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Research Article

EFFECT OF INTEGRATED CROP MANAGEMENT PRACTICES THROUGH FRONT LINE DEMONSTRATIONS ON RICE YIELD AND ECONOMICS IN COASTAL KARNATAKA

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Abstract- Wilt Front Line Demonstrations (FLD) in rice were conducted to demonstrate the production potential and economic benefit of adoption of scientific crop management practices over existing traditional practice during kharif season of 2013-14, 2014-15 and 2015-16 in the field of 30 farmers in Dakshina Kannada district of Coastal Karnataka. Each FLD was laid out in an area of 0.4 ha with farmers practice as check. The technology comprised of seed treatment, INM and IPDM. The results indicated that adoption of integrated crop management practices in rice recorded a yield of 42.8 q per ha compared farmers practice (35.6q per ha) an increase by 20 percent over a period of three years. The average technology gap and technology index was 7.2 and 14.3 respectively in demonstration plots. There were additional net returns gain by Rs.11851/- in demonstration plots compared to check.

Keywords- *FLD, Crop management, Rice, Technology gap, Technology Index*

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Introduction

Rice (*Oryza sativa* L) is the most important staple food crop grown in India on an area of 43.19 million ha with a production of 110.15 million tons [1]. It contributes about 43 percent of total food grain production and continues to play a vital role in national food and livelihood security of the system [2]. Meeting the food requirement of nearly two third of the Indian population [3]. However, the productivity is 2.55 tons per ha (milled rice) which is less compared to global productivity of 3.28t/ha [4]. Adoption of scientific practices has no doubt recorded greater strides in augmenting agricultural production and productivity. Yet the same has to be sustained in a continuous manner to meet the demands of growing population. The Indian population is expected to reach 1.63 billion by 2050. Based on the assumption that 60% of the cereal requirement will be fulfilled by Rice, the requirement of rice by the year 2050 would be about 136 million tons for consumption alone [2-4]. Under such circumstances increasing the productivity of rice remains the main challenge considering that about 90% of the cultivated area under rice belongs to small and marginal farmers. The most feasible way by which this could be achieved is by adopting a more integrated approach involving nutrients, water and other agronomic factors for maximizing the rice grain yield. Moreover, simultaneously applying a number of best compatible individual technologies could maximize overall benefits to farmers [5]. Front Line Demonstrations has been used as a useful extension tool to demonstrate HYV along with production, protection and management practices in farmers' fields under different agro-climatic conditions and farming situations [6]. However, the agricultural technology is generally not accepted by the farmers completely in all respects. As such there always appear to be a gap between the recommended technology by the scientist and its adoption in modified form at the farmers field [3]. The technological gap is thus the major problem in the efforts of increasing the agricultural production in the country. There is a need to reduce the technological gap between the agricultural technology recommended by the scientists and its acceptance by the farmers in the field [3]. FLDs play a vital role in this regard.

Considering these aspects, in view of significance of transfer of technology the present investigation was carried out to study the yield gaps between demonstration plots and farmers yield, extent of technology adoption and benefit cost ratio in adoption of recommended technology.

Materials and Methods

The present study was conducted by ICAR- Krishi Vigyan Kendra, in Dakshina Kannada District of coastal Karnataka for a period of three years during Kharif season of 2013-14, 2014-15 and 2015-16. All the 30 Front Line Demonstrations (FLD) were laid out in an area of 12.00 ha covering 06 villages of Bantwal and Belthangady Taluka under farmer participatory mode. The area under each demonstration was 0.4 ha. The soils of the field were acidic in pH, and nutrient status was medium Nitrogen, low in Phosphorus and medium in Potash. Rice variety used was (red kernel) MO-4 maturing in 130-135 days. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training on improved cultivation practices of rice was imparted to the selected farmers. The technologies under FLD and the farmers practices followed in check plot are shown in Table 1 The technology transfer in FLDs was effected through trainings and method demonstrations with follow-up advisory visits The FLDs successfully concluded with celebration of field days. At the time of harvest, the observations for yield was recorded. To study the impact of technology demonstrated, data output from FLDs and local check were collected at harvest and analyzed. The extension gap, technology gap and technology index were calculated using the formula suggested by [7]) as given below:

Technology Gap = Potential Yield-Demonstration Yield

Extension Gap = Demonstration Yield-Farmers yield

Technology Index = Potential Yield-Demonstration Yield x100 / Potential Yield

Table-1 *Comparison between front line demonstrations and farmers practices*

SN	Particulars	Existing farmers practice	Improved practices on demonstration
1	Farming situation	Rainfed	Rainfed
2	Variety	Local variety Kaje Jaya (125 days)	Improved variety MO-4 (135 days)
3	Plant population	30-32 hills /sq metre	50 hills /sq metre
4	Seed treatment	Not followed	Fungicide seed treatment
5	Selection of bold seeds	Only water soaking is followed	Salt water treatment @ 1: 4 removes chaffy and half-filled seeds retaining only bold seeds
6	Application of fertilizers	Imbalanced or absence of chemical fertilizers use.	Recommended dose of fertilizers @ 60:30:60 kg NPK/ha
7	Micronutrients	No micronutrient application	Application of Znso4 @ 20kg/ha
8	Plant Protection	Indiscriminate use of pesticides	Adoption of Integrated Pest and disease management

Table-2 *Potential yield, yield gaps and technology index as influenced by integrated crop management practices in rice*

Year	Potential yield	Demonstration yield q/ha		Technology gap q/ha		Extension gap q/ha	Technology index (%)	
	q/ha	FLD Plot	Check Plot	FLD plot	Check Plot		FLD plot	Check plot
2013-14	50	42.5	34.5	7.5	15.5	8	15	31
2014-15	50	41.8	35.6	8.2	14.4	6.2	18.4	28.8
2015-16	50	44.2	36.7	5.8	13.3	7.5	11.6	26.6
	50	42.8	35.6	7.2	14.4	7.2	14.3	28.8

Table-3 *Economics of integrated crop management in paddy*

SN	Year	FLD plot				Check plot			
		Gross Cost (Rs.)	Gross Returns (Rs.)	Net Returns Rs.	Benefit Cost Ratio Rs.	Gross Cost Rs.	Gross Returns Rs.	Net Returns Rs.	Benefit Cost Ratio Rs.
1	2013-14	40000	75250	35250	1.88	36000	51000	15000	1.42
2	2014-15	40150	63040	22890	1.57	38350	54570	16220	1.41
3	2015-16	40625	66320	25695	1.63	36875	53936	17061	1.46
	Average	40258	68203	27945	1.69	37075	53169	16094	1.43

Results and Discussion

The grain yield, technology gap, extension gap and technology index as influenced by front line demonstrations in rice compared to farmers practice are presented in [Table-2].

Grain yield

The results indicated that the average rice yield over a period of three years in demonstration plots ranged between 41.8-44.2 q per ha with the average yield of 42.8 q per ha as against the average yield of 35.6 q per ha recorded in check plot. The increase in yield in demonstration plots indicate the advantage of technology demonstrated over existing practice toward enhancing the productivity of rice and could be attributed to seed treatment, use of HYV, balanced nutrition of major and micro nutrients with adoption of Integrated pest and disease management contributing to 20 percent increase in yield in demonstration plots compared to check plots. Application of micronutrient ZnSo4 enhances plant growth and dry matter production through auxin production [8]. Similar results of increase in yield through front line demonstration has been reported by workers in rice [9-12] onion [13] groundnut [8] and cumin [14].

Extension Gap and Technology Gap

The results in table 2 revealed that yield of demonstration plot and potential yield of rice was compared to estimate the yields which were categorized into technology gap and extension gap. The extension gap ranged between 6.2 -8.0 q per ha with average of 7.2 q per ha emphasized the need to educate the farmers through various means for adoption of improved technologies for agricultural production to reverse the trend of wide extension gap. The technology gap ranged between 5.8-8.2 q per ha with average of 7.2 q per ha over three years reflected the farmer cooperation in carrying of such demonstrations with wide encouraging results in three years. The increase in technology gap could be attributed to different soil fertility status and prevailing weather condition [15]. The average technology index was lower in FLD plot (14.3%) as compared to check plot (28.1%) which indicated the feasibility of evolved technology at the farmers field. [16]. These results corroborate with the findings of earlier workers [3] in rice.

Economics

The input and output prices of commodities prevailed during three years of demonstration were taken into consideration for calculating the cost of cultivation. The economics of the FLDs are shown in Table.2. The average investment on production by adopting integrated crop management practices in demonstration plots was Rs. 40258/- per ha as compared to average of Rs.37075 /- recorded in traditional practices over a period of three years. The net income ranged from Rs.22890/- to Rs 35250/ per ha with mean value of 27945/- per ha over farmers practice (Rs.16094/-). The average benefit cost ratio of demonstration plot was 1.69 compared to 1.43 recorded in check. Similar results of economic advantage due to FLD have been reported in soybean [17].

Conclusion

The front-line demonstrations conducted in the farmers field revealed that integrated crop management practices adopted in rice performed better than traditional method of rice cultivation. Economic viability has potential for up-scaling of production. However, skill-oriented technologies like seed treatment, bold and healthy seed selection, identification of pest and diseases may face constraint in adoption at farmers level. Hence along with FLD regular training programme must be conducted to overcome the constraints faced by the farmers. During the present study also both training and demonstration was conducted which resulted in reduction of technology index and showed the feasibility of the technology in the farmers field. This will substantially increase the income as well as the livelihood of the farming community. The favorable cost benefit ratio is self-explanatory of economic viability of the demonstrated technology and convince the farmer to adopt the technology. The study emphasized the need to educate the farmers in adoption of improved technology to narrow extension gaps through various technology transfer centres.

Application of Research

Adoption of integrated crop management practices improves the productivity of rice.

Research Category: Crop Management

Abbreviations: FLD= Front Line Demonstration

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Author Contributions: Sole Author

Author statement: Author read, reviewed, agreed and approved the final manuscript. Note-Author agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Thirty farmers from ten villages of Bantwal and Belthangady Taluk of Dakshina Kannada District, Karnataka

Cultivar / Variety / Breed name: Rice (*Oryza sativa* L) (red kernel) MO-4

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.
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References

[1] Anonymous (2017) *Agricultural Statistics at a Glance GOI, Directorate of Economics and Statistics, Ministry of Agriculture and farmer welfare DACFW GOI*, 36.
[2] Anonymous (2015) *Vision 2050 ICAR Indian Institute of Rice Research, Rajendranagar, Hyderabad*, 13-15.
[3] Kamlesh Meena, Anuradha Ranjan Kumari, R P Sharma and R Srivatsava (2018) *International Journal of Current Microbiology and Applied Science*s, 7(1), 328-331.
[4] Anonymous (2018) *FAO- Rice Market Monitor*, 21, 1-2.
[5] Depeng Wang, Jianling Huang, Lixiao Nie, Fei Wang, Xiaoxia Ling, KehuiCui, Yong Li and Shaobing Peng (2018) *Nature /scientific reports, 7 article numbe*r 38982.
[6] Beigh M.A., Rufaida Mir S.Z.A., Matoo J.M. and Sibat F.K (2015) *Academic Journals-Scientific Research and Essays*, 10(14), 449-455.
[7] Sharma R.N. and Sharma K.C. (2004) *Maharashtra Journal of Extension Education*, 7, 72-75.
[8] Bhargava M.K., Singh Pushpendra Kumar Puneet and Singh Surendra (2019) *International Journal of Agriculture Sciences*, 11(1), 7715-7716.
[9] Mandavkar P.M., Sawant P.A. and Mahadik (2012) *Rajasthan Journal of Extension Education*, 20, 4-6.
[10] Suthar J.V., Chawda S.K., Patel A.T., Pastagia J.J. and Patel B.B. (2016) *Journal of Bio innovation*, 5(4), 588-593.
[11] Sunitha khuswah, Kumara Sharda and Raghubar Sahu (2015) *International Journal of Extension Education*, 11, 59-61.
[12] Samant T.K. (2014) *Agriculture Update*, 9(3), 311-315.
[13] Karabhantanal S., Vastrad S.M., Patil H.B. and Wali S.Y. (2015) *Pest management in Horticultural Systems*, 21(1), 42-45.
[14] Morwal B.R., Pradeep Pagaria, Kantwa S.L. and Shayam Das (2018) *Journal of Krishi Vigyan*, 6(2), 176-17.
[15] Mitra B. and Samajdar T. (2010) *Agricultural Extension Review*, 22, 16-17.
[16] Bhowate R.T. and Olambe A.P. (2017) *Journal of Krishi Vigyan*, 6(1), 138-140.
[17] Raj D., Yadav V. and Rathod J.H. (2014) *Research Journal of Agricultural Science*s, 5(1), 94-96.