

Enhancing field pea productivity

through varietal replacement

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The productivity of pulse crops is decreasing in the grain bowl of the Central portion of the plateau of Bundelkhand region of Madhya Pradesh. The district, state and national productivity of field pea grain is poised at 9.81, 10.49 and 9.40q/ha against the varietal potential of 20-22 q/ha as the farmers have not adopted suitable package and practices along with improved varieties rather following their own conventional practices. In this situation, KVK Chhatarpur introduced the dual purpose improved dwarf variety of field pea (Harith-IPFD 10-12) under National Food Security Mission programme during rabi 2019-20 besides creating awareness among farmers about the balanced dose of fertilizers along with biofertilizers. Farmers adopted the improved production technology of field pea crop and received the higher grain and fresh pod production (17.8 and 80 q/ha) as well as net income (₹ 3990 and 71800/ha) as compared to their own traditional system of farming (8.2 & 55 q/ha and ₹ 6610 & 27500/ha) respectively. Moreover, cultivation of field pea crop using Harith-IPFD 10-12 along with appropriate production technology brought out the changes in social and economic status of the farmers. Similar growth was also recorded in other high economic crops owing to the technical assistance provided by the scientists of KVK at regular interval which also improved economic condition of the farmers.

Keywords: Bundelkhand, Field pea, Pulse

The smooth green-seeded varieties of field pea are used for human consumption as fresh and dry split. Field pea has high levels of the essential amino acids viz. lysine and tryptophan, which are usually low in cereal grains. Other favourable attributes are its beneficial effects on soil fertility through nitrogen fixation in root nodules. During field visit and several meetings with farmers in operational area of KVK Chhatarpur such as Badagaong/ Taparian village, Block Bijawar and district Chhatarpur, it was found that chickpea crop was the predominant crop under cropping system (Greengram/Blackgram-Chickpea) during *rabi* season and very few areas engaged under field pea crop in *rabi* season. While this predominated cropping system was adversely affected by both sudden downpour of heavy rainfall or

long dry spell during *kharif* season and maximum wilt infestation in chickpea was also observed in each year *rabi* season. In this situation, most of the farmers were growing *Lathyrus* in the place of field pea for fulfilling requirement of other

pulses to human beings. Generally, farmers were not cultivating the field pea/vegetable pea crop as farmers were unaware about suitable package and practices of field pea. Therefore, farmers were getting very low productivity of



50% flowering stage

Nodulation and yield attributes

Important parameter	Findings/results	
	Variety/ Practice/Intervention	Local/control
Germination	85%	80
Plant population (per m ²) :	12	12
Nodule number/plant	19	13
Nodule diameter (mm) :	5.2	3.5
Plant height (per cm)	65	85
Pods/ plant (No.) :	17	12
No.of grain/pod	9	5
Yield (q/ha) :	17.8	8.2

802 kg/ha in Block-Bijawar, district Chhatarpur of Madhya Pradesh against District, State and National productivity (981, 1049 and 940 kg/ha during 2016-17) respectively and their varietal potential of field pea (20-22 q/ha). There were several reasons for low productivity of field pea crop viz. lack of knowledge about suitable package and practices, unavailability of improved varieties, use of imbalanced dose of fertilizers and inappropriate plant protection measures etc. Under such circumstances, the scientists of KVK Chhatarpur introduced the improved production technologies of field pea crop such as introduction of dual purpose (Vegetable pea or split dal) improved variety (Harith, IPFD 10-12), use of 75% recommended dose of fertilizers (N: P: K 20:60:20 kg/ha), line sowing with seed drill, treatment of seeds with systemic fungicide (Carboxin + thiram @ 2 g/kg seed) and specific bacterial association for nitrogen fixation in field pea is with the bacterium *Rhizobium leguminosarum* and soil application of PSB and KSB @

5 kg/ha along with 75% recommended dose of fertilizers. Field pea crop is a good substitute of chick pea crop as the wilt and dry root rot disease of chick pea reduce the yield up to 50-70% which depends on the severity of the disease during *rabi* season and similar harmful effect on blackgram/chickpea crop by YMV and wilt. In this situation, field pea crop growing in cool season is necessary for optimum field pea production. In addition, Harith (IPFD 10-12) dual purpose dwarf cultivar of field pea is suitable for early (September) and late (December) sowing in irrigated conditions. The average fresh vegetable and grain yield of the cultivar is 100 and 22 q/ha.

Varietal performance

This elite green seeded dwarf field pea variety Harith (IPFD 10-12) was released by Indian Institute of Pulse research (IIPR) Kanpur during 2016-17. The variety matures in 110 days and has 100 seed of about 16.4 g. Grains are bold, round, smooth and attractive green colored. These are use in both way either

green pod for vegetable purpose or dry seed for split dal/besan were the key of success of the demonstration.

KVK Intervention

Smt. Anita Lodhi, W/o Shri Bahadur Lodhi, Vill. Badagaon, block Bijawar, district Chhatarpur is a marginal women farmer. Agriculture is the main source of their income to fulfill all the basic requirements of her family. Before introduction with scientist of Krishi Vigyan Kendra (Chhatarpur), she was unable to get higher crop production as she was ignorant of the improved agricultural technologies such as improved varieties, optimum seed rate, line sowing, seed treatment, appropriate plant protection measures etc. However, she was very curious to learn new things to raise her income level. Since she is a marginal farmer and her village is close to Bijawar Block, hence, KVK Chhatarpur emphasized to initiate the cultivation of field pea for vegetable purpose and cereal crops to raise the income of farmers. In view of this, she started cultivation of dual purpose field pea variety Harith (IPFD 10-12) for consumption of fresh vegetable or split dal. In addition, KVK Chhatarpur also supported the farmer by providing improved variety of Mustard and Chickpea (RVM 2 and RVG 202) along with trainings, krishak sangoshthi and field visits at regular interval to update their knowledge regarding day-by-day advances in agriculture. Thus, the farmer has adopted this technology and raised her income level to improve their livelihood.

Performance of biofertilizers on nodulation and yield attributes

The biofertilizers seed treatment with *Rhizobium leguminosorum* @ 10 g/kg seed and soil application of PSB & KSB @ 5 kg/ha along with application of 75% recommended dose of fertilizers significantly enhanced the yield, yield attributes and nodulation under this treatment. This technology is suitable for Bundelkhand region because soil fertility level is very poor due to imbalance and indiscriminate use



Flowering to pod formation stage



Pod filling stage-I



Pod filling stage-II

of fertilizers. In this situation, above mentioned combined application of inorganic fertilizers and biofertilizers are more beneficial for better supply of plant nutrients and provide good physical, chemical and biological condition in root zone which professed root development and improve mobility of Rhizobia in rhizosphere of root zone. This ultimately resulted in more nodulation due to the promotion of symbiotic process between legume crop root and the bacteria responsible which increased the nitrogenase activity that can be related to the improved photosynthetic process which ultimately increased the nitrogen fixation. Therefore sufficient availability of nitrogen in root zone facilitates exchange of ion reactions of roots thereby enabling them to absorb more phosphorus and potash from the soil thus N P and K might have been utilized in greater quantities due to their abundant availability. The nitrogen fixing capability in legume can be judged by the accumulation in the root nodule diameter. The fixed phosphorus and potash in the soil can be solubilized by the use of PSB and KSB, which have the capacity to convert inorganic unavailable phosphorus and potash form to soluble forms through the process of

organic acid production, chelation and ion exchange reactions and make them available to plants.

In this regard, Smt. Anita Lodhi, a progressive farmer women adopted the improved production technology of field pea crop and received the higher production of dry grain and fresh pod (17.8 and 80 q/ha) as well as net income (₹ 39090 and ₹6610 & 27500/ha) as compared to traditional system of farming (8.2 & 55 q/ha and ₹6610 & 27500/ha) respectively. Thus cultivation of field pea crop using improved cultivar (Harith, IPFD 10-12) along with appropriate production technology brought out the changes in social and living status of the farmer. Similar growth was also recorded in other crops which also impart improvement in economic condition of the farmer by providing technical assistance by the scientists of KVK at regular interval.

Impact of technology: The adoption of this technology contributed to raise the income level of the farmer which brought out positive socio-economic changes in her life. She has inspired the other farming community especially marginal farmers in the village and adjoining village to adopt this technology. The horizontal spread of this technology is very fast and currently 30 farmers

have been purchased seed as a fellow farmers in the village and adjoining village. It could be possible mainly due to effective dissemination of improved variety and production technique (Harith) of field pea crop by bringing awareness among farmers and farm women along with RAO of the village through various field-oriented activities, training programme and availability of literature related to package and practices of Field pea crop.

Feedback of field pea growers

Adoption of a given variety (Harith, IPFD 10-12) is usually a process, which passes through awareness about the variety, assessment of the expected returns from the variety, the farmer may then decide to grow. Good performance of the variety was observed during



Pod formation stage

Economic analysis of the technology

Used practice		Yield (q/ha)	Cost of Cultivation (₹)	Gross income (₹/ha)	Net income (₹/ha)	B:C ratio
Farmer practices	Dry grains	8.2	22500	29110	6610	1.3
	Fresh Vegetable	55	27500	55000	27500	2.0
Demonstration	Dry grains	17.8	23200	63190	39990	2.7
	Fresh Vegetable	80	28200	100000	71800	3.5

evaluation with the farmers. For getting feedback about the variety, farmers were interviewed through group meeting in the study area. The farmers decided to switch off the other variety and adopt this improved variety.

SUMMARY

Decrease in the productivity of field pea was observed due to lack of knowledge about dual purpose field pea variety and their suitable package and practices. In this situation, KVK (Chhatarpur), introduced high yielding dual purpose dwarf variety of field pea (Harith- IPFD 10-12) along with

suitable package and practices. Because farmers could obtain up to optimum field pea yield which resulted in the higher grain or fresh pod production (17.8 or 80 q/ha) as well as net income (₹ 39990 or 71800/ha) as compared to their own traditional system of farming (8.2 or 55 q/ha and ₹ 6610 or 27500/ha) respectively. Besides these, dual-purpose improved variety of field pea is more profitable at farmer's field through sell out of fresh pea for vegetables purpose in high market value situation to gain maximum remuneration. Besides these, if market value is low, farmers should decide switch off picking of fresh

pea and they harvest this crop at full maturity to store as field pea. Because farmers will sell out in future when their market value will become high. In addition, dual purpose dwarf cultivar of field pea is suitable for early and late sown in irrigated situation. Grains are bold round smooth and attractive for green colored. These are use in both way either green pod for vegetable purpose or dry seed for split dal/ besan were the key of success of the demonstration.

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