J Krishi Vigyan 2021, 10 (1) : 123-132 DOI : 10.5958/2349-4433.2021.00078.7

Improved Management Practices of Garden pea (*Pisum sativum* L.) Produced Higher Yield in Karbi Anglong District of Assam

Shourov Dutta and Prakshipta Boruah

Krishi Vigyan Kendra, Karbi Anglong, Assam Agricultural University
Diphu-782 460

ABSTRACT

Vegetables are very well grown in Karbi Anglong district due to its favourable climatic conditions. Out of all the major vegetables, garden pea is a popular crop out here. Due to the insufficient knowledge regarding the scientific management of the crop, farmers were not able to reap the maximum returns out of it. Under such circumstances, Krishi Vigyan Kendra, Karbi Anglong conducted demonstration programmes during the year 2019-20 and 2020-21 on scientific cultivation of Garden pea. Results revealed that the technology demonstrated had obtained higher plant height (51.94 cm), number of branches per plant (16.3 no) and days to flowering (41.58 d) than the farmers' practice which were 45.83 cm, 15.63 nos. and 52.17 days, respectively. In addition to that, the pod yield was higher in the demonstration plot (58.12 q/ha) than the farmers' practice which ended up its yield up to 46.84 q/ ha only. Moreover, the gross return in case of the scientific technology showed encouraging results (Rs. 205415/ha in 2019-20 and Rs. 201425/ ha in 2020-21) during both years. Whereas, the practice followed by the farmers obtained a return of Rs. 144960/ha in 2019-20 and Rs. 136110/ha in 2020-21.

Key Words: Arkel, Garden pea, Improved practice, Karbi Anglong, Vegetables.

INTRODUCTION

Garden pea (*Pisum sativum*) is one of the most important cool season vegetable crop grown almost throughout the country. It is one of the main crop in Karbi Anglong district. The plant foliage can be used as a fodder for cattle and green pods are highly nutritive and so are preferred for culinary purposes. Important constituents like digestible protein (7.2 g), carbohydrates (15.8 g), vitamin A (139 I.U.), vitamin C (9 mg), magnesium (34 mg) and phosphorus (139 mg) are present per 100 g of edible portion (Gopalkrishnan, 2007). Garden pea is a leguminous crop and therefore it fixes atmospheric nitrogen to soil and thus maintains the soil fertility. It is also been reported to fix residual nitrogen up to 50-60 kg/ha in soil (Negi *et al*, 2006). It can be grown in a wide range of soils with proper drainage facilities but, best pH ranges from 5.5 to 6.5.

Karbi Anglong is one of the three hill districts of Assam and is very suitable to a wide range of horticultural crops. Some vegetable growing pockets are present in the district *viz*., Barlangpher, Sariahjan, Bokolia, Rajapathar, Patradisha, Taralangso, Longnit *etc.* Under pea cultivation the district covers an area of 42 ha with an average production of 6015 kg/ha. Karbi Anglong receives an annual rainfall of 1121.50 mm with an average temperature range of 10°C to 30°C which makes it congenital for pea cultivation. Peas are rich source of protein and thus play an important role to maintain a healthy daily diet. As a result, the area under pea cultivation should be increased to meet the nutrition requirement for the increasing population. Under such circumstances, good agricultural practices like proper time of sowing, timely manuring and fertilization, proper irrigation facilities, weeding, appropriate plant protection measures, *etc.* has become an integral part in increasing the productivity. The crop is cultivated widely in the district but the farmers are not doing

Corresponding Author's Email: shourov.dutta6@gmail.com

Table 1. Package of practices followed during the demonstration in both the plots.

Particular	Technology demonstration plot	Farmers' practice
Time of Sowing	Mid October	November to December
Seed rate	50 Kg/ha	No any specific rate followed usually use 90 kg/ha
Variety	Arkel (2019-20); AP3 (2020-21)	Non-descript seeds
Spacing	30 cm × 10 cm	Broadcasting, no line sowing is followed.
Fertilizer dose	N: P_2O_5 @ 20:45 Kg/ ha	Non judicious use of fertilizer, generally 60 kg Urea and 45 kg DAP/ha is followed
Irrigations	One irrigation at 40-50 DAS	No irrigation is done
Plant protection	Neem based insecticides	No use of chemicals or botanicals

it scientifically. Therefore, an effort has been made by the Krishi Vigyan Kendra, Karbi Anglong by conducting multiple demonstrations on garden pea under the North East Hill.

MATERIALS AND METHODS

Krishi Vigyan Kendra, Karbi Anglong conducted demonstrations under NEH programme to disseminate the technology of improved cultivation practices of garden pea using variety Arkel in 2019-20 and the variety AP 3 in 2020-21. The demonstrations were carried out covering an area of around 8.6 ha with 36 farmers. The villages selected for the demonstrations were Bhetagaon, Rongnihang, Sunpura, Manja, Bokolia, Sombudhon and Daujingphang. Under the technology demonstration plot, the land selected was with deeply worked soils and ploughed 2-3 times to obtain a good tilth. The package of practices followed in both the demonstration plots *i.e.,* the technology demonstration plot and the plot under farmers' practice are depicted in the Table 1. The data like plant height, pod length, number of pods per plant, number of seeds per pod, fresh pod yield, gross return, net return and B:C ratio were recorded. The technology gap, extension gap and technology index were calculated by using the following formula as given below (Samui *et al,* 2000).

Technology gap = Potential yield (q/ha) – Demonstration yield (q/ha)

RESULTS AND DISCUSSIONS

Growth parameters

The data (Table 2) revealed that the plant height in both the year was found higher in the improved practice (51.97 cm) than the farmers' practice (45.83 cm). This may be due to the favourable climatic conditions prevailing in this hill district. The result was in conformity with Sharma *et al* (2020). Similar results were also reported by Bozoglu *et al* (2007) and Shah *et al* (2016). In case of number of branches per plant, both the cultivation practices showed a slightly different behaviour. The higher number of branches was found in the demonstration (16.30) than the farmers' practice (14.99). This might be due to equal absorption of minerals and nutrients from soil by the cultivars of both the practices at the same time. The variations could be also due to the germplasm or climatic conditions (Wadan *et al*, 1993). Variation has been found in case of days to flowering in both the cultivation methods. The demonstration plot with improved practice had an early flowering (41.58) whereas, after around 11 days flowering has been seen in the farmers' practice (52.17). Similar results have also been reported by Khichi *et al* (2017). The cultivar which flowers early was found to have comparatively early maturity (Ozdemir, 2002). This might be the reason behind the lesser number of days to pod picking of the improved practice (59.33d) in comparison to the farmers' practice (65.45d). Similar results were also reported by Sharma *et al* (2020).

Table 2. Effect on growth parameters.

Cultivation practice	Plant height			No. of branches/plant			Days to flowering			Days to first pod picking		
	A	B	Mean	A	B	Mean	A	B	Mean	A	B	Mean
Improved practice	53.27	50.67	51.97	16.48	16.12	16.3	40.54	42.62	41.58	58.36	60.31	59.33
Farmers' practice	45.36	46.31	45.83	14.36	15.63	14.99	53.31	51.04	52.17	66.25	64.66	65.45

A-2019 and B-2020

Yield and yield attributes

Various yield attributes were studied during the study (Table 3) like number of pods per plant, pod length, pod weight, number of seeds/pod and pod yield ha^{-1} which has been detailed as below.

In the study, it has clearly come out that the improved cultivation of garden pea has higher number of pods per plant (13.15) than the farmers' practice (10.70). From the earlier discussions it can be understood that maximum growth was found in the improved practice than the farmers practice during the crop establishment period and this might be the reason of higher number of pods in the former one (Muehlbauer and McPhee, 1997). These results are in line with the findings reported by Kumar *et al* (2018). The pod length in both the cases was not found to have a much difference (Table 3). Many workers in their earlier study reported that pea cultivars vary highly in pod length and number of seeds (Kakar *et al*, 2002). Pod weight in case of improve method was 3.85g whereas it was 3.42g by the method generally used by the farmers. This might be due to the reason that the cultivars possess certain inherent potential and their interaction with soil and climatic conditions (Khichi *et al*, 2017). Higher seed per pod (8.59) was evident in the demonstration plot on the other hand, the check plot was found to have a lesser number of seed per pod (6.74). It might be due to the varietal characteristics used in both the practices. Makasheva (1983) and Amjad *et al* (2002) stated similar statements in their findings. Moreover, Arshad *et al*(1998) also observed that numbers of seeds are correlated with pod length.

Huge difference has been observed in case of pod yield per hectare in case of both the cultivation practices. The higher yield was found in case of the demonstration plot (58.12 q/ha) and lower results have been shown by the check plot or farmers' practice (46.84 q/ha). This might have resulted due to a greater number of branches per plant with higher numbers of pods per plant, moreover,

Table 3. Effect demonstration on yield and yield attributes.

Cultivation practice	No. of pods/plant			Pod length			Pod weight			Number of seeds/pod			Pod yield/ha		
	A	B	Mean	A	B	Mean	A	B	Mean	A	B	Mean	A	B	Mean
Improved practice	13.83	12.48	13.155	7.13	8.02	7.575	3.69	4.01	3.85	8.98	8.2	8.59	58.69	57.55	58.12
Farmers' practice	10.28	11.13	10.705	6.89	6.56	6.725	3.23	3.62	3.425	7.03	6.46	6.745	48.32	45.37	46.845

Table 4. Analysis of Technology gap, Extension gap and Technology index.

Year	Area (ha)	No. of farmers	Pod yield (q/ha)			Per cent increase	Tech. Gap (q/ha)	Extension gap (q/ha)	Tech. Index (%)
			Potential	Demo	Farmers' practice (Control)				
2019-20	4.93	19	60.0	58.69	48.32	21.46	1.31	10.37	2.18
2020-21	4.13	17	60.0	57.55	45.37	26.84	2.45	12.18	4.08

inherent characters of the varieties and prevailed favourable conditions of the location. Additionally, enhanced yielding ability might also be due to its genetic potential and better adaptability to the soil and climatic conditions (Khichi *et al,* 2016).

Yield gap

In the present study, the yield gap was analyzed in the form of technology gap and extension gap (Table 4). From the data, it can be inferred that the technology gap is much lesser in both the years (1.31 q/ha and 2.45 q/ha) which reflects the sincerity and seriousness of the farmers in conducting the demonstration. This gap might have resulted due to the varying soil fertility status and weather conditions. A huge extension gap has been seen (10.37 q/ha and 12.18 q/ha) in both the years. The majority farmers in this hill districts belongs to the tribal community and they are very reluctant to adopt any new technology. Thus, an extension gap has been created which depicts that more extension techniques should be applied for the effective adaptation of the technologies by the farmers. Technology gap exhibits the feasibility of the technology in the farmers' field conditions. From the Table 4, it has been found that the demonstration plot has a technology index of 2.18 per cent which was a lesser one and thus explains the feasibility of the technology because lower the value of technology index, more the feasibility of the technology (Jeengar *et al,* 2006).

Economics

Cost of cultivation and returns were calculated by the prices of the inputs required and the market value of the crop at the location where the study was conducted. In both the years it has been found that the improved practice has got a higher Benefit Cost ratio than the farmers' practice (Table 5). The total cost of cultivation in the year 2019-20 was Rs. 58977/- and in the year 2020-21 was Rs. 59177/- in the demonstration plot whereas, in case of the farmers' practice it was Rs. 62955/- and Rs. 65420/- in 2019-20 and 2020-21, respectively. Since, the demonstration plot has higher yield therefore, the gross return was Rs. 2,05,415/- in 2019-20 and Rs. 2,01,425/- in 2020-21 with a B:C ratio of 3.48 and 3.40, respectively. But, in case of the check/farmers' practice it could manage only up to 2.30 and 2.08 for the year 2019-20 and 2020-21, respectively.

CONCLUSION

From the study, it could be finally concluded that the improved cultivation practice of garden pea cultivation has a remarkable role in benefitting the farmers in getting higher returns than the existing

Table 5. Effect of the demonstration on Gross cost (Rs./ha), Gross return (Rs./ha), Net return (Rs./ha) and B:C ratio.

Method of practices	Gross cost (Rs.)		Gross return (Rs.)		Net return (Rs.)		B:C ratio	
	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
Improved practice	58977	59177	205415	201425	146438	142248	3.48	3.40
Farmers' practice	62955	65420	144960	136110	82005	70690	2.30	2.08

practice followed by them. Since, the crop is very much favourable to the climatic conditions prevailed in the district; efforts should be done to spread the technology horizontally to cover more area under garden pea cultivation. Moreover, the extension workers and the farmers together must work hard to minimise the technology gap in fruitful adaptation of these technologies which will finally help in increase the crop productivity of the district.

REFERENCES

Amjad M and Anjum M A (2002). Performance of nine pea cultivars under Faisalabad conditions. *Pakistan J Agril Sci* **39**(1): 16-19.

Arshad M, Hussain S A, Ali S A N, Muhammad N and Ziaullah. (1998). Screening of pea (*Pisum sativum* L.) cultivars in Kohat valley. *Sarhad J Agri* **14**(6): 559-562.

Bozoglu H E, Peksen A and Gulumser A (2007). Determination of the yield performance and harvesting periods of fifteen pea (*Pisum sativum* L.) cultivars sown in autumn and spring. *Pakistan J Bot* **39**(6): 2017-2025.

Gopalkrishnan T R (2007). *Vegetable Crops*. New India Publishing Agency, New Delhi. 4. p. 170.

Jeengar K L, Panwar P and Pareek O P (2006). Front line demonstration on maize in bhilwara District of Rajasthan. *Current Agri* **30**(1/2): 115-116.

Kakar A A, Saleem M, Shah R and Shah S A Q (2002). Growth and marketable green pod yield performance of pea (*Pisum sativum* L.) under varying levels of NPK fertilizers. *Asian J Plant Sci* **1**(5): 532-534.

Khichi P, Chandan P M, Chauhan J, Srinivas J and Bhagat M. (2016). Varietal evaluation of garden pea under semi-arid conditions of Vidharba region. *Int J Farm Sci* **6**(1): 20-24.

Khichi P, Pant R and Upadhayay S (2017). Performance of garden pea varieties for their growth and yield characteristics in Vidharbha region of Maharashtra, India. *J Appl Nat Sci* **9**(4): 2300-2304

Kumar S V, Datta S and Basfore S (2018). Performance of Garden Pea (*Pisum sativum* var *hortense L.*) Varieties under Conventional and Organic Nutrient Sources under Sub-Himalayan Foot Hills of West Bengal, India. *Int J Curr Microbiol Appl Sci.* **7**(7): 3231-3241.

Makasheva R K (1983). The pea. *Oxonian Press Pvt Ltd* New Delhi India. Pp. 78-107.

Muehlbauer E J and McPhee K E (1997). *Peas.* In The Physiology of Vegetable Crops (Ed. H C Wein). CAB International, Wallingford, UK. pp. 429-459.

Negi S, Singh R V, Dwivedi O K (2006). Effect of Biofertilizers, nutrient sources and lime on growth and yield of garden pea. *Legume Res* **29**(4): 282-285.

Ozdemir S (2002). Yemeklik Baklagiller. *Hasad Yayıncılık Ltd. Sti*. Pp. 142.

Samui S K, Maitra S, Roy D K, Mandal A K and Saha D (2000). Evaluation of front line demonstration on groundnut. *J Indian Soc Coastal Agric Res* **18**: 180-183

Shah B H, Hamid F S, Islam S U, Fayaz A, Sohail A and Khan N (2016). Evaluation of different pea (*Pisum sativum* L.) genotypes for yield and other attributes at Shinkiari, Mansehra. *Pakistan J Agri Res* **29**(4):323-330.

Sharma D, Chauhan A and Jarial K (2020). Performance of Pea Varieties in Different Altitude Ranges under North-Western Himalayan Region. *Int J Curr Microbiol Appl Sci* **9**(6): 3292-3302.

Wadan D, Khan M. and Majeed A (1993). Performance of pea cultivars in various agro climatic conditions of Swat. *Sarhad J Agri* **9**(2): 139-143.

Received on 31/5/2021 *Accepted on 12/8/2021*