Biological Forum – An International Journal **15(9): 846-849(2023)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Evaluation of Technology Dissemination through front line Demonstration on the Yield of Brinjal (*Solenum melongena* L.) at Korba District (Chhattishgarh)

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(Received: 08 July 2023; Revised: 05 August 2023; Accepted: 06 September 2023; Published: 15 September 2023)
(Published by Research Trend)

ABSTRACT: Brinjal also known as eggplant (*Solenum melongena* L.) is one of the preeminent fruit vegetable in India, which play a crucial role for enhancing the socio-economic status of Korba area farmers. The major constraints of brinjal crop farming is impoverished nursery which responsible to reduce productivity and non-adoption of recommended package of practices including improved varieties. To minimize the discrepancy, Krishi Vigyan Kendra Katghora Korba conducted front line demonstration (FLD) at an adopted farmer's field during 2020-21 to 2022-23. Cultivation practices adopted under this are improved variety, nursery raising, seedling treatment, transplanting method, balanced fertilizer application and disease and pest control. The trial showed that the average yield ranges between 220.22 to 230.23 q/ha, Technological index upto 12.1%. From a study, it revealed that over the years, variety of Kashi Uttam performed superior over local check. The average gross return ranges between Rs. 220220 to Rs. 230230, net return ranges between Rs. 158050 to Rs. 166434 and B:C ratio found between 3.54 to 3.61 in consecutive years from the demonstration as compared to farmers practices.

Keywords: Brinjal, FLD, Technology gap, Technology index, Gross return.

INTRODUCTION

Brinjal (*Solenum melongena* L.) belongs to Solanaceae family and is one of the commercial vegetable crop produced in India for domestic consumption which rich in minerals, fibre, vitamin B_6 potassium, Phosphorus, Iron and other nutrients. It is well known as aubergine, *baigan*, eggplant (because it seem to be eggs of duck or chicken. It has potential to lowering blood pressure, and having anti-pyretic, analgesic, anti- inflammatory properties. White brinjal are good source for the patient who suffering from diabetes (Dhaliwal, 2014). In India brinjal crop covered 7.58 million ha area and having total production of 131.54 million tons (Annon., 2020). In Chhattisgarh brinjal covered area 37.766 thousand ha with production 6.99.663 thousand MT (Annon., 2020). Brinjal is the major crop for farmers to generate income in Korba. Korba falls under hot temperature climate zone. It experiences hot summer38-48°C and feel 12-32°C in winter. The maximum rainfall is received during the month of June to August. Production and productivity depend not only on area and cultural practices but also on environment and genotypic behaviour of the brinjal. It is observed that the cultivated area has positive relation and total cost per hectare has inverse relation with the farm size in brinjal cultivation (Sahu *et al.*, 2020). Inattentive behavior of farmer about improved cultivation practices, soil type, growing suitable season, climate change are the main factors for limiting the production of brinjal directly or indirectly. Other factors are adopting old and traditional cultivation practices by the farmers are main reason for low productivity and less income. In that case Front line demonstrations are effective tool for transfer of technology among farmers. The KVK scientists demonstrate the proven technology of university on the research basis and modified the existing one through better management practices and improved variety. The main purpose for conducting FLD to replace the old variety those who are susceptible to insect– pest and disease and also giving poor yield which reduce the farmer income and affect the socio-economic status of the farmers. The demonstration conducted under supervision of KVK to exploit their efficiency and get feedback for wide- scale dispersal in the area. The primary objective of the demonstration is to replace the existing one with high yielding variety through implementing a package of practices on the farmer's field by exploiting their available resource and to bring them out with front line varietal as well as management technologies, leading to large-scale dispersal and adoption of technology at farmer's level. In India, over these years cultivation methods has changed significantly depending upon the

technological knowledge, socio-cultural practices and characteristics of the environment. The extent of adoption of new practices are influence by different factors like method of introduction, soil type, usefulness of demonstration practices, financial ability of the farmers to carried them and finally the willingness of the farmer to adopt them (Kaur and Singh 2013).

The technological breakthrough has no confusion that amplifying brinjal production and productivity. But there were several factors resulting in insufficient and improper extension of non-adoption of an improved package of practices developed at research institutions. It may be observed that by conducting frontline demonstration on affirmed technologies, the focus on the yield potential of crop can be increased to a large extent. It will substantially increase the income as well as socio-economic status of the farmers (Singh, 2018). Korba has a sizeable area under brinjal cultivation, but the productivity level is very low. Keeping the above point in view, the frontline demonstration was conducted with the objective of showing the productive potential of improved high yielding variety and production technologies under existent farm situation over the local ones of brinjal.

MATERIALS AND METHODS

A front-line demonstration on high yielding varieties of brinjal was conducted by Krishi Vigyan Kendra, Katghora, Korba for three consecutive year, *viz*., 2020-21 to 2022-23 in 5 villages of 2 blocks. The material used for the study comprised brinjal var. Kashi Uttam with local variety treated as check. There were 30 demonstrations conducted in the03 ha area in different villages to convince them about potential of improved production technologies.

For each demonstration, one control plot or area was also kept, where farmer's practices were carried out. The result are recorded on the basis of growth and yield attributes. The soil of the study area was sandy loam with a pH ranging from 5.5 to 6.5. The soil is content low organic matter, available phosphorus, available potassium and available nitrogen. For the study material respecting to front line demonstration and farmer's practices are presented in Table 1. Yield data was recorded after each harvesting of the crop and for growth characters randomly 10 plants are selected from each field. The data on production costs and other monetary returns were recorded from front line demonstration plots to work out the economic feasibility of an improved variety. Data on local check commonly adopted by the farmers were also recorded. Percentage increase in yield can be calculated by using ratio of demonstration yield –farmer's yield to farmer's yield, then multiplying by 100

$$Y_{(\%)} = \frac{Y_d - Y_f}{Y_f} \times 100 \quad (1)$$

Whereas, $Y_{(\%)}$ is percentage increased in yield , Y_d as Demonstration's yield, Y_f as Farmer's yield .In demonstration plots, critical inputs as seed, fungicides, biofertilizers were given to the farmer. Data calculated on the basis of area covered by plot, other inputs such as timely sowing in raised bed, transplanting at time and proper stage, inter-culture operations, rouging also performed and traditional practice treated as control plot. Training provide to the farmers for being involved in demonstration such as nursery preparation, transplanting, control of disease and pest to harvesting and observation are recorded on both demonstration and local check in timely basis by KVK scientists. Calculation of technology gaps, extension gaps and technology index was given by Samui *et al.* (2000) as

$$Y_{(tg)} = Y_p - Y_d \quad (2)$$

$$Y_{(eg)} = Y_d - Y_f \quad (3)$$

$$TI_{(\%)} = \frac{Y_p - Y_d}{Y_p} \times 100 \quad (4)$$

whereas, Y_{tg} is technology gap, Y_p is potential yield, Y_d is demonstration yield, Y_{eg} is extension gap and $TI_{(\%)}$ as Technology Index.

Table 1: Farmer practices (Local check) and demonstration package of practices for brinjal var. Kashi Uttam.

Package of Practices	Local check	Demonstration
Variety	Local variety (Gola)	High yielding variety Kashi Uttam
Seed	Not treated	Treated with *trichoderma* spp.10 g/ Kg
Seedling treatment	No seedling treatment	Seedling treated with *trichoderma* spp. 10g/liter water
Spacing	Close plantation	Row to Row 45 cm and plant to plant -30cm
Fertilizer	N:P:K @ 60:30:00 Kg/ha	Recommended dose of fertilizer N:P:K @ 150:100:50 Kg/ha
Application of biofertilizer	No application of biofertilizer	Azotobacter and PSB are applied as soil application with FYM at the time of transplanting.
Inter-culture operation	One hand weeding	Spray pendimethalin @ 1.0 Kg/ha as Pre E and one hand weeding after 6 weeks from transplanting.
Pest and disease management	No pest and disease management	Adaptation of pest and disease management. Bio pesticide such as *Bacillus thuringiensis* are used.
Post harvest management	improper practices	Adaptation of post-harvest management

The farmers are selected on the basis of their interest specially those are vegetable grower but fetches lower yield due to selection of variety and other pest –disease problem. The farmers are firstly trained by training courses which are schedule in pre, mid and post manner. In pre training courses farmers know about cultivation practices *i.e.* tillage, seed rate, sowing method, sowing time, spacing, fertigation schedule and

in midterm training about plant protection measures and identification of pest and diseases, irrigation schedule, weeding etc and post- training schedule on post-harvest and storage were considered for the study.

RESULTS AND DISCUSSION

A. Performance of FLD

Brinjal var. Kashi Uttam recorded average higher $Y_{(d)}$ 220.22 to 230.23 q/ha as compared to average $Y_{(f)}$ 123.12q/ha to 133.4 q/ha. The percentage increase in yield over local check was 44.10% to 42.10% in consecutive years for Kashi Uttam. The yield improvement in Kashi Uttam variety is due to combined effect of high yield potential and it showed moderate resistance against insect-pest & disease as compared to local ones. A similarly recorded yield of high yielding varieties over local check was observed by Singh (2018); Irulandi *et al*. (2020). It also reported that fruit yield are higher than local check by adopting technologies however, yield of crop effects caused by rainfall, soil type and pest - disease occurrence as well as changes in the location every year. The results indicate that the improved technology has made an acceptable impact on the farmers of Korba as they were influenced by the technology applied in farmer's field.

Economics of front-line demonstrations and farmer's practices were estimated and the results are presented in Table 3. Economics analysis of the data over the years revealed that brinjal var. Kashi Uttam recorded the highest gross returns (Rs. 220220 to Rs. 230230), net returns (Rs. 158050 to Rs. 166434) and B:C ratio (3.54 to 3.61) compared to local check in consecutive years from 2020-21 to 2022-23. The results are similar findings of Rajhansa *et al*. (2021); Desai *et al.* (2018). The present study showed that a gap exists between demonstration practices and farmers practices on yield and management practices. However, FLD perform better than farmers practices that could be adopting by farmers with recommended practices.

Table 2: Yield, Technology gap, Extension gap and Technology Index of demonstration and farmer's practices of brinjal var. Kashi Uttam.

Year	Area per ha	Number of demonstration	Estimated Yield per ha (q/ha)		$Y_{(\%)}$	$Y_{(p)}$	$Y_{(tg)}$	$Y_{(eg)}$	TI (%)
			$Y_{(d)}$	$Y_{(f)}$					
2020-21	3.0	30	220.22	123.12	44.1	250.5	30.28	97.1	12.1
2021-22	3.0	30	225.1	127.3	43.4	250.5	25.4	97.8	10.1
2022-23	3.0	30	230.23	133.4	42.1	250.5	20.27	96.83	8.1

B. Technological gap

$Y_{(tg)}$ shows the difference of potential yield over the demonstration yield. The potential yield of the crop is 250.50q/ha. The $Y_{(tg)}$ recorded of 30.28 in year 2020-21, 25.40 in year 2021-22 and 20.27 in year 2022-23. The $Y_{(tg)}$ existence are due to weather conditions, soil fertility and resource availability. The similar findings are observed by Singh and Bisen (2020); Balai *et al*. (2013). $Y_{(eg)}$ shows that difference of demonstration yield over existing practices done by the farmers as local check. The higher $Y_{(eg)}$ (97.1) indicate that farmers need to more awareness, training programme to educate them. There is need to demonstrate then further more.

C. Technological index

TI $_{(\%)}$ shows the credibility of variety or technology at farmers field. The lower the value of the technology index gives an efficient result of the demonstration. The TI $_{(\%)}$ recorded 12.10% in year 2020-21, 10.10% in year 2021-22 and 8.10% in year 2022-23. The similar findings are recorded by Rajhansa *et al*. (2021); Singh (2018). Hence, it can be concluded from the study that the higher yield was due to adaptation of brinjal var. Kashi Uttam and applying demonstration package of practices, so the yield potential of the crop can be elevated to considerable extent. This will eventually increase the farmer's earning as well as enhance their socio-economic status and reduced the extension gap.

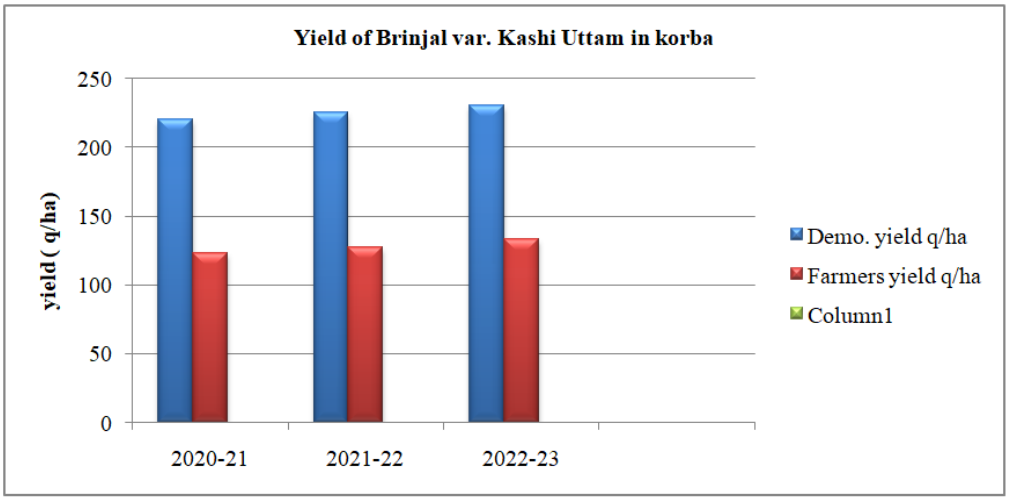

Fig. 1. Represent the yield q/ha of demonstration and local check.

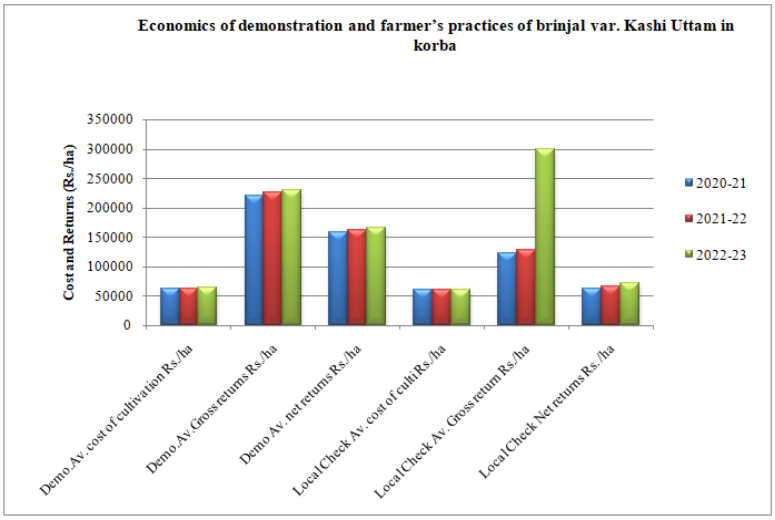

Fig. 2. Represent the cost and returns Rs./ha of demonstration and local check.

Table 3: Economics of demonstration and farmer's practices of brinjal var. Kashi Uttam in Korba.

Year	Cost of cultivation (Rs./ha)		Gross returns (Rs./ha)		Net returns (Rs./ha)		B:C ratio	
	Demonstration	Local check	Demon-stration	Local check	Demonstration	Local check	Demonstration	Local check
2020-21	62170	60700	220220.00	123120.00	158050.00	62420.00	3.54	2.03
2021-22	62920	60800	225100.00	127300.00	162180.00	66500.00	3.58	2.09
2022-23	63796	60800	230230.00	133400.00	166434.00	72600.00	3.61	2.19

CONCLUSIONS

It may be concluded that the adoption of bettered technologies by farmers can increases the yield potential of brinjal to greater extent and enhance their socio-economic status. Front line demonstration play a significant role in transfer of technology and reaches to farmers field. Adoption of improved technology defiantly upgrade the source of income and reduce the cost of cultivation. The substantially adoption of technology boost up the yield potential of brinjal and help to enhance the income of the farmer.

Acknowledgement. We would like to extend our deepest gratitude to invaluable support provided by the farmers of Korba district, Krishi Vigyan Kendra Katghora who welcomed us into their fields and shared their knowledge and experiences.

Conflict of Interest. Nil.

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How to cite this article: Archna Banjare, Shani Raj and S.K. Upadhayay (2023). Evaluation of Technology Dissemination through front line Demonstration on the Yield of Brinjal (*Solenum melongena* L.) at Korba District (Chhattishgarh). *Biological Forum – An International Journal*, *15*(9): 846-849.