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Evaluation of front line demonstration on chick pea (*Cicer arietinum* L.) in Panna district of M.P.

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Abstract
Chickpea is important rabi pulse crop growing in district Panna. On production front Madhya Pradesh is leading grower of gram (chickpea). In India, Madhya Pradesh also recorded the highest productivity (9.86 quintal per hectare) of gram crop. However, the average productivity per hectare of chickpea in district Panna found to 8.43 quintal in the year 2015-16. Front line demonstrations were conducted at 60 farmers' fields under 20 ha in one block of Panna district of 10 villages, to demonstrate production potential and economic benefits of improved technologies comprised viz., Method of field preparation (55.00%), Improved chickpea variety (JG-11& JG-16) (40%), Seed rate (75-80kg/hact) (51.67%) Seed treatment (Carbendazim at 1.5g/kg seed) (43.33), Method of sowing (46.47%), Spacing (30x10cm) (38.33%), Fertilizers (NPK) (50:150:70kg/hact), (28.33%), Plant Protection Measures (43.33%), Applying Post harvest technology (45.00%) and Method of marketing (53.34%) The demonstration was carried out at Panna district of Madhya Pradesh.

Keywords: Chickpea, Pulses, technology and FLD

Introduction
Pulses are one of the important food crops globally due to higher protein content. Pulses are an important group of crops in India, which is also responsible for yielding large financial gains by amounting for a large part of the exports.

India has made remarkable progress in enhancing production of pulses during the past 15 years. During 2005-06, the total production of pulses in India was 13.38 million MT, which increased to 25.58 million MT during 2020-21. This shows an impressive growth of 91% or a compound annual growth rate (CAGR) of 4.42%. During 2020-21, chickpea had a lion‟s share of 49.3% in the total pulses production. Among remaining pulses, pigeonpea contributed 16.2%, mungbean 10.3%, urdbean 9.3%, lentil 4.9% and other pulses 9.9%. During the past 15 years, the highest growth in production was observed for mungbean (178%), followed by chickpea (125%), urdbean (90%), pigeonpea (51%) and lentil (34%).

Among the food grain and pulses the chickpea has its immense importance. Gram (Chickpea) comes at third place among the food grains after the rice and wheat but first among pulses in the State. Madhya Pradesh is one of the largest chickpea growing State in the Country followed by Uttar Pradesh, Rajasthan, Haryana, Maharastra, Bihar, Karnataka and Punjab respectively. The higher area under gram cultivation in Madhya Pradesh is due to suitability of agro-climatic condition and successfully can be grown in rainfed area or low irrigated area and unfertile land with more profit fetched by the farmers.

Front Line demonstrations (FLDs) is a unique approach to provide an direct interface between researcher and farmers as the scientists are directly involved in planning, execution and monitoring of the demonstrations for the technologies developed by them and get direct feedback from the farmers‟ field about the crops like wheat, rice and pulses production in general and technology being demonstrated in particular. This enables the scientists to improvise upon the research programme accordingly. In FLDs, the subject matter scientists provide technological inputs to extension scientists to organize the demonstrations.

Many studies also referring that improved technology in agriculture has generated considerable demand for agricultural labourers and also pushed up his earning. This has helped in improving the economic condition of the farmers. On the basis of above facts, it is sure that improved chickpea production technology found to remunerative but lacunae is that there are low adoption of improved chickpea production technology at farm level.

Taking into consideration this lacunae front line demonstration on chickpea was conducted by agricultural scientist to increase the knowledge and adoption of improved chickpea production technology at farm level.

Materials and Methods

The present study was carried out by the Bundelkhand University of Agriculture & Technology, Ayodhya (U.P.) during rabi season of 2014-15 to 2017-18 four consecutive years in the farmer's field of 10 adopted villages of Panna district. The soil was black cotton soil fit for chickpea and rocky nature located in undulated terrain is another problem of the district. Each demonstration was conducted in an area of 0.4 ha and 0.4 ha area adjacent to the demonstration plot as farmer's practices i.e. prevailing cultivation practices served as local check. All 60 front line demonstrations in 20 ha area were conducted in different villages. The improved technologies package included chickpea wilt resistant varieties, line sowing, integrated nutrient management and timely weed removal. The Method of field preparation, Improved chickpea variety (JG-11& JG-16) (40%), Seed rate (75-80kg/hact) Seed treatment (Carbendazim at 1.5g/kg seed), Method of sowing, Spacing (30x10cm), Fertilizers (NPK) (50:150:70kg/hact), Plant Protection Measures, Applying Post harvest technology and Method of marketing. Due to climatic conditions, no pest infestation was observed over the year. Before harvesting final plant height (cm) was recorded. The crop was harvested at maturity stage.

Results and Discussion

The perusal of data (Table 1) indicate that due to front line demonstration on chick pea average yield from 2015 to 2016 18.78 q/ ha in demonstration plots and from 11.16 q/ ha in farmer's practice plot in four years of demonstration. This results clearly indicated that the higher average yield in demonstration plots over the years compare to farmers practice due to knowledge and adoption of full package of practices i.e. use Improved chickpea variety (JG-11& JG-16) (40%), Seed rate (75-80kg/hact) Seed treatment (Carbendazim at 1.5g/kg seed), Method of sowing, Spacing (30x10cm), Fertilizers (NPK) (50:150:70kg/hact), Plant Protection Measures, Applying Post harvest technology and Method of marketing. The yield of chick pea could be increased over the yield obtained under farmers' practices (lack of knowledge on use of no use of the balanced dose of fertilizer, no plant protection) of chick pea cultivation. The above findings are in similarity with the findings of (Singh *et al*., 2011) [11]. Extension gap on an average extension gap less than four year FLD programme was 7.67 q/ha. This emphasized the need to educate the farmers through various techniques for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap.

It is evident from the Table that out of the total respondents, the majority of 33 chickpea growers i.e. (55.00%) to total had completely adoption about field preparation followed by 18 chickpea growers i.e. (30.00%) of total had incomplete adoption and 9 chickpea growers i.e. (15.00%) of total had partial adoption respectively.

In respect of improved chickpea varieties (JG-11& JG-16) showed, the majority of 24 chickpea growers i.e. (40.0%) of total had completely adoption followed by 23 chickpea growers i.e. (38.33%) of total had incompletely adoption and 13 chickpea growers i.e. (21.67%) of total had partially adoption respectively. The adoption of seed rate (75-80kg/hact) showed, the majority of 31 chickpea growers i.e. (51.67%) of total had completely adoption followed by 17 chickpea growers i.e. (28.33%) of total had incompletely adoption and 12 chickpea growers i.e. (20.00%) of total had partially adoption respectively. This finding is in conformity with the findings as reported by Hanumanaikar (1995) [3], Sharma and Nahatkar (1998) [8], Gandhi *et al*. (2006) [2] and Mayda (2011) [5].

Regarding adoption of seed treatment (Carbendazim at 1.5g/kg seed) showed, the majority of 26 chickpea growers i.e. (43.33%) of total had completely adoption followed by 20 chickpea growers i.e. (33.34%) of total had incompletely adoption and 14 chickpea growers i.e. (23.33%) of total had partially adoption respectively. The adoption of Method of sowing (By Seed-Drill & acc. to the availability of machinery) showed, the majority of 28 chickpea growers i.e. (46.67%) of total had completely adoption followed by 17 chickpea growers i.e. (28.33%) of total had incompletely adoption and 15 chickpea growers i.e. (25.00%) of total had partially adoption respectively. This finding is in conformity with the findings as reported by Chouhan (2007) [1], Kiran (2010) [4], Solanki (2011) [11] and Raghuwanshi (2012) [7].

Regarding adoption of Spacing (30x10cm) showed, the majority of 23 chickpea growers i.e. (38.33%) of total had completely adoption followed by 21 chickpea growers i.e. (35.00%) of total had incompletely adoption and 16 chickpea growers i.e. (26.67%) of total had partially adoption respectively. The adoption of FYM/Bio fertilizer application (5 to 10 Tonne/hact. & Rhizobium culture 2-2.5g/kg seed) showed, the majority of 24 chickpea growers i.e. (40.00%) of total had incompletely adoption followed by 20 chickpea growers i.e. (33.33%) of total had completely adoption and 16 chickpea growers i.e. (26.67%) of total had partially adoption respectively.

Regarding adoption of Fertilizers (NPK) (50:150:70kg/hact) showed, the majority of 23 chickpea growers i.e. (38.33%) of total had incompletely adoption followed by 20 chickpea growers i.e. (33.33%) of total had partially adoption and 17 chickpea growers i.e. (28.33%) of total had incompletely adoption respectively. It is evident from the Table that out of the Intercultural operations showed, the majority of 29 chickpea growers i.e. (48.33%) of total had completely adoption followed by 18 chickpea growers i.e. (30.00%) of total had incompletely adoption and 13 chickpea growers i.e. (21.67%) of total had partially adoption respectively. Similar finding also: Singh (2009) [9] and Verma (2013) [12].

Regarding adoption of Irrigation (2 Pre-flowering & Pod formation) showed, the majority of 30 chickpea growers i.e. (50.00%) of total had completely adoption followed by 17 chickpea growers i.e. (28.33%) of total had incompletely adoption and 13 chickpea growers i.e. (21.67%) of total had partially adoption respectively. It is evident from the Table that out of the Plant Protection Measures showed, the majority of 26 chickpea growers i.e. (43.33%) of total had completely adoption followed by 18 chickpea growers i.e. (30.00%) of total had partially adoption and 16 chickpea growers i.e. (26.67%) of total had incompletely adoption respectively.

Regarding adoption of Proper method of harvesting and threshing showed, the majority of 29 chickpea growers i.e. (48.34%) of total had completely adoption followed by 17 chickpea growers i.e. (28.33%) of total had incompletely

adoption and 14 chickpea growers i.e. (23.33%) of total had partially adoption respectively. Regarding adoption of applying post harvest technology showed, the majority of 27 chickpea growers i.e. (45.00%) of total had completely adoption followed by 23 chickpea growers i.e. (38.33%) of total had incompletely adoption and 10 chickpea growers i.e. (16.67%) of total had partially adoption respectively. Regarding adoption of method of marketing showed, the majority of 32 chickpea growers i.e. (53.34%) of total had completely adoption followed by 14 chickpea growers i.e. (23.33%) of total had both incompletely and partially adoption respectively. Similar finding also: Singh (2001) [10] and Patel *et al*. (2003) [6].

The FLD produced a significant positive result and provided an opportunity to demonstrate the productivity potential and profitability of the latest technology (intervention) under real farming situation.

Table 1: Adoption level of chickpea production technology by adopter chickpea growers.

S. No.	Recommended production technology	Adoption level by adopter chickpea growers		
		Partial	Incomplete	Complete
1.	Method of field preparation	9 (15.00)	18 (30.00)	33 (55.00)
2.	Improved chickpea variety(JG- 11& JG-16)	13 (21.67)	23 (38.33)	24 (40.00)
3.	Seed rate (75-80kg/hact)	12 (20.00)	17 (28.33)	31 (51.67)
4.	Seed treatment (Carbendazim at 1.5g/kg seed)	14 (23.33)	20 (33.34)	26 (43.33)
5.	Method of sowing(By Seed- Drill & acc. to the availability of machinery)	15 (25.00)	17 (28.33)	28 (46.67)
6.	Spacing (30x10cm)	16 (26.67)	21 (35.00)	23 (38.33)
7.	FYM/Bio fertilizer application Tonne/hact. & Rhizobium culture 2-2.5g/kg seed)	16 (26.67)	24 (40.00)	20 (33.33)
8.	Fertilizers (NPK) (50:150:70kg/hact)	20 (33.33)	23 (38.33)	17 (28.33)
9.	Intercultural operations (Nipping)	13 (21.67)	18 (30.00)	29 (48.33)
10.	Irrigation (2 Pre-flowering & Pod formation))	13 (21.67)	17 (28.33)	30 (50.00)
11.	Plant Protection Measures	18 (30.00)	16 (26.67)	26 (43.33)

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