



Impact of Front Line Demonstration on Vegetable Pea Yield Improvement in Eastern Uttar Pradesh

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INTRODUCTION

Vegetable Pea (*Pisum sativum* L.) belongs to the Leguminaceae family, is one of the important vegetables in the world and ranks among the top 10 vegetable crops (Kumar *et al.*, 2017). having high value with good percentage of digestible protein along with carbohydrates, vitamins and higher proportion of mineral matter. It is used by human either as a vegetable or in soup, canned, frozen or dehydrated. Pea straw is a nutritious fodder for animals. India is the second largest vegetable producer country, next to China in the world, with a production of 169.064 million tonnes from 10106 thousand hectares of land area with productivity 16.73 MT/ha in 2015-16. In India, the area under vegetable pea cultivation has increased endlessly from 5593 thousand hectares in year 1991-92 to 10106 thousand hectares in year 2015-16. The production of vegetable peas has goes up from 58.532 million tonnes in year 1991-92 to 169.064 million tonnes in year 2015-16 and the productivity of vegetable peas has also revealed an unequal trend, but it slightly enhanced from 104.7 q/ha in in year 1991-92 to 167.3 q/ha in year 2015-16. Pea is commonly used in human diet throughout the world and it is rich in protein (21-25 %), carbohydrates, vitamin A and C, Ca, phosphorous and has high levels of amino acids lysin and tryptophan (Bhat *et al.*, 2013). Its cultivation maintains soil fertility through biological nitrogen fixation in association with symbiotic rhizobium prevalent in its root nodules and thus play a vital role in fostering sustainable agriculture (Negi *et al.*, 2006). Therefore, apart from meeting its own requirement of nitrogen, peas are known to leave behind residual nitrogen in soil 50-60 kg/ha (Kanwar *et al.*, 1990).

The vegetable pea is one of the most important vegetable crops of eastern Uttar Pradesh. It is grown during the cool season of October to February in Uttar Pradesh. However, the extension and technology gap of yield was observed more in the eastern Uttar Pradesh as compared to other part of country. Low yield per unit area can be attributed to the number of yield affecting factors such as low fertility of land, not growing recommended variety for the region, lack of knowledge of technology and ultimately low adoption of recommended production technology by the vegetable pea growers of eastern Uttar Pradesh. Keeping this in view, the present study was undertaken to evaluate the performance of garden pea with the objective to assess the economic sustainability of garden pea variety.

MATERIALS AND METHODS

The present study on performance of high yielding variety of vegetable pea (var. Kashi Udai) against existing local check was evaluated through frontline demonstrations conducted at farmer's field during *rabi* season by Krishi Vigyan Kendra Deoria during 2014-15, 2015-16 and 2016-17 and Krishi Vigyan Kendra Kushinagar during 2017-18 under ICAR-Indian Institute of Vegetable Research Varanasi. Total 32 frontline demonstrations were conducted on the selected farmer's fields of eleven adopted villages, situated at different locations of Deoria and Kushinagar districts in eastern Uttar Pradesh and covering 1.81 ha area. Materials for the present study with respect to frontline demonstrations (FLDs) and existing farmers' practices were given in Table 1. In general, soils of the area under study were sandy loam in texture with medium to low in fertility status. Climate of the district is characterized by humid summer and dry cool winter and rainfall during July –October. Low yield, high seed rate, broadcast method of sowing and increased incidence of powdery mildew were identified as major issues during survey, farmers' meeting and field visit. In order to manage these problems, improved and recommended practices were followed as new interventions during

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ABSTRACT

Vegetable pea (*Pisum sativum* L) is an important and nutritive legume vegetable crop. Low productivity and poor returns from market due to non-adoption of improved varieties and recommended package of practices by vegetable pea growers of the district. Krishi Vigyan Kendra Deoria and Krishi Vigyan Kendra Kushinagar, ICAR-IIVR Varanasi, conducted front line demonstrations (FLDs) comprised use of improved variety, recommended spacing, balanced fertilizers application and plant protection measures. The result revealed that an average yield of demonstrated vegetable pea variety Kashi Udai was noticed 95.3 q/ha which was 22.79 % higher than the farmers existing practice yield i.e., 76.4 q/ha. Average Net return and BC ratio were recorded Rs. 157695.00 and 4.2:1 from demonstrations whereas Rs. 119065.00 and 3.6:1 from existing local practices of farmers. As a result, it may be concluded that the yield and net return increased considerably with improved variety of vegetable pea and recommended agro-practices.

KEYWORDS

Vegetable pea, Kashi Udai, recommended agro-practices

the course the investigation. In case of FLDs recommended package of practices of vegetable pea, like high yielding variety (Kashi Udai) as developed from ICAR-IIVR Varanasi with crop rotation, seed rate, seed treatment, line sowing, manures and fertilizers, plant protection measures, intercultural operations and harvesting at proper maturity were followed whereas in the farmers existing practices (control plot) on Dentame matar, poletype were also followed. Before conducting the demonstrations selected farmers of the districts were trained to identify technologies. Procedure for site and farmers selection, layout of demonstration and farmers participation etc were followed as per the

methodology followed by Choudhury (1999). Farmers visits and field day were organized at demonstration plots to show the significance of large scale cultivation of pea. Yield attributes data were collected from demonstration plots as well as existing farmer's practices (control plots) and per cent increase yield, income, benefit cost ratio and extension gap, technology gap, technology index were calculated and analyzed.

Technology gap = Potential yield - Demonstration yield
Extension gap = Demonstration yield - yield under existing practice

Table 1: Comparison between demonstration practice (FLD) and existing farmers practice in agronomical packages of vegetable pea

| Particulars | Vegetable pea | |
|----------------------------------|---|--|
| | Demonstration practice | Existing practice |
| Farming situation | Irrigated plain field | Irrigated plain field |
| Variety | Kashi Udai | Local |
| Sowing time | 20 th October to 25 th November | 20 th October to 25 th November |
| Seed rate | 160 kg/ha | 180 kg/ha |
| Sowing method | Line sowing (30 x 10 cm) | Broad casting |
| Manure & Fertilizers application | FYM/compost-50 q/ha, Nitrogen-60 kg/ha, Phosphorous-40 kg/ha, Potash-40 kg/ha | FYM/compost-150 q/ha, Nitrogen-40 kg/ha, Phosphorous-60 kg/ha, Potash-50 kg/ha |
| Plant protection | Spray wettable sulphur 2g/lit | Nil |
| Weeding | Two weeding manual | One weeding manual |

RESULTS AND DISCUSSION

Data pertaining to plant height, no. of pods per plant and no. of seeds per pod in Table 2 which are affected the yield of demonstrations. In this study, during the demonstration period of 4 years in both the districts, average no. of pods per

plant and no. of seeds per pod were observed 9.13 and 8.13 which is higher than existing farmers' practice 7.33 and 6.33 respectively. While the average plant height was noted more with the existing farmers practice.

Table 2: Yield attributes under demonstrated and farmers existing practices

| Years | Districts | Plant height (cm) | | No. of pods per plant | | No. of seeds per pod | |
|---------|------------|-------------------|-------------------|-----------------------|-------------------|----------------------|-------------------|
| | | FLD | Existing Practice | FLD | Existing Practice | FLD | Existing Practice |
| 2014-15 | Deoria | 47.5 | 57.6 | 9.4 | 7.7 | 8.4 | 6.7 |
| 2015-16 | | 43.2 | 55.7 | 9.2 | 7.5 | 8.2 | 6.4 |
| 2016-17 | | 45.3 | 53.4 | 9.0 | 7.2 | 8.1 | 6.2 |
| 2017-18 | Kushinagar | 44.0 | 58.0 | 8.9 | 6.9 | 7.8 | 6.0 |
| | Average | 45.0 | 56.4 | 9.13 | 7.33 | 8.13 | 6.33 |

Data pertaining to experiment total pod yield, yield gaps (Technological and Extension gaps) and Technology index (%) is presented in Table 3. Technological gap, which is the difference between potential and demonstration yield was ranging between 21.7 -27.5 q/ha. The extension gaps, which is the difference between demonstration and existing farmers practice yield ranged from 15.0 – 25.3 q/ha was found during the period of study. However, overall average extension gap was noticed 18.9 q/ha. Extension gap indicates that there is a tremendous scope of extension activities in the region. The recommended packages of practices with high yielding

variety will definitely increase the yield and subsequently reduce the extension gap. This high extension gap requires urgent attention from planners, Scientists, Extension personnel and development departments. Similar findings were reported by Patel *et al.* (2013) and Sharma and Sharma (2004).

The income and benefit cost ratio of front line demonstrations are presented in Table 3 clearly revealed that, the benefit with BC ratio from recommended practice were significantly higher than control plot *i.e.* farmers existing practice over

Table 4: Economic indicators of demonstration and existing practices of vegetable pea

| Years | Districts | Average Gross Return (Rs./ha) | | Average Net Profit (Rs./ha) | | Benefit Cost Ratio | |
|---------|------------|-------------------------------|-------------------|-----------------------------|-------------------|--------------------|-------------------|
| | | FLD | Existing Practice | FLD | Existing Practice | FLD | Existing Practice |
| 2014-15 | Deoria | 245750.00 | 195000.00 | 209330.00 | 148895.00 | 5.2:1 | 4.2:1 |
| 2015-16 | | 240500.00 | 183840.00 | 191900.00 | 139040.00 | 4.9:1 | 4.1:1 |
| 2016-17 | | 188400.00 | 164850.00 | 139200.00 | 119250.00 | 3.8:1 | 3.6:1 |
| 2017-18 | Kushinagar | 138750.00 | 112375.00 | 90350.00 | 69075.00 | 2.9:1 | 2.6:1 |
| | Average | 203350.00 | 164016.00 | 157695.00 | 119065.00 | 4.2:1 | 3.6 |

study of four years. During the study period net profit ranging Rs.90350–209330 was revealed with the recommended practice while Rs. 69075–148895 from the farmers existing practice. However, an average per hectare net profit from the demonstrations was recorded Rs. 157695 while from existing farmers practices Rs. 119065. The overall average net profit from recommended practice was observed 32.44 % higher than existing farmers practice. The variation in the net profit could be due to productivity, weather and price variation during the study years. In general, benefit cost ratio of demonstrated and farmers practice were noticed 4.2:1 and 3.6:1 respectively. Hence, favourable benefit cost ratios proved the economic viability of the intervention made under demonstration and convinced the farmers on the utility of intervention. Similar findings were reported by Sharma (2003) in moth bean and Gurumukhi and Mishra (2003) in sorghum.

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CONCLUSION

The findings of the study revealed that ample gap existed in potential and demonstration yield in high yielding vegetable pea variety due to technology and extension gap in eastern Uttar Pradesh. By conducting front line demonstrations of proven technologies, yield potential of vegetable pea can be increased to a great extent.

This will significantly enhance the income as well as the livelihood of the farming community. The study emphasize that the needs to educate the farmers in adoption of improved technology to narrow the extension gap through various technology transfer centre like KVKs. Therefore it is suggested that these factors may be taken for consideration to increase the scientific temperament of the farmers.

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