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IMPACT ASSESSMENT OF BIOPESTICIDE PADDY CROP OF PADDY CARE IN DISTRICT BHADOHI UTTAR PRADESH

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ABSTRACT: Paddy is the important kharif season food crop of Uttar Pradesh as well as Bhadohi district and improvement in its productivity has played a key role in making the country self- sufficient in food grain. However, its productivity is very low in district Bhadohi as compared to other districts of Uttar Pradesh. The present study was conducted by Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during 2023-24 in kharif season with 10 FLDs across 5 selected villages of the district. The results of the demonstrations showed that farmers could increase paddy productivity by cultivating short duration superfine varieties mainly Basmati 1509, a high- cost Basmati rice by adoption of improved production technology. From the frontline demonstrations, it was observed that the improved paddy variety 1509 with improved production technologies and the use Paddy care- bio plant protectant recorded mean yield of 25.32 q/ha from the fields treated with botanical plant care at 12to 15 days interval and 23.21 quintal when the fungal management was done by the use of mancozeb and carbondesym used on "as and when required "basis. Yield was higher in treated plots by 8% higher than that obtained from control treated with chemical fungicide. The average mean of technology gap, extension gap and technology index were recorded 4.68/ha, 2.11 q/ha and 11.70 %, respectively. Use the Botanical fungicide Paddy care gave higher mean net return of Rs.42736.00 per ha with a B:C ratio 1.11 as compared to chemical fungicide (Rs. 35341/ha. B:C ratio 1.03).

KEY WORDS*:* Paddy, Pa1509, FLDs, Extension gap, Technology gap,Technology index, B: C ratio

Paddy (*Oryza sativa* L.) is one of the most predominant food crops in India and second in the world. Among the paddy growing countries, India having the largest area under paddy crop in the world and in case of production it is next to China. India has produces 105.48 million tons of paddy in an area 44.14 mha with an average yield of 2404 $kgha^{-1}$ during 2014-15(Agric Statistics, 2016). Uttar Pradesh has an area of 5.87 mha produces 12.17 million tons with an average yield of 2072 $kgha^{-1}$ of paddy during 2014-15 (Agric Statistics, 2016).

Paddy plays a key role in food security; more than 90% of total production of rice in the world is consumed in Asian countries, where it is a staple food for a majority of the population (Mohanty, 2013). The need to produce more rice will increase if it has to meet the growing demand which is likely to be 130 million tons of milled rice in 2030. India needs to produce 1.7 million tons of additional rice every year to ensure national food security (Dass and Chandra, 2013). Mostly the farmers of Bhadohi district are growing medium-long duration (135-145 days) paddy varieties in irrigated condition. Narendra- 359, MTU 7029, Arize 6444 etc. are popular paddy varieties mostly grown in the district, but among these 1509 is a superfine basmati variety with very little lodging problem (maturity 110-115 days). Farmers in India still grow traditional varieties of paddy in their traditional systems. As a result of these, they often fail to achieve the desired potential yield and grow varieties which have a low selling rate. The close discussion with farmers it was found that farmers had keen interest in increasing their financial returns from paddy cultivation and would love to cultivate short duration basmati varieties which need much less fertilizer doses and the paddy from them is sold at a much higher price than prevailing once. adopting the improved HYVs but they do not use proper agronomical practices due to lack of knowledge are also the reasons responsible for limiting the production and productivity of paddy. Keeping this in view the Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj conduct FLDs to introduce and popularize of basmati variety 1509 in farmers' fields. These demonstrations were conducted under the close supervision of scientists of Directorate of Extension. The aim of the demonstration is to convey the technical message to farmers that if they grow high value, short duration basmati variety 1509 use recommended package and practices the yield of crop and income of the farmers can be easily increased.

MATERIALS AND METHODS

The present study was carried out by the Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during kharif season of 2023- 24 at the farmer's field of five adopted villages in Bhadohi district of Uttar Pradesh. During this study an area of 4.0 ha was covered with plot size 0.4 ha under FLDs with active participation of 10 farmers. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training was given to the selected farmers regarding package of practices of paddy crop were

followed as suggested by **Choudhary, 1999 and Venkattakumar *et al.*, 2010.**

The present study was made to compare between Paddy Care a botanical plant protectant and the chemical fungicides available in market. Plots treated between 10 to15 days with Paddy care were taken as treated whereas plots treated with chemical fungicides on "as and when needed" basis as control. Findings are given in table 1. The soils under study area were sandy loam, medium in fertility status and medium organic carbon content (0.42-0.56%). Paddy was transplanted in all plots in first week of July andharvested till mid-October.

This product Bio Extract (**Paddy Care**) is made by the Hari Organic Manure Limited, Janakpuri, district Saharanpur. **Paddy Care** is an ideal biological treatment for the prevention of incurable diseases of paddy like Bakani Rust, Blight, Break Neck and False Smut. Paddy care gives the plant the strength to fight these diseases by creating long-term immunity in the plant. Regular spray 5 ml Paddy Care per liter of water from the time of transplant to the time of final harvest was made 10 to 15 days after planting the paddy. In control plots chemical fungicides were sprayed on "as and when required basis". For the introduction of technology, different extension approaches through regular field visit and interpersonal communication were made by the scientists of Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh. Farmers Trainings were conducted for the awareness among the farmers and organized field days at demonstration plots to disseminate the message at large scale. Pamphlet and leaflets of improved production technologies of paddy crop were prepared and distributed among the farmers during training program. The data were collected from FLDs plots as well as control plots and finely the extension gap, technology gap and technology index were calculated (*Samui et al.*, 2000).

RESULTS AND DISCUSSION

Basmati 1509 is a superfine variety with an early maturity and less fertilizes requirement. It is highly suitable for rice, /todia/pea wheat cultivation and is thus gainingpopularity in small and marginal farmers. a variety having yield potential 45 qha^{-1}. Selection of suitable crop varieties for limited irrigated conditions in different agro-climatic zones of India can improve productive of respective crop (Singh *et al.*, 2008). Further, selection of suitable crop varieties also comes under good agronomic practices, which can eliminate chances of biotic and abiotic stress (Singh *et al.*, 2012b). The gap between the existing and recommended technologies of paddy in district Bhadohi is presented in Table 2 and 3. Full gap was observed in case of use of variety, sowing method, seed treatment and weed management and partial gap was observed in fertilizer dose and plant protection measure, which definitely was the reason of not achieving potential yield. Comparison was made between the regular use of Paddy Care botanical fungicide at 10-15 days intervals and chemical fungicide "as and when required".

Field days were also held in each cluster to exhibit farmers from the same village and other villages, the outcomes of front-line demonstrations.

Results obtained during study are presented in Table in 2. Average basmati yield was recorded 25.32 q/ha under demonstrated plots use of botanical fungicide paddy care as compared to farmers practice with chemical fungicides of 23.21 q/ha. during 2023-24. These results clearly indicated higher average grain yield in demonstration plots compared to control plots. The average yield of paddy increased by almost 8 per cent of control plot. The yield of paddy was increased due to **Paddy Care bio extract**. The above findings are in similarity with the findings of Singh (2002).

Technology gap

The technology gap, the differences between potential yield and yield of demonstration plots under study were 4.68 q/ha uses with the botanical extract Paddy Care during 2023-24. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation.

Extension gap

An average extension gap 7.79 q/ha was observed during 2023-24, which emphasized the need to educate the farmers through various extension means i.e. front-line demonstration for adoption of improved production and protection technologies, to revert the trend of wide extension gap. More and more use of latest production technologies with high yielding varieties will subsequently change this alarming trend of galloping extension gap.

Technology index

The technology index shows the feasibility of the demonstrated technology at the farmer's field. The technology index was found 11.70 per cent in the study (Table 3), during the years of OFTs and FLDs program, which shows the efficacy of good performance of technical interventions. This will accelerate the adoption of demonstrated technical intervention to increase the yield performance of paddy.

Table- 1: Differences between technological intervention and farmers practices under OFTs and FLDs in paddy

Particular	Demonstration Package	Farmers Practice
Farming Situation	Irrigated	Irrigated
Improved Variety	Basmati 1509	Basmati 1509
seed rate	25kg/ha	25kg/ha
Sowing Method	Line Transplanting (20cm.x10cm.)	Line Transplanting (20cm.x10cm.)
Seed Treatment	Seed treatment with Paddy Care Fungicide	Carboxin 37.5% + Thiram 37.5@ 2.5gm/ Kg seed
Time of Sowing	1st Fortnight of July	1st Fortnight of July
Application of Fertilizers	N:P:K @ 60:60:40 Kg/ha.	N:P:K @ 60:60:40 Kg/ha.

Weed Management	Pretilachlor 50 EC @ 1.60 lit./ha as pre-emergence weedicide	Pretilachlor 50 EC @ 1.60 lit./ha as pre-emergence weedicide
Disease management	Paddy care 5 ml per lit water from transplanting to harvest at 10–15-day interval	Carbendazim and Mancozeb as per required

Table 2: Yield and yield attributing character of paddy variety Basmati1509 under OFTs and FLDs

Year	Variety	No. of Trial	Area (ha)	Average Yield (q/ha)			No. of Panicle	
				Potential	Trial (Paddy Care Fungicide)	Farmers Practice (chemical Fungicide)	Trial (Paddy Care Fungicide)	Farmers Practice (Chemical Fungicide)
2023-24	Basmati 1 509	10	4	40.00	25.32	23.21	26	21.2

Table- 3: Technology, Extension gap and Technological Index of paddy Basmati1509 under OFTs and FLDs

Year	Variety	No. of Trial	Area (ha)	Potential	Technology gap (q/ha)	Extension Gap (q/ha)	Technological Index (%)
2023-24	Basmati 1509	10	4	40.00	4.68	2.11	11.7

Table- 4: Economic Impact of paddy variety Basmati1509 under OFTs and FLDs

Year	Variety	Cost of cultivation (Rs. /ha)		Gross Income (Rs. /ha)		Net Return (Rs. /ha)		B:C Ratio	
		Trial	control	Trial	control	Trial	control	Trial	control
2022-23	Basmati 15 09	38500	34400	81236	67641	42736.00	35341.00	1.11	1.03

Note:- Trial- (Paddy Care Fungicide), Control-Farmers Practice (ChemicalFungicide)

Economic return

The inputs and outputs prices of commodities prevailed during the study of demonstration were taken for calculating net return and benefit: cost (BC) ratio (Table 4). The cost cultivation, Gross Income and Net Income of paddy demonstrations treated with Paddy care gave higher Rs. 38500 per ha, Rs.81236.00 per ha and Rs. 42736.00 per ha during study in 2023-24 Similarly, cost cultivation, Gross Income and Net Income for control plots w Rs.34400.00 per ha, Rs.69741.00 per ha and Rs.35341.00 per ha. Similar findings were reported by Kirar *et al.,* (2006). The benefit: Cost ratios of paddy cultivation under improved cultivation practices with paddy care bio fungicide were 1.11 as compared to 1.03 under chemical fungicide. This is due to higher yield obtained from treated plots in comparison to control. This finding is in corroboration with the findings of Mokidue *et al.,* (2011).

CONCLUSIONS

The productivity by the use of botanical plant protectant Paddy care gain over control in Basmati 1509. The demonstration's results underline the potential for **increased productivity and profitability** in paddy cultivation. **Extension services, resource accessibility, and farmer education** must be strengthened. The use of **botanical extracts** for plant pest management, as seen in the study with the plant protectant **Paddy Care**, aligns well with the current trend of **organic farming**. This shift reflects farmers' growing interest in sustainable agriculture, where there is a focus on reducing reliance on synthetic chemicals and adopting natural alternatives and has increasingly gained attention from both consumers and the government over time.

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