

Original Research Article

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## Impact Assessment through Technology Transfer for Increasing Productivity of Pigeonpea in Surguja District, India

Ravindra Tigga<sup>1</sup> and Satyapal Singh<sup>2\*</sup>

<sup>1</sup>Krishi Vigyan Kendra, Ambikapur, District- Surguja, India

<sup>2</sup>Department of Genetics and Plant Breeding, College of Agriculture, Raipur  
Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh-492012, India

\*Corresponding author

### ABSTRACT

Pigeon pea is one of the major *kharif* crop grown in district. Farm Science Center known as Krishi Vigyan Kendra laid down Front Line Demonstration in the year 2017-18 to 2018-19 introducing new and high yielding varieties and applying scientific practices in their cultivation. The FLDs were carried out in different villages of Batauli block of surguja district. Highest grain yield was obtained from obtained from Bataikela (11.65 q/ha) followed by Jarahadih (11.35 q/ha.), Nakna (10.50 q/ha), Boda (10.45 q/ha) and minimum average grain yield found in Maheshpur (10.40 q/ha). Hence, increased the yield 15.33 % after intervention of Krishi Vigyan Kendra Ambikapur. The variation in the yield was found due to the lack of knowledge, and poor socio economic condition. It is concluded that the FLDs programmes were effective in changing attitude, skill and knowledge of improved package and practices of HYV of pigeon pea adoption.

#### Keywords

FLDs, Field practices, Impact, Pigeon pea, Yield

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### Introduction

Pigeon pea (*Cajanus cajan* L.) is one of the important pulse, plays a vital role in daily diet. It is also known as red gram, tuar etc. and is the second most important pulse crops of India after chickpea it is occupying an area of 35 lakh ha with a production of 19 lakh tones with an average productivity of 753 kg ha<sup>-1</sup>

(Anonymous, 2014b). India has a virtual monopoly in pigeon pea production by accounting 90 per cent of world's total production. Pigeon pea is one of the protein rich legume crops of semi-arid and sub tropics and domestic requirement. This crop has the privilege of occupying the first place both in area and production among *kharif* grown legumes. Although pigeon pea ranks sixth in

area and production in the world in comparison to other grain legumes such as beans, peas and chickpeas, it is used in more diverse ways than others (Nene and Sheila, 1990).

Pigeon pea has a wide range of products, including the dried seed, pods and immature seeds used as green vegetables, leaves and stems used for fodder and the dry stems as fuel. It also improves soil fertility through nitrogen fixation as well as from the leaf fall and recycling of the nutrients (Snapp *et al.*, 2002). It is an important pulse crop that performs well in poor soils and regions where moisture availability is unreliable or inadequate (Reddy *et al.*, 1993). The crop can withstand low moisture condition and performs well in areas with less than 1000 mm of annual rainfall, depending on the distribution pattern. Pigeon pea can be intercropped with crops such as maize, sorghum or groundnuts without significantly reducing the yield of the main crop. Intercropping with maize and groundnuts is very common in Malawi. Its grain is of high nutritional value with high protein content that ranges from 21% to over 25%, making it very valuable for improving food security and nutrition for many poor families who cannot afford dairy and meat-based diets.

## **Materials and Methods**

Further nine villages were selected for data collection (Table 1). A sample of 30 farmers from each village was selected by using probability proportional to size (PPS) method. Data were collected by Krishi vigyan Kendra, Indira Gandhi Krishi Vishwavidyalaya, Ambikapur, Surguja, Chhattisgarh. It is Situated at N 23°8'22" latitude, E 83°8'55" longitude and altitude of 558m above mean sea level. The data in which the empirical model is based were drawn from a sample size of hundred farmers (includes fifty seed

growers and fifty grain growers of pigeon pea) in Surguja district using random sampling procedure. Structured questionnaire was used in collecting information from the farmers and primary sample survey was conducted in selected village of Surguja district (Fig. 1). Purposive sampling procedure was used for selecting the study area having highest area under pigeon pea. Data on socioeconomic parameters, various inputs used in the grain and seed production of pigeon pea, and their costs and returns were collected for the agricultural year 2017-2018 and 2018-2019. Data collected from two years cultivation practices and observation recorded from farmer's field. Krishi Vigyan Kendra an innovative science based institution plays an important role in bringing the research scientists face to face with farmers.

The main aim of Krishi Vigyan Kendra is to reduce the time lag between generation of technology at the research institution and its transfer to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis. KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different micro farming situation at district (Singh *et al.*, 2016). Front line demonstration is a long term educational activity conducted in a systematic manner in farmer's field to worth of new practices/ technology (Table 2).

## **Results and Discussion**

### **Socio-economic characteristics of the farmers**

The studied socio-economic variables were gender, age, education, and total land holding. 53% of the household heads were male while 47 % were female indicating that most households are male headed. This implies that

farming community is dominated by males. Majority (60 %) of the farmers were between the ages of 37 to 59 years. 14% of the household heads were illiterate while only 11 % had gained higher secondary education. Low literacy level thus can have negative impacts on crop production. Nwele (2016) reported that education can influence decision making process of the farmers such as adoption of farm innovation. Educated farmers can deal with traders in a better way.

**Yield of pigeon pea varieties**

Highest grain yield was obtained from Bataikela (8.75 q/ha) followed by Boda (8.35 q/ha), Jarahadih (7.70 q/ha.), Nakna (7.60 q/ha) and minimum average grain yield found in Maheshpur (7.50 q/ha) before intervention of KVK Ambikapur as shown in Table 3.

Yield variation may be associated with cultivation practices, degree of disease and pest incidence and management practices. Krishi Vigyan Kendra Ambikapur support and provide recommended practices to the farmers to increase yield. After intervention highest grain yield was obtained from obtained from Bataikela (11.65 q/ha) followed by Jarahadih (11.35 q/ha.), Nakna (10.50 q/ha), Boda (10.45 q/ha) and minimum average grain yield found in Maheshpur (10.40 q/ha) (Table 3). Hence, It is revealed that pigeon pea yield increased 15.33 % after intervention of Krishi Vigyan Kendra Ambikapur (Fig. 2).

**Challenges in the cultivation of pigeon pea**

Barrier to widespread adoption of pigeonpea include land tenure, market, and availability of early maturing varieties. In the surguja where the crop is widely cultivated by farmers, According to the farmers, the market for pigeonpea is not always readily available and return on investment is too slow. Among the native farmers, female and male farmers differed in the cultivation of legumes such as pigeonpea. Women farmers preferred pigeonpea over rice cultivation due to its role in food security as well as its low labour requirement (Adjei-Nsiah et.al. 2007). During focus group discussions in the field, the farmers noted that the late maturing pigeonpea varieties had produced a lot of biomass and had higher litterfalls compared with the early maturing varieties. The farmers observed and commented on the greater litterfall from the late maturing varieties. They further stated that the greater production of biomass and the higher litterfall of the late maturing varieties would lead to better soil fertility improvement compared with the early maturing pigeonpea varieties (Mapfumo *et al.*, 2001).

In addition to food uses, pigeon pea has outstanding soil improvement and conservation properties. The growth habit facilitates soil protection, as the canopy continues to expand during the dry season after the component crops in the mixed cropping have been harvested.

**Table.1** Selected villages under the study

Sr.	Villages	No. of H.H.	Population
1	Nakna	310	1358
2	Boda	258	1821
3	Maheshpur	423	2475
4	Bataikela	423	1874
5	Jarhadih	153	706
	<b>Total</b>	<b>1567</b>	<b>8234</b>

**Table.2** Intervention practices of the KVK, Ambikapur, Surguja

Sr.	Practices	Farmers' practices	Recommended Practices
1	Selection of Seeds	Old seed	Improved Seed
2	Date of Sowing	Too late	Timely showing
3	Sowing Method	Broadcasting	Line sowing
4	Fertilizer	No. fertilizer	Integrated nutrient management
5	Weed management	No or late or Hand weeding	Timely use of pre and post emergence weedicide
6	Plant Protection	Improper	Timely

**Table.3** Impact of Pigeon yield after intervention under study

Year	Before Intervention Yield (q/ha.)					Mean	After Intervention Yield (q/ha.)					Mean
	1	2	3	4	5		1	2	3	4	5	
2018	6.5	7.2	6.8	8.2	6.9	7.12	9.4	8.5	9.2	10.5	9.6	9.44
2019	8.7	9.5	8.2	9.3	8.5	8.84	11.6	12.4	11.6	12.8	13.1	12.30
Mean	<b>7.60</b>	<b>8.35</b>	<b>7.50</b>	<b>8.75</b>	<b>7.70</b>	<b>7.98</b>	<b>10.50</b>	<b>10.45</b>	<b>10.40</b>	<b>11.65</b>	<b>11.35</b>	<b>10.87</b>
SE	1.10	1.15	0.70	0.55	0.80		1.10	1.95	1.20	1.15	1.75	
CV	20.47	19.48	13.20	8.89	14.70		14.82	26.39	16.32	13.97	21.80	

Note: 1-Nakna, 2-Boda, 3-Maheshpur, 4-Bataikela, 5-Jarahadih

**Fig.1**

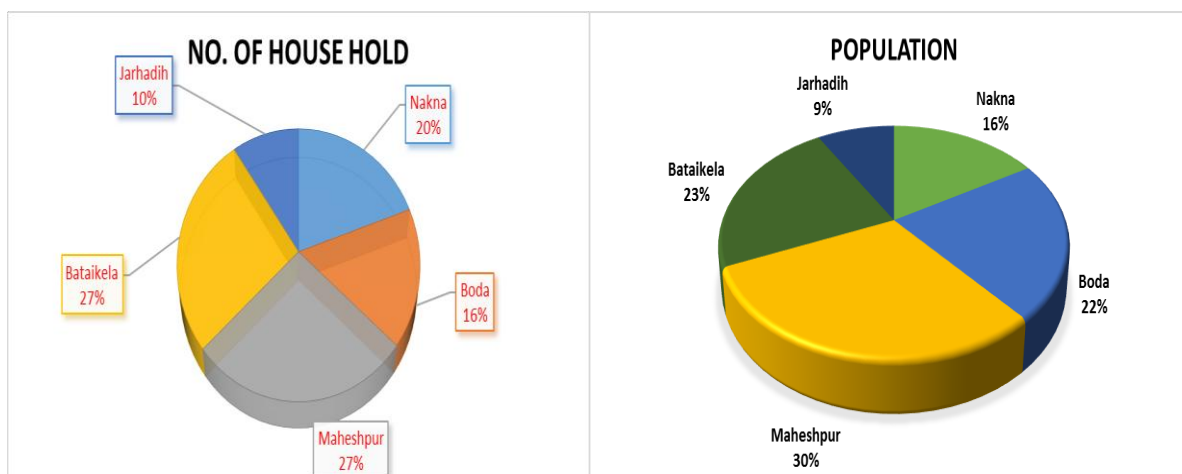
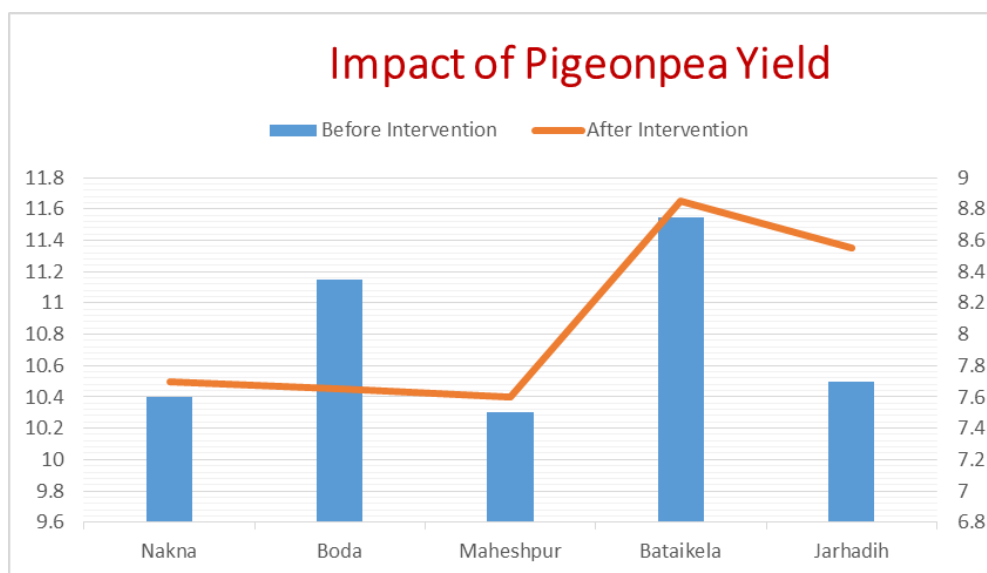


Fig.2



### Recommendation

The FLDs produces a significant positive result and provided the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (Intervention) under real farming situation, which they have been advocating for long time.

The productivity gain under FLDs over existing practices of pigeon pea cultivation created greater awareness and motivated the other farmers to adopt suitable production technology of pigeon pea in the district. Therefore, for enhancing the production & productivity of pigeon pea crop, strategy should be made for getting the more and more recommended technologies adopted by the farmers.

The average production for Pigeon pea in Bataikela and Nakna was very high. The majority of the farmers had obtained very low benefit compared to necessary investment for Pigeon pea cultivation.

Rajiv lochan is the most economic pigeon pea variety in terms of gross production in Bataikela and Jarhadih. This finding will help farmers to adopt cultivation practices with greater profitability. Following recommendations are suggested to increase Pigeonpea production in Batauli block of Surguja district.

Farmers should adopt proper cultivation practices so that crop varieties could express to their fullest genetic production potential.

Training on varietal selection and performance should be provided to the farmers.

Development of new technologies and provision of subsidies to the farmers will enhance farm production.

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