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Performance of Mid Duration Variety of Pea (*Pisum sativum* L.) under FLD in Banka District of Bihar

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ABSTRACT

Pea (*Pisum sativum* L.) is the most important crop globally. Attempts were made to improve productivity and to increase area under vegetable pea by adoption of high yielding varieties (HYVs). In order to compare performance of conventional vegetable pea varieties with HVY, 34 front line demonstrations (FLD's) were laid out at farmers' field to show the worth of new variety over local check. Likewise, to facilitate the farmers through FLD's about potential of new improved production practices of vegetable pea for the adoption, knowledge enhancement and satisfaction were undertaken. The demonstrations resulted in enhancement in productivity. The yield was found to be increased from 98 (q/ha) in local check to 175 (q/ha) under FLDs. Similarly, the benefit: cost ratio was improved to 3.77 as compared to 2.11 in local check. Lack of market and support price (83.43) was observed to be major constraints in late sown pea cultivation.

Key Words: Knowledge, Adoption, Pea Cultivation, Improved production technology.

INTRODUCTION

Pea (*Pisum sativum* L.) is grown successfully in different districts of Bihar. In Banka district it is grown in Banka, Katoria Amarpur, Baunsi and Chandan blocks with approx. 106 ha area. It is harvested in immature conditions and cooked as fresh or canned for subsequent uses. The acreage under vegetable pea in Bihar did not increase during last five years. Banka district topography is undulated and rain fed. Land is low to medium upland. Farmers cultivate vegetable pea variety locally known as *Kushia* Mater. This variety is poor yielding, having lesser sweetness with low marketable price. The productivity of vegetable pea is low due to various constraints like unavailability of early to mid season variety to the farmers, use of traditional varieties, inadequate moisture availability at sowing time and late sowing of peas particularly in rice –fallow areas, broad casting method of sowing and use of high seed rate, pod borer infestation and wilting in plants.

KVK's role in agriculture and its allied sector is crucial as it is ideally placed to facilitate field – tested proven technologies with appropriate modulation which addresses location specific problems and concern on the prevailing natural and socio –economic conditions, needs and priorities. Climatic conditions are suitable for pea cultivation, therefore trials were conducted to introduce new vegetable pea variety in Banka district to increase the profitability. Keeping the above point in view, FLDs on vegetable pea were conducted to compare the yield levels of local check with the improved variety, work out the economic feasibility of the crop, calculate technology satisfaction, know feedback for further improvement in extension programme and to note down various constraints in dissemination of technology.

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Table 1. Detail of vegetable pea grown under FLD and existing practices.

Sr. No.	Particular	Existing practice	Improved cultivation practice under FLD
1.	Use of seed	Local seed (Kushia Mater)	Azad Pea3 used for mid season sowing
2.	Seed quality	Medium bold, light green	Wrinkled , dark green colour
3.	Method of sowing	Broadcasting	Line sowing
4.	Fertilizer application	0:0:0 (kg N:P:K/ha)	55:20:40 (kg N:P:K /ha)
5.	Bio fertilizers	No use of Rhizobium spp.	Seed treatment with Rhizobium@10ml/kg of seed
		No soil application of Rhizobium spp.	Soil application of Rhizobium@ 3l/ha

MATERIALS AND METHODS

Front Line Demonstrations were conducted on 34 farmers' field on an area of 2.3 ha and cultivar Azad Pea 3 was used in FLD during the year 2015-16. Full recommended package of practices were followed under the FLD plots (Table 1). An interview schedule was prepared and administered to the respondents and data were analyzed. Preferential ranking technique was utilized to identify the constraints faced by the farmers in vegetable pea cultivation. The quantification of data was done by first ranking the constraints and then calculating the rank based quotient (RBQ) as given by Sabarathanam (1998), as mentioned below-

$$RBQ = \frac{fi\ (n+1-\ ith\ )}{N \times n} \times 100$$

Where, fi=Number of farmers reporting a particular problem under ith rank; N= number of farmers and n=number of problems identified.

Production and economic data for FLD's and local practices were collected and analyzed. The technology gap and technology index were calculated using the following formulas as given by Samui *et al* (2000).

Technology gap= Potential yield- Demonstration yield

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

Knowledge level of the farmers about improved cultivation practices of the Azad Pea 3 variety before frontline demonstration and after implementation, was measured and compared by applying dependent 't' test. The selected respondents were interviewed personally with the help of a pre test and well structured interview schedule. Client satisfaction index was calculated by using formula as developed by (Kumaran and Vijayaragavan, 2005).

$$\text{Client satisfaction index} = \frac{\text{Individual obtained score}}{\text{Maximum possible score}}$$

RESULTS AND DISCUSSION

A comparison of productivity levels between demonstrated variety and local check is shown in table 2. It was observed that in front line demonstrations, the improved pea variety Azad pea 3 recorded higher seed yield (175q/ha) as compared to local check variety (98 q/ha). The increase in yield over check was 78.6 percent. It was, thus, evident that improved high yielding variety Azad Pea 3 performed well as comparison to local check at different locations in the district. Yield of

Table 2. Yield, technology gap, technology index and economics of front line demonstration of vegetable pea.

Variables	Seed yield (q/ ha)	(Per cent) increase over check	Po- tential yield (q/ha)	Technol- ogy gap (q/ha)	Tech- nology index (%)	Cost of cultiva- tion (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	Benefit cost ratio
Local check (FP)	98					61000/-	196000/-	135000/-	2.21
FLD	175	78.6	200	25	12.5	66375/-	314000/-	247325/-	3.77

the demonstration and potential yield of the crop was compared to estimate the yield gap which were further categorize into technology index and harvest index. Potential yield for variety was 200 q/ha. The technology gap showed the gap in the demonstration yield over potential yield of 25 q/ha.

The observed technology gap was due to various constraints like low soil fertility, availability of low moisture content during sowing time, weather condition and climatic hazards etc. Hence to reduce the yield gap, there must be location specific recommendation for variety, soil testing and timely sowing appears to be necessary. Technology index showed the suitability of variety at farmer's field. Lower technology values indicated that feasibility of variety among the farmers was more. It was revealed (Table 2) that technology index (32.51%) was better than the local one. These results were in agreement with Singh and Kumar (2012).

The economic analysis of the yield performance revealed that front line demonstrations recorded higher gross return (Rs 314000/ha) and net return (Rs 247625/ha) with higher benefit cost ratio 3.77, compared to 2.21 over local check (Table 2).

Technology satisfaction among respondents

The extent of satisfaction level of farmers about performance of demonstrated varieties was measured by Client Satisfaction Index (CSI). It was observed that majority of the farmers indicated high (52.94 %) to the medium (26.47 %) level of adoption or satisfaction for improved cultivation practices and HYV of pea. Whereas, 20.58 percent respondents expressed lower level of satisfaction with respect to improved vegetable pea variety and cultivation practices. The medium to higher level of satisfaction with respect to improved cultivation practices, linkage with farmers, services rendered etc. indicated stronger conviction, physical and mental involvement in the front line demonstration. Similar findings obtained by Tomar (2010) and Dudi and Meena (2012)

Knowledge gain regarding new variety and technology among respondents

Knowledge level of respondent farmers on various aspects of improved pea production technologies before conducting the front line demonstration (MS=23.6) and after front line demonstration (MS=85.6) was measured and compared by applying dependent 't' test. It was observed that farmers mean knowledge score increased to 85.6 after implementation of frontline line demonstrations. Mean difference recorded was 62.0) for pea growers. The increase in mean knowledge score of farmers was significantly higher as the computed value of 't' (4.54) at 5 percent probability level. It indicated that there was significant increase or gain in knowledge level of farmers that have resulted in higher adoption of improved farm practices.

Constraints with mid season vegetable pea variety

In the cultivation of mid season vegetable pea problems encountered and ranking given by the farmers are mentioned in table 3. A perusal of data

Table 3. Rank based quotient obtained by the vegetable pea respondents (n=34)

S. No.	Problem encountered	RBQ	Overall rank
1	Lack of market and support price	83.45	I
2	Disease and insect pest infestation	78.25	II
3	Lack of high yielding varieties of mid season pea	74.42	III
4	Lack of moisture availability in the field during sowing	73.68	IV
5	Low soil fertility	68.47	V
6	Weed infestation	62.14	VI
7	Lack of technical support	60.42	VII
8	Undulated topography of land	59.15	VIII
9	Lack of credit facilities	48.43	IX
10	Illiteracy among farmers	50.75	X
11	Damage by wild animals	30.75	XII

indicated that lack of market and support price ranked first by 34 respondent's with RBQ value (83.45). Disease and insect pest infestation, lack of high yielding varieties of vegetable pea, lack of moisture availability in the field during sowing, low soil fertility, pod borer and weed infestation were major constraints faced by the pea farmers. While lack of technical support, Undulated topography of land, lack of credit facilities, illiteracy among the farmers and crop damage by wild animals were also found as a constraints to reduce the production of mid season sown pea crop. The view was also supported by Singh *et al* (2007).

CONCLUSION

The productivity gain under FLD over existing practices of vegetable pea cultivation created greater awareness and motivated to the other farmers to adopt suitable production technology of vegetable pea in the district. The constraints faced by the farmers were different for different technologies. Efforts should, therefore, be made by the extension agencies in the transfer of technology programmes to consider the constraints as perceived by the farmers in this investigations as well as personnel. The effect of FLD showed that there was significant improvement in knowledge level and satisfaction on the part of pea farmers.

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