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ASSESSMENT OF YIELD PERFORMANCE AND ADOPTION OF BASMATI VARIETY PUSA BASMATI-1509 IN DISTRICT BIJNOR OF UTTER PRADESH, INDIA.

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Abstract:
The rice variety Pusa Basmati-1509 was disseminated through Front Line Demonstrations at farmer's field in Bijnor district of Utter Pradesh. The demonstrations conducted during last four years (2014 to 2017), were considered for the study. The results indicated that adoption of this variety significantly increased due to higher productivity and higher market demand, which ultimately resulted in more net return.

Key Words: Pusa Basmati-1509, yield gap, performance and adoption.

Introduction:

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. In Bijnor district total area under paddy is about 54,000 ha, out of that 30,000 ha area is under scented rice. Commonly grown rice varieties are, Pusa Basmati-1, Pusa-1121, Sharbati (Locally grown and not notified through any agencies) and some area of traditional scented rice varieties. Traditional basmati varieties are tall, prone to lodging, photoperiod and temperature sensitive and very low yielding.

An improvement over basmati variety, Pusa Basmati-1509 is developed by IARI, New Delhi and released during 2013. It has semi-dwarf plant stature (95 - 100 cm), 120 days seed to seed maturity. Quality wise, this genotype posses aromatic extra long slender grains (8.41mm) with very occasional grain chalkiness, very good kernel length after cooking (19.1 mm), desirable ASV (7.0) and intermediate amylose content (21.24%). Compared to Pusa Basmati 1121, this genotype has advantage of 20 days earliness, non-shattering and non-lodging habit. In present study the basmati variety namely Pusa Basmati-1509, were selected for Assessment of yield performance and adoption in district Bijnor of Utter Pradesh.

Materials and Methods:

The front line demonstrations were conducted during 2014 to 2017 in Kotwali, Jalilpur, Budhanpur, Najibabad, Dhampur Kiratpur, Jhalu, Afjalgarh, Devmal, Nehtor, and Noorpur blocks of district Bijnor, at 90 farmers field for evaluation of performance, effectiveness and adoption of Pusa Basmati - 1509 in 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 –

Technology gap = Potential yield – Demonstration yield

Extension gap = Demonstration yield – farmers yield

Technology index = [(Potential yield – Demonstration yield) /Potential yield] X 100

Results and Discussion

The potential and field performance of the Pusa Basmati-1509 along 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 47.50 to 57.66 qt./ha in different blocks of Bijnor district , as compared to local check. In 2006, Singh and Rana reported seed yield increase up to 20.70 qt./ ha by Pusa Barani Variety of mustard crop under irrigation condition. Earlier Biswas *et al.* (1998) also reported varietal differences of grain yield in scented rice. In 2011 Singh *et al* also reported that increasing seed yield in basmati rice variety Pusa Basamti -1401.

The economics of demonstrations shown in Table 1, indicated that the additional return of basmati variety Pusa Basmati-1509 over farmers practice, ranged from 86637.50 to 117866.67 Rs./ha in different blocks of Bijnor district . It was high in Jhalu block (Rs. 117866.67). In 2006, Singh and Rana reported seed yield increase up to 20.70 qt./ ha by Pusa Barani Variety of mustard crop under irrigation condition. Earlier Biswas *et al.* (1998) also reported varietal differences of grain yield in scented rice In 2011 Singh *et al* also reported increasing seed yield in basmati rice variety Pusa Basamti -1401.

The benefit cost ratio of Pusa Basmati-1509 was also higher in all the blocks in comparison to local check. It varied from 3.12 to 4.61. 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 (Gupta and Sharma, 2005; Hegde, 2006). 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 (K K Singh and P K Singh, 2015).

Technology gap (Table-1) ranged from 4.84.20 to 15.00 at per ha, with an overall mean differences 8.94.29 qt. per ha. This gap minimum in block Jhalu (4.84) and maximum in block Nazibabad (15.00) was noticed under study. The gap between potential and front line demonstrations is due to climatic, edaphic, socio-economic and management practices. Verma *et al* (2017) reported that Technology gap ranged from 5.2 to 7.40 qt/ha, with an overall mean difference 6.41 qt/ha in basmati rice . Kadian *et al.* (1997) reported that technology gap can be narrowed down only by location specific technology based recommendations.

Table-1 showed, that the extension gap ranged from 5.66 to 15.75 qt. per ha, with an overall mean differences 11.42 qt. per ha. High extension gap (15.75 qt. per ha.) was recorded from block Dhampur, followed by minimum extension gap of block Devmal (5.66.). This indicates that there is need to educate the farmers through various extension tools. Gupta and Sharma (2005) also confirmed these results. K K Singh and P K Singh (2012) reported that extension gap in basmati rice varieties. There is clear-cut and significant yield gap between farmers practice and demonstration field. The choice of late sown wheat 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. The demand of quality seeds of timely sown wheat varieties is also increasing which has led to participatory quality seed production at farmer's field.

Table-2 showed, that the Adoption of Pusa Basmati-1509 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 of Pusa Basmati-1509 ranged between 14.19 to 32.00 in different blocks of district with a mean percent increase of 25.13 % as compare to local check. Rana *et al.* (2002) reported that the demonstration is quit successful in farmer practice. Rice. In 2011 Singh *et al* also reported adoption percentages of basmati rice variety Pusa Basamti -1401 increased in district.

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Table: 1 – Productivity, Economics, yield gap , extension gap of basmati variety Pusa Basmati-1509

Name of blocks	No. of demo.	Avg. yield (qt./ha)			% Yield increased	Net Return (Rs/ha)		BCR		Technology gap (qt./ha)	Extension gap (qt./ha)	Technological index
		PY	DY	FY		DY	FY	DY	FY			
Kotwali	45	62.50	53.40	42.59	25.38	94306.67	67530.00	3.65	2.73	9.10	10.81	14.56
Jalilpur	05	62.50	49.50	39.35	25.79	81320.00	54280.00	3.37	2.39	13.00	10.15	20.80
Budhanpur	05	62.50	55.00	41.25	33.33	92910.00	59820.00	3.69	2.56	7.50	13.75	12.00
Najibabad	03	62.50	47.50	38.50	23.37	72066.67	49166.67	3.12	2.24	15.00	9.00	24.00
Dhampur	04	62.50	57.00	41.25	38.18	103500.00	64075.00	3.88	2.62	5.500	15.75	8.80
Kiratpur	08	62.50	53.37	38.75	37.72	88218.75	54187.50	3.48	2.37	9.13	14.62	14.60
Jhalu	03	62.50	57.66	45.16	27.67	117866.67	91033.33	4.61	3.60	4.84	12.50	7.74
Afjalgarh	05	62.50	53.10	45.25	17.34	107940.00	85550.00	4.31	3.38	9.40	7.85	15.04
Devmal	03	62.50	54.16	48.50	11.67	114476.67	92266.67	4.53	3.58	8.34	5.66	13.36
Nehtor	04	62.50	52.50	40.68	29.05	86637.50	58450.00	3.49	2.48	10.00	11.82	16.00
Noorpur	05	62.50	55.99	42.20	32.67	109740.00	77100.00	4.15	3.04	6.60	13.79	10.56
Mean	**90**	**62.50**	**53.56**	**42.13**	**27.47**	**97180.27**	**68496.27**	**3.84**	**2.81**	**8.94**	**11.42**	**14.31**

PY = Potential yield, DY =Demo. Yield), FY = Farmers Yield, BCR= Benefit Cost Ratio

Table: 2 – Adoption of Basmati variety Pusa Basmati-1509 in district Bijnor:

Block	Area under Rice crop Area (ha)	Area under scented Rice (ha)	Area under covered by Pusa Basmati-1509	Adoption (%) under Total rice area	Adoption (%) under Scented rice area
Kotwali	10478	7550	1650	15.74	21.85
Jalilpur	3770	1800	520	13.79	28.88
Budhanpur	2848	1500	480	16.85	32.00
Najibabad	6059	2550	370	6.10	14.50
Dhampur	3439	1700	495	14.30	29.11
Kiratpur	3195	2600	730	22.84	28.07
Jhalu	2964	1350	360	12.14	26.66
Afjalgarh	10782	5200	1124	10.42	21.61
Devmal	3462	1550	220	6.35	14.19
Nehtor	3354	1900	566	16.87	29.78
Noorpur	3820	2300	685	17.93	29.78
Mean	**54171**	**30000**	**654.54**	**13.93**	**25.13**