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IDENTIFICATION OF SUITABLE CHICKPEA VARIETIES (*CICER ARIETINUM* L.) THROUGH PARTICIPATORY VARIETY SELECTION (FPVS) IN BIHAR

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ABSTRACT

The evaluation of six chickpea varieties (DCP-92-1, JG-14, JG-16, KAK-2 and Subhra including local check BG-372) through farmer-participatory varietal selection (FPVS) trials under Tropical Legumes–II project. These varieties were evaluated under FPVS trials (non-replicated, with full set of varieties) were conducted at farmers' fields at nine different location in Bhagalpur and Banka districts of Bihar during the 2010-11 rabi season. Each variety was sown in an area of 100 m^2. The varieties were evaluated for grain yield and other economic parameters besides taking into consideration the farmer's perception on their performance based on a 1- 9 scale, where 1 is the lowest and 9 is the highest for preference. The top three varieties selected by the farmers included KAK 2, JG 14 and Subhra.

Key words : *Participatory variety selection, evaluation, location, chickpea***.**

Chickpea (*Cicer arietinum* L.) is the premier pulse crop of Indian subcontinent. India is the largest chickpea producer as well as consumer in the world. The major constraints to chickpea production include terminal drought and heat stresses and occurrence of these stresses is increasing due to climate change (Gaur *et al.,* 2008). Chickpea is one of the major pulse crops in Bihar, with an average crop yield of 1170 kg/ha which is higher than the national average yield of 960 kg/ha. Despite a huge potential, the area of chickpea in Bihar has declined considerably during the past four decades. During 1970 to 1979, the chickpea area in Bihar was 217,000 to 262,000 ha, which has now decline to about 60,000 ha due to lack of availability of seed of improved varieties and the unawareness of farmers about improved varieties and improved crop production practices The Government of Bihar is keen to enhance area, production and productivity of chickpea in Bihar. Enhancing production of pulses is also the national priority. So, there is a need to enhance area and productivity of chickpea for enhancing and sustaining cropping system productivity and improving income, food and nutritional security of farmers. It can be achieved by adopting a two pronged strategy involving horizontal expansion through crop diversification and productivity enhancement by promoting suitable cultivars and improved crop production practices. For these purpose the Tropical Legumes–II project was implemented in Bihar with an overall goal of improving chickpea production. The major activities of this project included (1) identification of suitable chickpea cultivars through farmer-participatory varietal selection (FPVS) trials, (2) enhancing availability of quality seed by strengthening formal and informal seed systems, and (3) knowledge empowerment of farmers through various awareness activities and training programs on improved cultivars, integrated crop management, seed production and storage. To fulfill these objectives, we have conducted a set of trial at nine different location in Bhagalpur and Banka districts of Bihar during the 2010-11 rabi season.

MATERIALS AND METHODS

Bihar was the new target state included in phase 2 of Tropical Legumes II (TL-II) project. The major activities included (1) identification of suitable chickpea cultivars through farmer-participatory varietal selection (FPVS) trials, (2) enhancing availability of quality seed by strengthening formal and informal seed systems, and (3) knowledge empowerment of farmers through various awareness activities and training programs on improved cultivars, integrated crop management, seed production and storage. Under the TL II project, ICRISAT worked closely with the Bihar Agricultural University in Banka and Bhagalpur districts of Bihar. The crops included were chickpea, pigeonpea and groundnut. Farmer Participatory Varietal Selection Trials (FPVST) were conducted in each of these crops. Both formal and informal seed systems were

strengthened to enhance access of farmers to seed of new varieties.

Taking into account biotic and abiotic constraints to chickpea production in Bhagalpur and Banka districts in Bihar and the preference of farmers and the market for chickpea traits, FPVS trials were constituted involving five improved early-duration chickpea varieties, DCP-92-1, JG-14, JG-16, KAK-2 and Subhra and the local check BG-372. Those farmers, who showed interest and commitment in conducting FPVS trials and had accessible fields, were selected to conduct FPVS trials. Nine FPVS trials (non-replicated, with full set of varieties) were conducted at farmers' fields in Bhagalpur and Banka districts of Bihar during the 2010-11 rabi season (Table-1). Each variety was sown in an area of 100 m^2. The varieties were evaluated for grain yield and other economic parameters besides taking into consideration the farmer's perception on their performance based on a 1-9 scale, where 1 is the lowest and 9 is the highest for preference.

Table-1 : Location of FPVS trials and dates of sowing.

S. No.	Village	District	Date of sowing
1.	Khankitta	Bhagalpur	22-12-2011
2.	Khankitta	Bhagalpur	24-12-2011
3.	Jhichho	Bhagalpur	20-12-2011
4.	Jhichho	Bhagalpur	26-12-2011
5.	Kotwali	Banka	25-12-2011
6.	Rajpur	Bhagalpur	12-12-2011
7.	Simaria	Banka	16-12-2011
8.	Simaria	Banka	18-12-2011
9.	Sabour	Bhagalpur	24-12-2011

Table-2 : Performance of different chickpea varieties under FPVS trials.

Sl. No.	Variety	Yield range (kg/ha)	Average yield (kg/ha)
1.	DCP 92-1	769-3300	2300
2.	BG-372	641-3300	2025
3.	JG-14	769-3300	2164
4.	JG-16	769-3300	2433
5.	KAK-2	641-2500	1819
6.	Subhra	769-2380	2134

RESULTS AND DISCUSSION

Six varieties were evaluated in nine FPVS trials on farmers' fields in Bhagalpur (6 trials) and Banka (3 trials) districts of Bihar (Table-1). Among desi chickpea varieties, JG 16 gave the highest average yield (2433 kg/ha), followed by DCP 92-1 (2300 kg/ha) and JG 14 (2164 kg/ha). Between the two kabuli varieties, Subhra gave higher average yield (2134 kg/ha) than KAK 2 (1819 kg/ha).

Among the top three varieties selected by the farmers, the kabuli variety KAK-2 was at the first postion as it was among the top three at all the nine locations (Table-3). Though this variety gave the lowest yield, the farmers preferred it because of earliness and attactive large seed. The heat tolerant desi chickpea varuity JG 14 was at the second position as it was among the top three at eight of the nine locations. The kabuli chickpea variety Shubhra was at the third place as it was among the top three varieties selected at six of the nine locations. The variety DCP 92-1 was among the top three varieties only at three locations. It was interesting to note that the desi chickpea variety JG 16, which gave the highest yield, was preferred by the farmers only at one location.

The results of this study clearly indicate that grain yield alone is not the criterion for acceptance of a variety by the farmers. The farmers also give

Table-3 : Varieties preferred by farmers.

Sl. No	Village	Three most preferred varieties		
		First	Second	Third
1.	Khankitta	JG-14	KAK-2	Subhra
2.	Khankitta	JG-16	DCP-92-1	KAK-2
3.	Jichcho	KAK-2	Subhra	JG-14
4.	Jichcho	JG-14	KAK-2	DCP 92-1
5.	Kotwali	Subhra	JG-14	KAK-2
6.	Rajpur	DCP 92-1	KAK-2	JG-14
7.	Simaria	KAK-2	Subhra	JG-14
8.	Simaria	Subhra	JG-14	KAK-2
9.	Sabour	KAK-2	JG-14	Subhra

consideration to maturity duartion, plant type and seed traits. Despite lower yields of kabuli types in comparision to desi types, the farmers preferred kabuli varieties (KAK 2 and Subhra) because of their attractive seeds and high market value. We promoted the three varieties (KAK 2, JG 14 and Subhra) preferrd by the farmers in the two districts. Breeder seed of these varieties was produced at BAU and ICRISAT while certified and TL seeds were produced at farmers' fields. The interventions of TL-II project enhanced adoption of improved cultivars and production technologies by smallholder farmers in the target locations and the farmers realized 30-40% increase in the net income and improvement in food and nutritional security.

CONCLUSION

Six varieties have been evaluated under eight different farmer's field. Of which three varieties namely KAK-2, SUBHRA and JG-14 have been accepted by local farmers. However, average yield of JG-16 was highest but as per report of the concern farmers KAK-2 yielded poor in some of the location due to theft of podded plants.

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