha. High extension gap (11.1 qt/ha) was recorded from variety Pusa Basmati-1612, followed by Pusa Basmati-1509(6.65) and Pusa Basmati-1121(3.3) qt/ha. This indicated there is need to educate the farmers through various extension tools. These results are also in confirmation with those of Gupta and Sharma (2005).

There was clear cut and significant yield gap between farmers practice and demonstration field. The choice of basmati variety is also an important factor leading to additional net return. The extension and technology gap can be bridged by sustained effort of extension agencies and by adopting location specific technologies.

## References

Rana, V.S.; Malik, A.C. and Midha, L.K., (2002). Evaluating gap in transfer of dry land technology in mustard frontline demonstrations in Haryana. *J. Agron.*, 18(1&2): 1148-1149.

Singh, T. and Rana, K.S., (2006). Effect of moisture conservation and fertility on Indian mustard(*Brassica juncea*) and Lentil(*Lens culinaris*) intercropping system in rainfed condition. *Ind. J. Agron.*, 51(4):267-270.

Kadian, K.S., Sharma, R. and Sharma, A.K.,(1997). Evaluation of frontline demonstration trial on oilseed in Kangra Vally of H.P. *Annals of Agril. Res.* 18(10): 40-43.

Hedge, D.M., (2006). Oilseed crop diversification In: Extended summaries of National Symposium on Conservation agricultural and environment. Oct. 26-28, 2006 held at BHU, Varanasi.

Samui, S.K., Maitra, S., Roy, K., Mondal, A.K. and Saha, D., (2000). Evaluation of frontline demonstrations on groundnut (*Arachis hypogea* L*). J. of Indian Society of Coastal Agriculture Research.* 18(2): 180-183.

Sagar, R.L. and Chandra, G.(2004). Evaluation on frontline demonstration on mustard in Sundarbans, W.B. *Indian Journal of Extension Education.* 40(3&4): 96-97.

Biswas, J.K., Hossain, M.A., sarkar, B.C., Hassan, M and Haque, M.Z., (1998). Yield performance of several rice varieties seeded directly as late aman crops. *Bangladesh J. of Life Sci.*, 10:47-52.

Kusutani, A., Tovata, M., Asanuma, K., and Kui, J., (2000). Studies on the varietal differences of harvest index and morphological characteristics of rice. *Japanese J. Crop Sci.*, 69:359-364.

Singh, K.K., and Singh, P.K., (2012). Evaluation of Basmati rice varieties for yield assessment and economics under farmers field conditions. *New Agriculturist*, 23(1):11-14.

Singh, K.K., Singh, P.K. and Ashok., (2011). Analysis of yield, performance and adoption of Basmati rice variety PB-1401 in Saharanpur district. *New Agriculturist. 22(1,2): 1-3.*