



## Assessment of Brinjal (*Solanum Melongena* L.) cv. G.H. B.-1 under FLD in Panchmahal District of Western India

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### ABSTRACT

Brinjal (*Solanum melongena* L.) is an important solanaceous crop of tropics and sub tropics. An extensive survey of brinjal growers was carried to know the constraints in brinjal cultivation. The lack of suitable HYVs, technical knowhow, quality irrigation water and plant protection was the four most important factors which were found to be responsible for low productivity. To fulfil this gap a FLD (front line demonstrations) was designed during 2012-2013 on Brinjal cv. Gujarat Hybrid Brinjal-1 at ten selected farmer's field. The main objective of FLD was to popularize good agriculture practices (GAP) among the farmers. The yield of Brinjal cv. GHB-1 was recorded 270.80qt/ha from demonstration plots as compared to local check (195.50qt/ha). The percentage increase in yield over local check was demonstrated in variety GHB-1 (38.51). The highest gross return, net return and cost benefit ratio were recorded Rs. 1, 02,300 /ha, Rs. 60,100/ha and 2.42 as compared to local check respectively. The "mean knowledge score" of farmers was increased significantly by 32.42% after implementation of frontline demonstrations.

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### Introduction

Brinjal or eggplant (*Solanum melongena* L.) is an important solanaceous crop of tropics and sub tropics. Brinjal is an important crop of warm areas of Far East, being grown extensively in India, Bangladesh, Pakistan, China and the Philippines. In India, it is one of the grown throughout the country except higher altitudes. It is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. It is a perennial but grown commercially as an annual crop. In India, total area, production most common, popular and principle vegetable crop and productivity of brinjal is 7.22 (lakh ha), 134.43 (lakh MT) and 18.61 MT/ha, respectively. The area, production and productivity of brinjal in Gujarat are 0.77 lakh ha, 13.41 MT and 17.41 MT/ha, respectively (Hort. Database, 2012-13). In Panchmahals district of Gujarat, brinjal is one of the most important vegetable crops. The area, production and productivity of brinjal of the district are 570 ha, 6270 M.T and 11.03 M.T/ha (Anonymous, 2010). The productivity of brinjal in the district is very low as compared to National and State level and the major factors responsible for low productivity are nonadaptation of variety and production technologies by the farmers of the area. The Gujarat Hybrid Brinjal-1 is one of the leading variety of Brinjal, suitable for the area. The fruits are medium in size, dark black in colour and attractive in appearance. Keeping these as back drop, a field trial was carried out at ten farmer's field in various villages of Panchmahals district of central Gujarat under front line demonstration to increase the productivity of brinjal. FLD plays an important role in adoption of technologies with respect to variety and agro-techniques by the farmers. The technological gap is the major factor of low productivity. Hence to bridge the gap FLD were laid to the farmers field to

create awareness among the farmers with respect to impact of technological intervention on production and productivity of brinjal.

### Materials and Methods

#### Study site, Climatic information and Soil analysis

The experiment was conducted during the seasons of 2012 and 2013 at ten farmer's field of the Panchmahal district of middle Gujarat. The climatic condition of the area is characterized as hot semi-arid ecosystem. The meteorological information of study period (June – December, 2012) area is presented in Table-1. The top soil of the experimental site was reddish black. Soil samples were collected from the study site before sowing and soil was analyzed at soil science laboratory, Central Horticultural Experiment Station (CIAH), Vejalpur Godhra Gujarat to determine the nutrient status of the soil. Nitrogen, phosphorus, potassium, calcium, magnesium and organic matter, per cent sand, silt, clay; pH and calcium chloride of the soil were estimated through standard protocol (AOAC, 1980).

**Table 1. Meteorological data of study sites (June – December 2012)**

Months	Average monthly Rainfall (mm)	Rainy days	Average monthly Temperature (°C)		Average relative Humidity (%)
			Maximum	Minimum	
June	54.25	3	40.50	28.30	36.50
July	98.32	4	39.26	27.32	78.60
August	150.64	3	38.85	28.58	72.30
September	182.65	6	31.27	25.64	79.60
October	-	-	35.65	23.26	77.60
November	15.15	-	38.32	24.07	75.34
December	-	-	37.80	25.30	73.85

Source: Meteorological Station, Godhra

### Need assessment

Random survey of 60 brinjal growers was carried out to identify the constraints in its cultivation. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in brinjal cultivation. Farmers were asked to rank the constraints perceived as limiting factors to brinjal cultivation in order of preference. The quantification of data was done by ranking the constraints and then calculating the Rank Based Quotient (RBQ) as per Sabarathanam (1988), which is as follows:

$$R. B. Q = \frac{\sum f_i (n + 1 - i_{th})}{N \times n} \times 100$$

Where,

$f_i$  = Number of farmers reporting a particular problem under  $i_{th}$  rank,

$N$  = number of farmers

$n$  = number of problems identified.

### Experimental set up

Based on the higher order problems identified, front line demonstrations were planned and conducted at the farmers' field under FLD. The main objective of the study was to find out the constraints and increase the production, productivity and find out the constraints in brinjal production. All the demonstrations were conducted to convince farmers about potentialities of improved variety of Gujarat Hybrid Brinjal-1. Certified seeds were procured, healthy seedlings were raised at KVK nursery and distributed to selected farmers of villages viz. kharsaliya, Bediya, chalali, aeral, bhukhi and richhiya. All the participating farmers were trained about various aspects of brinjal cultivation. The field was prepared by one deep ploughing during May and two harrowing before sowing. One fifth area was also allotted to grow local check. All the recommended practices i.e. seed treatment, spacing, recommended dose of manure and fertilizers, weed management, insect pest management was adopted by the farmers in both treatments (local check Surti Ravya and Gujarat Hybrid Brinjal-1).

### Data recording and analysis

The data of both treatments were collected and analyzed with appropriate statistical tools as suggested by various workers. The data related to cost of cultivation, production, gross return and net return were collected in both treatments from time to time from all the participating farmers. Average of cost cultivation yield, net returns of different farmers was analyzed as advocated Samui *et al.* (2000).

$$\text{Average} = \frac{(F_1 + F_2 \dots \dots \dots F_n)}{N}$$

Wherein

$F_1$  = Farmer

$N$  = No. of farmers

**Technology gap:** The technology gap shows the demonstration yield over potential yield. It was calculated by the formula given by Samui *et al.* (2000).

Technology gap =  $P_i$  (Potential yield) -  $D_i$  (Demonstration yield)

**Technology index:** Technology index shows the feasibility of the variety at the farmer's field. It was calculated by the formula given by Samui *et al.* (2000).

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$$

Knowledge level of the farmers about improved production practices of brinjal before and after frontline

demonstration implementation was measured and compared by applying student "t" test. Further, the satisfaction level of respondent farmers about extension services provided was also measured based on various dimensions like training of participating farmers, supply of inputs, solving field problems and advisory services, performance of variety demonstrated and overall impact of FLDs. The selected respondents were interviewed personally with the help of a pre-tested and well structured interview schedule. Client Satisfaction Index was calculated as developed by Kumaran and Vijayaragavan (2005).

$$\text{Client Satisfaction Index} = \frac{\text{The individual obtained score}}{\text{Maximum score possible}}$$

The cost benefit ratio was calculated by gross return divided by cost of cultivation. The collected data were tabulated and statistically analyzed to interpret the results.

### Results and Discussion

#### Agro climatic parameters

The meteorology data of study period are presented in Table 1. It was revealed from the data that the maximum average monthly rainfall (182.65mm) was recorded during the month of September followed by August (150.64 mm). The maximum (6) and minimum (3) rainy days was recorded during the month of September and June, respectively. The minimum and maximum mean monthly temperature ranged between 23.26-28.58 and 31.27-40.50 respectively. The range of relative humidity varied from 36.50 to 79.60, being minimum during June and maximum during September.

#### Constraints in Brinjal Production

The constraints in Brinjal production faced by the farmers were documented. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in Brinjal production. The ranking given by the different farmers are given in Table 3.

**Table 2. Ranks given by farmers for different constraints in Brinjal cultivation (Total respondents=60)**

S. No.	Production Constraints	Ranks							
		I	II	III	IV	V	VI	VII	VIII
1.	Lack of location specific suitable HYVs	31	7	6	5	4	3	2	2
2.	Lack of technical knowledge	15	9	14	6	8	3	3	2
3.	Low soil fertility	4	7	6	6	13	9	10	5
4.	Lack of quality irrigation water	14	12	8	5	9	4	6	2
5.	Demand of local / deshi produce	8	9	11	9	7	5	8	3
6.	Problems of wild animals	7	9	14	10	7	6	7	0
7.	Plant protection measures	8	9	7	9	9	8	9	1
8.	Weed infestation	7	8	6	9	6	11	9	4

Perusal of data indicates that the lack of suitable HYVs was given the top most rank by 31 respondent farmers. Based on the ranks given by the respondent farmers for the different constraints listed out in Table 2, the Rank Based Quotients

(RBQ) were calculated Table 3. The data presented in the Table-3, revealed that the suitable HYVs, technical knowledge and quality irrigation water were the major constraints in brinjal production. Rest such as, problems of wild animals, demand of local types, low soil fertility and weed infestation accountable for low productivity of brinjal production. Among all the constraints, low soil fertility and weed infestation were minor concerns. These finding are in agreement of the results as reported by earlier workers (Ouma et al. 2002; Joshi et al. 2005) in maize production.

**Table 3. Frequency distribution of RBQ values (Total respondents =60)**

S. No.	Problems	R.B.Q	Overall rank
1	Lack of location specific suitable HYVs	81.04	I
2	Lack of technical knowledge	72.08	II
3	Low soil fertility	52.29	VIII
4	Lack of quality irrigation water	68.96	III
5	Demand of local / deshi produce	62.50	V
6	Problems of wild animals	65.21	IV
7	Plant protection measures	61.04	VI
8	Weed infestation	56.67	VII

#### Performance of FLD

A comparison of productivity levels between demonstrated variety and local check is shown in Table-1. During the period of study, it was recorded that in front line demonstrations, the improved Brinjal cv. Gujarat Hybrid Brinjal-1 recorded the highest average yield (270.80 q/ ha) when compared to local check (195.50 q/ ha). The per cent increase in yield over local check was 38.51. Similar yield enhancement in different crops in front line demonstration has been documented by Kumar *et al.* (2014) in Okra, Hiremath *et al.* (2007) in onion, Mishra *et al.* (2009) in potato, Kumar *et al.* (2010) in Bajara and Dhaka (2010) in maize. From these results, it is evident that the performance of the hybrid variety was found better under improved package and practices rather than the local set of practices check under same environment conditions. The farmers were motivated by results of agro technologies applied in the FLDs trials and it is expected that they would adopt these technologies for getting higher income in the coming years.

#### Technology gap

The technology gap shows the increased demonstration yield over potential yield was 25.30 q/ ha. which may be attributed to the soil fertility and weather conditions. Hence, location specific recommendations are necessary to bridge the gap. These findings are similar to the findings of Kumar *et al.* (2014) in Okra and Dhaka *et al.* (2010) in maize.

**Table 4. Yield, technology gap and technology index of demonstration**

Variables	Yield (q/ h)	Increase (%) over Local check	Technology gap- (q/ h)	Technology index (%)
Local check	195.50	-	-	-
Demonstration Brinjal cv. GHB -1	270.80	38.51	75.30	38.51

#### Technology index

Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index, more is the feasibility. Results depicted in Table 5 revealed

that the technology index value was 38.51. The results of the present study are in consonance with the findings of Singh *et al.* (2007), Hiremath and Nagaraju (2009) in onion and Kumar *et al.* (2014) in okra.

#### Economics of frontline demonstration

The economics of brinjal cultivation under front line demonstration was estimated and the results of the study have been presented in Table 5. The Results of economic analysis of brinjal cultivation revealed that front line demonstration recorded higher gross returns (Rs. 1,02,300 / ha) and net return (Rs. 60,100 /ha) with higher cost benefit ratio (2.42) as compared to local check. These results are in accordance with the findings of Kumar *et al.* (2014), Hiremath *et al.* (2007) and Hiremath and Nagaraju (2009). Further, additional cost of Rs.3,800 /ha in demonstration has increased additional net returns by Rs. 23,400 /ha with incremental benefit cost ratio 6.15 suggesting higher profitability and economic viability. More or less similar results were reported by Hiremath and Nagaraju (2009) in onion and Dhaka *et al.* (2010) in maize.

**Table 5. Economics of frontline demonstrations**

Variables	Cost of cultivation (Rs/ ha)	Gross return (Rs/ ha)	Net return (Rs ha)	Benefit: cost ratio
Local check	38400	78900	40500	2.05
Demonstration	42200	102300	60100	2.42
Additional in demonstration	3800	23400	19600	6.15*

Incremental benefit cost ratio

#### Increase in Knowledge

Knowledge level of respondent farmers on various aspects of brinjal production technologies before conducting the frontline demonstration and after implementation was measured and compared by applying students't' test. It could be seen from the Table 6 that the farmers mean knowledge score increased significantly by 32.42 after implementation of frontline demonstrations as the computed value of 't' (6.01) was statistically significant at 5% probability level. The results are in accordance with that of Singh *et al.* (2007) which is clearly showed that there was significant increase in knowledge level of the farmers due to frontline demonstration.

**Table 6. Comparison between knowledge levels of the respondent farmers about improved production technologies of Brinjal (n=60)**

S. No.	Mean score			Calculated 't' value
	Before FLD implementation	After FLD implementation	Mean difference	
1.	34.32	66.72	32.42	6.01*

Significant at 5% probability level.

#### Farmers' Satisfaction

The extent of satisfaction level of respondent farmers over extension services and performance of demonstrated variety was measured by Client Satisfaction Index (CSI) and results are presented in Table 7.

**Table 7. Extent of farmers satisfaction of extension services rendered (n=60)**

S. No.	Satisfaction	Level Number	Per cent
1.	Low	10	16.66
2.	Medium	37	60.66
3.	High	13	21.66

Results revealed that the majority of the respondent farmers expressed medium (56.67 %) to high (30.00 %) level of satisfaction for extension services and performance of technology under demonstrations. Whereas, very few respondents (13.33%) were expressed lower level of satisfaction.

The results are in conformity with those reported by Narayanaswamy and Eshwarappa (1998) and Kumaran and Vijayaragavan (2005). Medium to higher level of satisfaction with respect to services rendered, linkage with farmers, and technologies demonstrated, etc. indicate stronger conviction, physical and mental involvement in the frontline demonstration which in turn lead to higher adaptation. This shows the relevance and success of frontline demonstration.

#### Conclusion

Results of the study revealed that the gap between existing and demonstrated technology is due to technology and extension gap. By conducting front line demonstrations of proven technologies, yield potential of brinjal can be increased to a great extent. This will substantially increase the income as well as the livelihood of the farming community. There is need to adapt multi-pronged strategy that involves enhancing brinjal production through improved technologies. In order to narrow down extension gap between farmers and extension workers there is need to educate the farmers regarding the improved technologies by adopting various transfers of technology tools.

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