INDIAN JOURNAL OF
ARID HORTICULTURE
2015, Vol. 10 (1-2):77-80

Evaluation of Bottle gourd cv. Pusa Naveen under semi arid conditions of Panchmahal district of Gujarat

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(Received: 12.10.2015; Accepted: 04.04.2016)

Abstract

The present study was carried out at Krishi Vigyan Kendra-Panchmahals district of central Gujarat during 2012-13. One of the major constraints of traditional bottle gourd farming is low productivity because of non-adoption of advanced technologies. The lack of suitable HYVs (High Yielding Varieties), technical knowledge, quality irrigation water and awareness with respect to use of protection measures were found to be the major constraints in bottle gourd production. To increase the production, productivity and quality of bottle gourd, Front Line Demonstrations were conducted at various farmers' field. All the recommended practices were provided to the selected farmers. Results of the study revealed that the improved variety of Bottle Gourd cv. Pusa Naveen recorded the higher average yield (273 q/ ha) as compared to local check (235 q/ ha) traditionally grown by the farmers. The percentage increase in the yield over local check (*padara bottle gourd*) and demonstration (Pusa Naveen) 16.17 was recorded. The technological gap in terms of productivity (17.0 q/ha) were computed. The technology index values 5.86 % was recorded. By adopting Bottle Gourd cv. Pusa Naveen along with improved production technologies, yield can be increased upto a great extent. This will substantially increase the income as well as the livelihood of the farming community.

Keywords: - Front Line Demonstrations, local check, bottle gourd, technology, yield

Introduction

Among, cucurbits, bottle gourd (*Lagenaria siceraria* (Mol.) Standi) is extensively grown in India and fruits are available throughout the year. Fruits at tender stage are used as a cooked vegetable and for preparation of sweets (*e.g. halva, kheer, burfi and petha*) and pickles. Hard shells of mature fruits are used as water jugs, domestic utensils, floats for fishing nets, etc. As a vegetable it is easily digestible. It has cooling effect and has diuretic and having cardio-tonic properties. Fruit pulp is used as an antidote against certain poisons and is good for controlling constipation, night-blindness and cough. A decoction made out of leaf is taken for curing jaundice (Thamburaj and Singh, 2001). In the study area, cucurbits are growing extensively as kitchen garden especially during kharif season or as commercial scale throughout the year. The tribals of the area are growing it and train the vines on boundary of the house and on pandal. Among cucurbits, bottle gourd is being grown by majority of the farmers than other cucurbitaceous vegetable. The area, production and productivity of cucurbits in the district is 6.0 lakh ha, 48.00 lakh M.T and 8.0 M.T., respectively (Anonymous, 2010). In Gujarat, it is grown in area of 46.69 lakh ha with production of 66.31 lakh M.T with the productivity of 14.20 M. T. (Anonymous, 2012).

Generally, the agricultural technology is not accepted by the farmers as such in all respects. There is always a gap between the recommended technology by the scientist /researcher and its modified form at the farmer's level which is a major lacuna in the efforts of increasing agricultural production in the country. There is an urgent need to reduce this technological gap between the agricultural technology recommended by the scientists or researchers and its acceptance by the farmers on their field. In view of the above facts, frontline demonstrations were undertaken in a systematical and scientifically on farmers' field to show the worth of a new technology and convince the farmers to adopt it in their farming system.

Materials and Methods

Need assessment

The random survey of 60 bottle gourd growers of various farmers of Panchmahal district was conducted to identify the constraints in its cultivation. Preferential ranking technique was adapted to identify the constraints faced by the respondent farmers in bottle gourd cultivation. Farmers were also questioned to rank the constraints perceived as limiting bottle gourd 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 methods given by Sabarathanam (1988), which is as follows:

$$R.B.Q = \frac{fi\,(n+1 \quad ith)}{N \times n} \times 100$$

Where

fi = Number of farmers reporting a particular problem under i* rank,

N = number of farmers
n = number of problems identified.

Experimental set up

Based on top rank farmer's problems identified, front line demonstrations were planned and conducted at the farmers' field. The main objective of the study is to increase the production, productivity of bottle gourd. All the demonstrations were conducted to motivate farmers exhibiting potentialities of improved variety of bottle gourd cv. Pusa Naveen. The genuine seeds were procured from National Seed Corporation, Godhra and distributed to ten selected farmers of villages *viz.* achhala, ramnath, richhiya, kharsaliya and sureli. The each farmer grow it in 0.5 ha land. All the participating farmers were trained about various aspects of bottle gourd cultivation. The demonstrated fields were prepared by one deep ploughing during May and two harrowing before sowing. A one fifth area was also allotted to grow local check (*padara bottle gourd)* for compression. All the recommended practices *i.e.* seed treatment, spacing, recommended dose of manure and fertilizers, weed management, pest and management were adopted by the farmers in both treatments (local check (*padara bottle gourd*) and demonstration (Pusa Naveen).

Data recording and analysis

The data of both treatments were collected and analyzed with suitable statistical method. The data related to cost of cultivation, production, gross return and net return were collected in both treatments as per schedule. An average of cost of cultivation yield, net returns of different farmers was analyzed by the formula given by Samui *et al.* (2000).

$$\text{Average} = \frac{(F1+F2.....Fn)}{N}$$

F = 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 = Pi (Potential yield) - Di (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).

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

The data thus collected were tabulated and statistically analyzed to interpret the results.

Result and Discussion

Constraints in bottle gourd production

The constraints in bottle gourd production faced by the farmers were documented. The preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in bottle gourd production. The ranking given by the different farmers are given in Table 1. A perusal of data indicates that lack of suitable HYVs (high yielding varieties) was given the top rank by 33 respondent farmers. Based on the ranks given by the respondent farmers for the different constraints listed in table 1, rank based quotients were calculated and presented in Table 2. It is revealed from the study that lack of suitable HYVs (high yielding varieties), technical knowledge about various package and practices and quality irrigation and aware with respect to plant protection measures were the major constraints in bottle gourd production. Other constraints such as, damage of crop by wild animals, demand of local / deshi produce, weed infestation and low soil fertility were also found as cases of low productivity for bottle gourd production. Among all the constraints, weed infestation and low soil fertility got the least concern. These finding are in agreement of the results as reported by earlier workers (Ouma *et al.*, 2002, Joshi *et al.*, (2005) in maize production.

Performance of FLD

A comparison of productivity levels between demonstrated variety and local check is shown in table-3. During the period of study, it was recorded that in front line demonstrations, the improved variety Pusa Naveen recorded

Table 1. Ranks given by farmers for different constraints in bottle gourd cultivation (n=60)

S. No.	Production Constraints	Ranks							
		I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
1.	Lack of suitable HYVs	33	7	7	5	3	2	2	1
2.	Lack of technical knowledge	17	9	13	7	6	3	3	2
3.	Low soil fertility	4	6	5	6	7	12	13	7
4.	Lack of quality irrigation water	14	10	8	5	8	6	5	4
5.	Demand of local / desi produce	9	8	12	9	6	5	7	4
6.	Problems of wild animals	6	9	10	8	6	6	7	8
7	Plant protection measures	9	8	10	7	6	5	7	8
8	Weed infestation	7	10	10	8	6	8	7	4

Table 2. Frequency distribution of RBQ values given by farmers (n=60)

S. No.	Problems	R.B.Q	Overall rank
1	Lack of location specific suitable HYVs	83.96	I
2	Lack of technical knowledge	73.54	II
3	Low soil fertility	48.13	VIII
4	Lack of quality irrigation water	66.46	III
5	Demand of local / deshi produce	62.92	IV
6	Problems of wild animals	53.96	VII
7	Plant protection measures	55.83	V
8	Weed infestation	57.29	VI

290 q/ ha yield potential. The average yield of various demonstration was (273 q/ ha) higher than local check (235 q/ ha). The percentage increase in yield was recorded 16.17over local check. Similarly, yield enhancement in different crops in front line demonstration had already been documented by Hiremath *et. al.* (2007) in onion, Kumar *et. al.* (2010) in bajara and Dhaka *et. al.* (2010) in maize. From these results, it is evident that the performance of improved variety was found to be better than the local check under same environment conditions. The farmers were motivated by showing the results in term of productivity and they are adopting the technologies.

Technology gap

The technology gap shows the difference between potential yields over demonstration yield of the technology. The potential yield of the technology (variety Pusa Naveen) is 290 q. ha. The technology gap of 17.0 q/ha was recorded. The Front Line Demonstration was laid down under the supervision of KVK specialist at the farmer's field. There exist a gap between the potential yield and demonstration yield. This may be due 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 Sharma and Sharma (2004) in oilseeds at Baran district of Rajasthan and Kumar *et. al.* (2014) in okra.

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 of the particular technology. The result of study depicted in Table- 3 revealed that the technology index value was 5.86. It means the technology bottle gourd cv. Pusa Naveen is suitable for the Panchmahals district of central Gujarat. The results of the present study are in consonance with the findings of Singh *et. al.* (2007), Kumar *et. al.* (2014) in okra and Hiremath and Nagaraju (2009) in onion.

Economics of frontline demonstrations

The economics of bottle gourd cultivation under front line demonstration was recorded (table- 4). The results of

Table 3. Potential yield, average yield, technology gap and index of demonstration

Variables	Potential yield (q/ ha)	Average yield (q/ ha)	Increase (%) over Local check	Technology gap (q/ ha)	Technology index (%)
Local check (*Padara bottle gourd*)	-	235	-	-	-
Demonstration (Pusa Naveen)	290	273	16.17	17.0	5.86

economic analysis of bottle gourd production revealed that the front line demonstration recorded higher gross returns (Rs. 76875/ ha) and net return (Rs. 47675 /ha) with higher cost benefit ratio (2.63) as compared to local check (Rs 61250, 33850 and 2.23, respectively). These results are in accordance with the findings of Hiremath *et. al.* (2007) onion, Kumar *et. al.* (2014) in okra and Hiremath and Nagaraju (2009) in onion. Further, additional cost of Rs.1800 per hectare in demonstration has increased additional net returns Rs. 13825 per hectare with incremental benefit cost: ratio 8.68

suggesting its higher profitability and economic viability of the demonstration. More and less similar results were also reported by Hiremath and Nagaraju (2009) in onion and Dhaka *et. al.* (2010) in maize.

Table 4. Cost of cultivation, Gross return, Net return & Benfit : Cost ratio

Variables	Cost of cultivation (Rs/ ha)	Gross return (Rs/ ha)	Net return (Rs ha)	Benefit: cost ratio
Local check (*Padara bottle gourd*)	27400	61250	33850	2.23
Demonstration (Pusa Naveen)	29200	76875	47675	2.63
Additional in demonstration	1800	15625	13825	8.68*

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