Journal of AgriSearch **2**(1): 53-56
Peer Reviewed Quarterly
ISSN : 2348-8808 (Print), 2348-8867 (Online)

Impact Assessment of Short Duration Paddy Variety Birsa Vikas Dhan-109 in Sidhi District of Madhya Pradesh

DHANANJAI SINGH*, AK SINGH[1], ALKA SINGH[2], AK PATEL[3] AND MS BAGHEL

JNKVV Krishi Vigyan Kendra, Sidhi, Madhya Pradesh (India)

ARTICLE INFO

Received on	: 22.11.2014
Accepted on	: 27.01.2015
Published online	: 10.03.2015

ABSTRACT

Paddy is one of the major *kharif* crop grown in Sidhi district of Madhya Pradesh. The on farm testing and front line demonstrations were carried out in two villages of Sidhi district with inclusion of high yielding and short duration variety "Birsa Vikash Dhan-109" and applying scientific practices in their cultivation. The paddy productivity and economic returns under improved technologies were calculated and compared with the corresponding farmer's practices. Results revealed that improved technology recorded higher yield of 31.21 q/ha and 32.00 q/ha in the year 2012-13 and 2013-14, respectively than 20.13 and 20.21 q/ha by farmer's practice. The improved technology gave higher gross return (34331 and 38400 Rs./ ha), net return (17299 and 27560 Rs./ha) with higher benefit cost ratio (3.18 and 3.54) as compared to farmer's practices.

Keywords: Impact assessment, paddy, Birsa Vikas Dhan-109, B:C ratio.

INTRODUCTION

Paddy (*Oryza sativa* L.) is the staple food for over half the world's population (Singh *et al*., 2012a). It provides 27 per cent of dietary energy and 20 per cent of dietary protein in the developing countries. This crop is cultivated in at least 114 developing countries and it is the primary source of income and employment for more than 100 million house hold in Asia (FAO, 2004). Almost 90 per cent of the paddy is grown and consumed in Asia (Khush and Brar, 2002). India is second largest paddy producer in world followed by China. Worldwide paddy is grown on about 145 million hectares with a production of 600 million tones, in India area under paddy cultivation varies from 38 to 43 million hectares with a productivity of 2.6 ton/ha only (Singh *et al*, 2009 and Singh *et al*., 2013b). Selection of proper variety and agronomic practices can play a vital role in increasing productivity (Singh *et al*., 2008).Even a simple intervention like planting pattern has shown potential to improve productivity, an good example of nonmaterial intervention to improve productivity (Singh *et al*., 2013a). Krishi Vigyan Kendra (KVK), an innovative science based institution plays an important role in bringing the research scientists face to face with farmers. The main aim of KVK is to reduce the time lag between generation of technology at the research institution and transfer technology to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis. KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different micro farming situation at district (Das, 2007). Front line demonstration is a long term educational activity conducted in a systematic manner in farmer's field to worth of new practices/ technology. Farmers in India are still producing crops based on the knowledge transmitted to them by their forefathers leading to a grossly unscientific agronomic, nutrient management and pest management practices. As a result of these, they often fail to achieve the desired potential yield of various crops and new varieties. The baseline survey was conducted by Krishi Vigyan Kendra and it was found that farmers were using old varieties without proper use of chemical fertilizers, herbicides and pesticides. Keeping in view the constraint, Krishi Vigyan Kendra, Sidhi conducted on farm testing and front line demonstration on paddy variety Birsa Vikas Dhan-109 with crop management practices under rain fed condition.

[1]**Directorate of Extension Services, Jabalpur, Madhya Pradesh (India)**

[2]**Krishi Vigyan Kendra, Chhatarpur, Madhya Pradesh (India)**

[3]**Krishi Vigyan Kendra, Rewa, Madhya Pradesh (India)**

Corresponding author Email: dsingh_001@rediffmail.com

MATERIALS AND METHODS

On Farm Testing (OFT) and Front line demonstrations (FLDs) on paddy variety Birsa Vikas Dhan-109 was conducted by Krishi Vigya Kendra, Sidhi, Madhya Pradesh (India) during the period from 2012-13 and 2013-14 in two village's *viz.* Mamdar and Chorgarhi. The total 20 number of demonstration was conducted in these two villages. In general soil of the area under study was sandy loam with low to medium fertility status. The component demonstration of front line technology in paddy was comprised of improved variety Birsa Vikas Dhan-109, proper tillage, proper seed rate and sowing method, balance dose of fertilizer (80 kg Nitrogen + 60 kg P_2O_5 and 40 kg K_2O/ha), use of PSB @ of 5g/kg of seed as seed treatment, proper irrigation, weed management and protection measure (Table 1). An area of 8 ha was covered in two consecutive years. In the demonstration, one control plot was also kept where farmers practices was carried out. The OFTs and FLDs was conducted to study the technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield and yield under existing practice and technology index. The yield data were collected from both the demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools. The technology gap, extension gap and technological index (Samui *et al.*, 2000) were calculated by using following equations [Eq.1-4] as given below

$$\text{Percent increase yield} = \frac{\text{Demonstration yield} - \text{farmers yield}}{\text{Farmers yield}} \times 100 \quad \text{Eq.1}$$

Technology gap= Potential yield-Demonstrated yield Eq.2

Extension gap= Demonstrated yield – Yield under existing practice Eq.3

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demonstrated yield}}{\text{Potential yield}} \times 100 \quad \text{Eq.4}$$

RESULTS AND DISCUSSION

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 Sidhi is presented in Table 1 and 3. Full gap was observed in case of use of HYVs, 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. Farmers were not aware about recommended technologies. Farmers in general used local or old-age varieties instead of the recommended high yielding resistant varieties. Unavailability of seed in time and lack of awareness were the main reasons. Farmers followed broadcast method of sowing or old days (25-30 days) seedlings of paddy and closer spacing (10-15 cm) against the recommended line sowing, newly seedlings (15-20 days) and proper spacing (15-20 days) and because of this, they applied higher seed rate than the recommended.

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

Particulars	Technological intervention	Existing practices	Gap
Variety	Birsa Vikas Dhan-109	Old and degenerated	Full gap
Land preparation	Three ploughing	Three ploughing	Nil
Seed rate	40 kg/ha	25 kg/ha	Higher seed rate
Seed treatment	*PSB* powder@ 5g/kg of seed	No seed treatment	Full gap
Fertilizer dose	60:30:0:0 (N:P:K:Zn)	80:40:30:25 (N:P:K:Zn)	Partial Gap
Weed management	Benthiocarb @ 1.5 l/ha	No weeding	Full gap
Plant protection	Need based plant protection measure	No plant protection	Full gap

Yield

Results obtained during two years are presented in Table 2. Average paddy yield was recorded 31.60 q/ha under demonstrated plots as compared to farmers practice of 20.17 q/ha. The highest yield was 32.0 q/ha in plots of FLDs and in farmers practice 20.21 q/ha during 2013-14. These results clearly indicated higher average grain yield in demonstration plots compared to local check over the years due to knowledge and adoption of full package of practices. The average yield of paddy increased 55.31 per cent. The yield of paddy could be increased over the yield obtained under farmers practices (use of non-descriptive local variety, no use of the balanced dose of fertilizer, untimely sowing and no control measure adopted for pest management) of paddy cultivation. The above findings are in similarity with the findings of Singh (2002).

Table 2: Yield and yield attributing character of paddy variety Birsa Vikash Dhan-109 under OFTs and FLDs.

Year	Variety	No. of Trial	Area (ha)	Average Yield (q/ha)		No. of Panicle/ hill	
				Trial	Farmers practice	Trial	Farmer's Practice
2012-13	Birsa Vikash Dhan-109	10	4.0	31.21	20.13	21.2	14.3
2013-14	Birsa Vikash Dhan-109	10	4.0	32.0	20.21	26.0	18.0
Total/ Average	-	20	8.0	31.60	20.17	23.6	16.15

Technology gap

The technology gap, the differences between potential yield and yield of demonstration plots were 11.08 and 9.75 q/ ha during 2012-13 and 2013-14 respectively. On an average technology gap under three year FLD programme was 10.42 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation.

Extension gap

Extension gap of 5.50 and 3.40q/ha was observed during 2012-13 and 2013-14 respectively. On an average extension gap was observed 4.45q/ha 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 varied from 24.37 to 27.70 per cent (Table 3). On an average technology index was observed 26.04 per cent during the both the years of OFTs and FLDs programme, 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.

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 cultivation of paddy under improved technologies gave higher net return Rs. 17299 and 27560 per ha in 2012-13 and 2013-14 respectively as compared to farmers practices. Similar findings were reported by Kirar *et al.*, (2006). The benefit: cost ratio of paddy cultivation under improved cultivation practices were 3.18 and 3.54 as compared to 3.07 and 3.32 under farmer's practice. This may be due to higher yield obtained under improved technologies compared to farmer's practice. This finding is in corroboration with the findings of Mokidue *et al.*, (2011).

CONCLUSION

The productivity gain under OFT and FLD over existing practices of paddy cultivation created greater awareness and motivated the other farmers to adopt suitable production technology of paddy in the district. The constraints faced by the farmers were different for different technologies. Efforts should, therefore, be made by the extension agencies in their transfer of technology programmes to consider the constraints as perceived by the farmers in this investigations as well as personal. Therefore, for enhancing the production and productivity of paddy crop, strategy should be made for getting the more and more recommended technologies adopted by the farmers.

Table 3: Technology & Extension gap and Technological Index of paddy variety Birsa Vikash Dhan-109 under OFTs and FLDs

Year	Variety	No. of Trial	Area (ha)	Technology gap (q/ha)	Extension Gap (q/ha)	Technological Index (%)
2012-13	Birsa Vikash Dhan-109	10	4.0	11.08	5.50	27.7
2013-14	Birsa Vikash Dhan-109	10	4.0	9.75	3.40	24.37
Total/ Average	-	20	8.0	10.42	4.45	26.04

Table 4: Economic Impact of paddy variety Birsa Vikash Dhan-109 under OFTs and FLDs.

Year	Variety	No. of Trial	Area (ha)	Gross Income (Rs./ha)		Net Return (Rs./ha)		B:C Ratio	
				Trial	Farmers practice	Trial	Farmer's Practice	Trial	Farmer's Practice
2012-13	Birsa Vikash Dhan-109	10	4.0	34331	22143	17299	10907	3.18	3.07
2013-14	Birsa Vikash Dhan-109	10	4.0	39820	24354	27560	16962	3.54	3.32

REFERENCES

Das P. 2007. Proceedings of the Meeting of DDG (AE), ICAR, with officials of Stat Departments, ICAR, Institutes and Agricultural Universities, NRC Mithun, Jharnapani; Zonal Coordinating Unit, Zone-III, Barapani, Meghalaya, India.pp.6.

FAO. 2004. The State of Food Security in the World. FAO, Rome, Italy. pp.30-1.

Khush GS and Brar D. 2002. Biotechnology for rice breeding: Progress and potential impact. Proceed. 20th Session Intern. Rice Comm. 23rd -26th July, Bangkok, Thailand.

Kirar BS, Narshine R, Gupta AK and Mukherji SC. 2006. Demonstration: An effective tool for increasing the productivity of Urd. *Ind. Res. J. Ext. Edu*. **6**(3):47-8.

Mokidue I, Mohanti AK and Kumar S. 2011. Correlating growth, yield and adoption of urdbean technologies .*Indian J Ext. Edu*. **11**(2):20-4.

Samui SK, Mitra S, Roy DK, Mandal AK and Saha D. 2000. Evaluation of front line demonstration on groundnut. *Journal of the Indian Society Costal Agricultural Research* **18** (2):180-3.

Singh AK, Bhatt BP, Sundaram PK, Gupta AK and Singh Deepak. 2013a. Planting geometry to optimize growth and productivity faba bean (*Vicia faba* L.) and soil fertility. *J. Environ. Biol*. **34** (1): 117-22.

Singh AK, Chandra N and Bharti RC. 2012a. Effects of genotype and planting time on phenology and performance of rice (*Oryza sativa* L.). *Vegetos*. **25** (1): 151-6.

Singh AK, Manibhushan, Chandra N and Bharati RC. 2008. Suitable crop varieties for limited irrigated conditions in different agro climatic zones of India. *Int. J. Trop. Agri*. **26** (3-4): 491-6.

Singh AK, Meena MK, Bharati RC and Gade RM. 2013b. Effect of sulphur and zinc management on yield, nutrient uptake, changes in soil fertility and economics in rice (*Oryza sativa*) – lentil (*Lens culinaris*) cropping system. *Indian J. Agril. Sci.* **83** (3):344-8.

Singh AK, Singh D, Singh A, Sangle UR, Gade RM. 2012b.Good Agronomic Practices (GAP) - An efficient and eco-friendly tool for sustainable management of plant diseases under changing climate scenario. *J. Plant Disease Sci*. **7** (1): 1-8.

Singh, AK, Verma, VS, Nigam HK, Manibhushan, Chandra N and Bharti RC. 2009. Studies on growth, development, yield attributes and yields of upland rice (*Oryza sativa*) under varying environmental condition and genotypes. *Environ. Ecol*. **27** (2A):880-4.

Singh, PK. 2002. Impact of participation in planning on adoption of new technology through FLD. MANAGE Extension Research Review July-Dec.pp 45-8.

Correct Citation

Singh D, Singh AK, Singh A, Patel AK and Baghel MS.2015. Impact assessment of short duration paddy variety Birsa Vikas Dhan-109 in Sidhi district of Madhya Pradesh. *Journal of AgriSearch* 2(1): 53-56