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Popularization of High Yielding, Small Grain Paddy Variety MSN-99 through Front Line Demonstration in Cauvery Command area of Mandya District, Karnataka

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ABSTRACT

Cauvery command area is known for paddy cultivation. In Mandya district, paddy occupies an area of 80735 ha with a production of 1,84,307 MT and productivity of 3400kg/ha. Use of locally available varieties, faulty cultivation practices with continuous submerged conditions are causing higher pest and disease incidence thus leading to lower yield. In this context an attempt was made with an objective to substitute existing variety with improved paddy variety MSN-99 with integrated crop management practices. The FLD on improved variety MSN-99 was carried out during the two consecutive years 2021 and 2022 in village B-Hullukere and Goravale of Mandya district. The soil of the area under study was red loamy soil. The components in FLDs comprised of improved variety MSN-99 along with proper land preparation, seed rate, seed treatment, pre-emergence application of herbicide and need based plant protection measures. The inputs *viz*., Seeds, Lodax powder herbicide, Zinc, *Azospirillum* were distributed to farmers. The crop was transplanted during the second week of July and harvested in 3rdweek of November. The yield data were collected from both demonstration and farmers' practices by random crop cutting methods. The result indicated that improved variety MSN-99 exhibited mean grain yield 43.70 q/ha which accounts to 26.11 % higher than the farmer's practices. The technology gap of the demonstration plot was 5.85 q/ha and 6.75 q/ha during 2021-22 and 2021-22, respectively. Extension gap of 9.10 q/ha and 9.00 q/ha was observed during 2021-22 and 2021-22, respectively. The technology index varied from 11.70 % to 13.50 % with a mean value of 12.60%. The efficacy of demonstrated technology improved variety MSN-99 coupled with scientific package of practices can be proved and it accelerates with the adoption of demonstrated technology to increase the yield of paddy.

Key Words: Paddy, MSN-99, Seed treatment

INTRODUCTION

India has the largest area under paddy in the world and ranks second in the production after China and occupies highest area among all the crops grown in the country. The major crop of the Mandya district is paddy occurring an area of 80735 ha. The crop's economic viability has steadily dropped due to non availability of high yielding medium duration variety. Due to this reason farming community still uses the local or old varieties. The continues use of same variety with mixed seed over the year, leads it to susceptibility to many disease and pest. Similarly, the local unidentified varieties are low yielder with low responsive to the inputs and prone to many diseases and pest. To meet the growing food need and overcome malnutrition, paddy varieties with higher yield potential, multiple resistances to stresses, and improved nutritional quality are needed. To overcome these problems Krishi Vigyan Kendra, Mandya conducted the Front Line Demonstrations on improved variety MSN-99. Front Line Demonstration (FLD) has been used as a useful extension tool to demonstrate high yielding variety along with production, protection

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and management practices in the farmer's field under different agro-climatic regions and farming situations (Beigh *et al,* 2015). The organization of FLD at the farmer's field has significantly increased the knowledge level amongthe farmers and use of majority of technologies (Samant, 2015).

Keeping in view such problems, the KVK Mandyamade an attempt with an objective to substitute existing variety with a newly released promising high yielding variety of paddy MSN-99. The main objective of the study was to substitute the existing medium duration variety with the newly released medium duration variety MSN-99. The FLDs were evaluated on yield and economic parameters of MSN-99 for its suitability in the existing farming situation and for higher productivity and income.

MATERIALS AND METHODS

Front line demonstration on paddy variety MSN-99 was conducted during the *Kharif* seasons of 2021 and 2022. The newly released promising high yielding variety MSN-99 is of medium duration, fine grain high yielding and suitable for Mandya region. The Purposive cum random sampling techniques was followed for selection of block and respondents. The FLD was conducted in the two Cluster villages B-Hullukere and Goravale of Mandya District. The soil of the area under study was red loamy soil. The components in FLDs comprised of improved variety MSN-99 along with proper land preparation, adequate seed rate, seedtreatment, pre-emergent application of herbicide and need based plant protection measures. Total 15 ha area covered in two consecutive years. In the demonstration, one control plot was also kept where farmer's practices were carried out. The crop was transplanted during the second week of July and harvested in 3rdweek of November. The yield data were collected from both demonstration and farmer's practices by random crop cutting methods. The extension gap, technology gap and technology Index, Benefit cost ratio (BCR) were worked out as per Samui *et al* (2000).

RESULTS AND DISCUSSION

The gap between the farmers' practices and recommended technology of paddy in Mandya district is presented in Table 1. Full gap was observed in case of high yielding fine grain paddy variety, seed rate, seed treatment, fertilizer dose and plant protection measures, while, partial gap was observed in weed management practice. These are the reason for not achieving the potential yield. Farmers weregenerally not adopting the seed treatment which leads to make the crop more susceptible to disease. They applied the higher dose of seed and fertilizer than the recommended leading to higher cost of cultivation with low yield.

Yield

The results of both years in farmer's field indicated that Improved variety of paddy MSN-99 with scientific package of practices recorded average grain yield 63.45 q/ha which is 21.55% higher than the farmer practices (Raksha) *i.e.* 52.20 q/ha (Table 2). These findings revealed that FLD might have positive impact on farmers of the district over the local check. This results clearly indicated that the higher average grain yield in demonstration plots over the years compare to local check due to knowledge and adoption of paddy variety MSN-99 with adopting timely sowing, seed treatment with carbendazim @ 4 g/kg of seeds, use of balanced dose of fertilizer (100 kg N+50 kg P+50 kg K/ha), method and time of sowing, timely weed management (preemergent weedicide – bisulfuran methyl and pertialachlor) and need based plant protection. Therefore, it can be conferred that FLDs have enhanced the overall grain yield with additional returns as compared to farmers practice. The result was also confirmatory with the findings of Lathwal (2010), Dayanand*et al* (2011), Beigh*et al* (2015), Samant (2015), Kumar *et al* (2019) and Girish *et al* (2020).

Technology Gap

The difference between the potential yield and yield of the demonstrated plot was 5.85 q/ha and 6.55 q/ha during 2021 and 2022, respectively with

Table 1. Technology intervention and farmer practices under FLD on Improved variety MSN-99.

Particulars	Technological intervention	Existing practices
Variety	MSN-99	Raksha or other bold grain, low yielding
Land preparation	Three ploughing and pudling	Three ploughing and pudling
Seed rate	45 kg/ha	60 kg/ha
Seed treatment	Azospirillum @200 g/ha seed or corbondezim @ 4 g/kg seed	-
Transplanting	Manual	Manual
Fertilizer dose	100: 50: 50 Kg NPK/ha Based on soil test value	50:25:20 Kg NPK/ha
Weed management	Londax power @ 10 kg/ha	Butachlor @ 20 kg/ha and Manual
Plant protection Need based	IPM	Full

an average 6.30 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situations (Girish *et al.* 2020). The result was in consonance with the finding of Girish *et al* (2011) and Beigh *et al* (2015).

Extension Gap

Extension gap which represents the productivity gain possible with the existing technologies were 9.10 q/ha and9.00 q/ha during 2021 and 2022, respectively. On an average extension 19.05 q/ha was observed. This gap might be due to lack of awareness and knowledge on actual package of practices, strategies and lack of skill on modern paddy cultivation techniques. Therefore, widespread extension activities like FLDs, trainings, field days etc need to be organized to educate the farmers for adoption of improved variety and production technologies to revert the trends to wide extension gap. Similar results were also reported by Shrama*et al* (2011), Samant (2015) and Girish *et al* (2020).

Technology Index

Technology index can also be used as an indicator of feasibility of growing the varieties under real farming situations. The technology index varied from 11.70% to 13.50% with an average of 12.60%. This showed the efficiency of good performance of technical interventions and will accelerate the adoption of demonstrated technical interventions to increase the yield performance of paddy. This finding is collaborated with the findings of Samant (2015) and Girish *et al* (2020).

Economic Returns

The benefit cost ratio of demonstrated variety MSN-99 was higher in demonstrated improved varietyover the check (Table 3). The average net return under improved cultivation practices were 2.02 and 2.04 as compared to1.69 and 1.72 under farmer practices. This finding was collaborated with Samant (2015) and Girish *et al* (2020). This may bedue to higher yield obtained under improved technology compared to local check (farmer practices).

Impact of technology (Horizontal Spread)

The technology had a greater impact on adoption of fine grain high yielding paddy variety MSN-99 to an extent of 830ha in past three years. The variety had quality parameters like early maturity (compare to local varieties by 15 days), Fine grains and higher yield potential up to 62q/ha. The demonstration also had promotion of scientific package of practice. The demonstration had a higher paddy yield of 60.5q/ha compared to farmer practice with 46.5q/ha which had a benefit cost ratio of 1.77 & 0.88, respectively. The technology had a greater impact with farming community for horizontal spread and

Table 2. Technology gap, Extension gap and Technology index under FLD on improved variety MSN-99.

Year	Area (ha.)	No. of farmers	Average yield (q/ha)		Increase yield over farmers practice	Technological gap (q/ha)	Extension gap (q/ha)	Technology Index (%)
			Demo	Check				
2020-21	6	15	67.50	50.68	31.18	2.50	16.82	3.50
2021-22	6	15	63.45	52.20	21.55	6.65	11.25	9.50
Mean	6	15	65.47	51.44	26.36	4.57	14.03	6.50

Table 3. Comparison of economics under FLD on Improved variety MSN-99.

Year	Cost of cultivation		Gross return		Net return		B:C ratio	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check
2020-21	57500	61750	114750	76020	57250	14270	1.99	1.23
2021-22	66200	68800	126900	93960	60400	24160	1.92	1.36
Mean	61850	65275	120825	84990	58825	19215	1.95	1.29

the cost of cultivation had been reduced by saving of Rs. 10950/ha. The Improved technology and variety MSN-99 had been linked to seed chain with line department to get subsidy to farmers for both paddy seeds.

CONCLUSION

There has been significant change in the income of farmers owing to adoption of paddy cultivation with variety MSN-99. This was evident from the income realized by the farmers from two years in comparison with variety used earlier. This demonstration had a greater acceptance with variety, weedicide application and other technologies by realizing higher profitability. In the years to come paddy farmers would contribute much to the district economy.

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