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Knowledge level of farmers on chickpea production technology in central plain zone of Uttar Pradesh

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Abstract
Chickpea (*Cicer arietinum*) generally known as "Chana" / "Gram" or "Bengal Gram" is an important leguminous food grains in India. Chickpea is the world's third most important food legume with 96% cultivation in the developing countries. Uttar Pradesh is the fifth rank in chickpea production. The study was conducted in the state of Uttar Pradesh (UP). The economy of U.P. is predominately agrarian. In this region there are sixteen districts, out of which Kanpur Dehat and Unnao were randomly selected for the present study. From each of the selected districts three blocks were randomly selected. From each of the selected blocks three villages were selected randomly and from each of the selected villages, 12 respondents were selected randomly for the so as a total (216) respondents were selected for present study. Finding The findings revealed that majority of 73.611 per cent of respondents had medium level of overall knowledge level, major knowledge about sowing method 98.1 per cent, harvesting time, method and handling 88.175 per cent, suitable soil 83.1 per cent, storage observed 81.7 per cent, land preparation 80.55 per cent and sowing time 78.2 per cent. The independent variable, extension contact had positive and significant association with the knowledge level of the respondents at 5% level of probability. The independent variables viz., education, size of land holding, annual income, attitude, sources of information utilized and training had positive and significant association with the knowledge level of the respondents at 1% level of probability.

Keywords: chickpea, knowledge level, determinants, U.P

Introduction
Chickpea (*Cicer arietinum*) generally known as "Chana" / "Gram" or "Bengal Gram" in India is an important leguminous food grain. Chickpeas are grown in the Indian subcontinent, Australia, Mediterranean, western Asia, the Palouse region, and the Great Plains. India is the world leader in chickpea (Bengal gram) production 8,832,500 metric tonnes, the second-largest producer, Australia 813,300 metric tonnes in second position. India rank first in area 99.27 Lakh hactare total 71 percent of world, production Lakh hacter 98.80 Lakh hectare total 71.95 percent of global. The highest productivity China got first position 3759 kg/ha. Followed by Israel, Repbl of Modova and Bosnia & Herzegovina. India was 995 kg/ha productivity. Chickpea is an important source of protein in the diets of the poor, and is particularly important in vegetarian diets. Also, it is being used increasingly as a substitute for animal protein. Chickpeas are a helpful source of zinc, folate and protein. In the last four decades, the area, production and productivity of chickpea fluctuated widely. Some of the states like Punjab, Haryana, Uttar Pradesh and Bihar have lost considerable area of chickpea whereas other states like Andhra Pradesh, Maharashtra, Karnataka have brought additional areaIn Uttar Pradesh, major chickpea producing districts like Banda, Hamirpur, Jhansi, Jalaun, Lalitpur, Muradabad and Chitrakoot of fall under the Bundelkhand region; these districts are the major chickpea producing districts and they share approximately 60% to the total state chickpea production. It is a protein-rich especially to the poor in developing countries, where people are vegetarians or cannot afford animal protein. In India pulses are cultivated on marginal lands under rain fed conditions.

Materials and Methods
The study was conducted in the Uttar Pradesh**.** There are nine agro-climate zones in the state, in this region sixteen districts, among which Kanpur Dehat and Unnao were randomly selected for the present study. From each of the selected districts three blocks were randomly selected from each of the selected blocks three villages were selected randomly for study, from each of the selected villages, 12 respondents were selected randomly for present study so as total (216) respondents were selected for present study.

Data was collected through pretested schedule by conducting personal interview. Primary data were analysed using SYSTAT 12 software. 'Knowledge' referred to the body of information understood and retained by the respondents about chickpea cultivation package and practices recommended by State Agriculture Department of Uttar Pradesh. It was measured by calculating 'Knowledge Index' as follows: Knowledge Index Maximum knowledge score Cumulative knowledge score obtained. Cumulative knowledge score was calculated based on the correct responses given by the respondents on all the nineteen dimensions of knowledge as per the recommended chickpea cultivation practices by the state department of agriculture, state of Uttar Pradesh. Further, respondents were classified into three categories of their knowledge level about recommended cultivation technology based on mean score and standard deviation. It was measured by calculating 'Knowledge Index'

Knowledge Index = $(\frac{\text{Cumulative knowlege score obtained}}{\text{Maximum knowledge score}})$ x 100

Results and Discussion

Knowledge level of farmers on chickpea production technology

Table 1 shows that majority (73.611%) of the respondents had medium level knowledge followed by high level (18.055%) and low level (8.334) knowledge, respectively. Knowledge is considered as one of the important element in adoption of innovation. This is also justified by Tripathi *et al.* (2008) [7, 8] revealed that majority of the respondents (67%) were found possessing medium level of knowledge followed by 19 per cent and 14 per cent respondents who had low and high levels of knowledge respectively.

Table 1: Knowledge on chickpea production technology by the grower n=216

S. No	Level of knowledge	Frequency	Percentage	Mean	SD
1.	High	39	18.055	34.481	4.539
2.	Medium	159	73.611		
3.	Low	18	08.334		
	Total	216	100		

Various dimension of farmer's knowledge on chickpea production technology

Table 2 shows that he mean knowledge score was (0.981) in case of sowing method observed (98.1%), followed by mean knowledge score (0.881) in case of harvesting time, methods & handling observed of (88.175%), mean knowledge score was (0.831) in case of suitable soil evaluate of (83.1%), mean score was (0.817) in case of storage observed of (81.7%), mean knowledge score was (0.805) in case of land preparation observed of (80.55%),mean knowledge score (0.782) in case of sowing time evaluate of (78.2%), mean knowledge score was (0.740) in case of water need during critical stages assessment of (74.05%),mean knowledge score was (0.711) in case of seed rate observed of (71.1%), mean knowledge score was (0.708) in case of weeding evaluate of (70.8%), mean knowledge score was (0.684) in case of fertilizer observed of (68.42%), mean knowledge score was (0.680) in case of type of seed assessment of (68.05%), mean knowledge score was (0.604) in case of implements observed of (60.4%), mean knowledge score was (0.570) in case of insect pest and disease management evaluate of (57.083%), mean knowledge score was (0.482) in case of cropping system observed of (48.42%), mean knowledge score was (0.470) in case of seed treatment assessment of (47.06%), mean knowledge score was (0.453) in case of yield observed of (45.3%), mean knowledge score was (0.449) in case of varieties evaluate of (44.98%), mean knowledge score was (0.324) in case of soil treatment observed of (32.4%), mean knowledge score was (0.254) in case of spacing observed of (25.4%), respectively.

Table 2: Knowledge of respondents on chickpea production technology n=216

S. No	Practices	Knowledge level			
		Mean score	Average Mean	Percentage	Rank
1.	**Land preparation**		0.805	80.55	V
	I) A rough seedbed is required for chickpea	0.884			
	ii) Do you know for chickpea desirable to go for a deep ploughing during the monsoon.	0.726			
2.	**Suitable soil**		0.831	83.1	III
	i) Chickpea cultivation in sandy loam	0.935			
	ii) Chickpea cultivation in clay loam	0.726			
3.	**Varieties**		0.449	44.98	XVII
	i) Avrodhi	0.712			
	ii) Radhey	0.379			
	iii) KWR	0.314			
	iv) Pant G-186	0.460			
	v) Gujarat Gram-4	0.5			
	vi) Pusa 372	0.333			
4.	**Type of seed**		0.680	68.05	XI
	i) Desi or Brown Gram or Locale (*Cicer arietinum* L.)	0.879			
	ii) Kabuli or White Gram or Improved (Cicer Kabulium)	0.481			
5.	**Seed treatment**		0.470	47.06	XV
	i) Seed priming (soaking of seed for 4-5 hours in water).	0.606			
	ii) Seed treatment with Trichoderma (6g/kg) and Vitavax (Carboxin)(1g/kg)	0.504			
	iii) Seed treatment with Rhizobium culture one packet (200 g)/10 kg seed.	0.300			
6.	**Sowing time**		0.782	78.2	VI

	i) Rainfed : 1st fortnight of Oct	0.814			
	ii) Irrigated : Last week of Oct. to 1st week of Nov	0.75			
7.	**Seed rate**		0.711	71.1	VIII
	i) Seed rate 75-100 kg/hectare	0.711			
8.	**Soil treatment**		0.324	32.4	XVIII
	i) Trichoderma	0.324			
9.	**Sowing method**		0.981	98.1	I
	i) Locale plough	0.972			
	ii) Seed Drill	0.971			
	iii) By hand	1.0			
10	**Spacing**		0.254	25.4	XIX
	i) Line sowing 30 x 10	0.254			
11.	**Weeding**		0.708	70.8	IX
	i)Pre-emergence spray of Pendimethalin @ 1.0-1.25 ai kg/ha One hand weeding if required	0.708			
12.	**Fertilizers**		0.684	68.42	X
	i) 15-20 kgN	0.731			
	ii) 40 kg P2O5	0.662			
	iii) 20kg S	0.680			
	iv) 25 kg Zn So4/ha	0.717			
	v) Spray of 2% urea at flowering stage (70 DAS) and 10 days thereafter	0.629			
13.	**Water need during critical stages**		0.740	74.05	VII
	i) Two irrigations first at branching	0.759			
	ii) 2nd at pod initiation stage	0.722			
14.	**Insect pest and disease management**		0.570	57.083	XIII
	i) Control of cutworm from Lindane 6%	0.736			
	ii) Control of Gram Pod Borer from Monocrotophos 36 EC	0.717			
	iii) Control of Wilt from Benlate and Thiram(1:1)	0.402			
	iv) Control Grey Mold from Bavistin 0.2 %	0.652			
	v) Control of Rust From Mancozeb 75 WP	0.495			
	vi) Control of Sclerotina blight from Captan	0.421			
15.	**Cropping system**		0.482	48.24	XIV
	i) Kharif fallow-chickpea	0.5			
	ii) Rice-chickpea	0.375			
	iii) Maize- chickpea	0.458			
	iv) Pearl millet - chickpea	0.537			
	v) Sorghum- chickpea	0.541			
16.	**Implements**		0.604	60.4	XII
	i) Locale plough	0.666			
	ii)Improved(Tractor, Seeddrill)	0.541			
17.	**Harvesting time, methods & handling**		0.881	88.175	II
	i) When leaves turn reddish-brown and start shedding	0.962			
	ii) By sickle	0.953			
	iii) Improved	0.625			
	iv) By bullocks	0.990			
18.	**Yield**		0.453	45.3	XVI
	i) 20-25 quintals /hectare	0.453			
19.	**Storage**		0.817	81.7	IV
	i) Indigenous	0.856			
	ii) Scientific	0.777			

It was also observed from table 2 that respondents had more than 50 per cent knowledge in only thirteen out of nineteen chickpea production technology. Thus there is need to organize training program me for the chickpea production technology. Tripathi *et al.* (2008) [7, 8] found having medium level of knowledge, which the respondents were distributed accordingly to the knowledge categories viz. low, medium and high. Out of 12 agricultural practices of chickpea production, knowledge about field preparation was ranked at first (92%) followed by seed rate (90.00%) and harvest and post harvest (83.71%) ranked at second and third respectively. The poor extent of knowledge was reported for the practices viz. insects and pests control (28.22%), seed treatment (24.83%) and disease control (12.88%). The overall extent of knowledge was found to be 52.86 per cent

Correlation between independent variables and knowledge level of the respondents

Table 3 reveals that the independent variable, extension contact had positive and significant association with the knowledge level of the respondents at 5% level of probability. The independent variables viz., education, size of land holding, annual income, attitude, sources of information utilized and training had positive and significant association with the knowledge level of the respondents at 1% level of probability. This inferred that higher the extension contact, education, size of land holding, annual income, attitude, source of information utilized and training will be higher the knowledge level of the chickpea cultivators. Age, family size, social participation, experience in chickpea cultivation, livestock possession, occupation and type of house, these are non significance variables in case of knowledge of chickpea cultivation.

Table 3: Correlation of independent variables with knowledge of the respondents n=216

S. No	Variables	Correlation coefficient
1	Age	0.075NS
2	Education	0.175*
3	Family size	0.119NS
4	Social participation	0.034NS
5	Size of land holding	0.179*
6	Annual income	0.233*
7	Attitude	0.286*
8	Extension contact	0.139**
9	Sources of information utilized	0.257*
10	Experience in chickpea cultivation	0.085NS
11	Livestock possession	0.064NS
12	Training exposure	0.176*
13	Occupation	0.052NS
14	Type of house	0.05NS

** Significance at 1% level of probability

* Significance at 5% level of probability, NS = Non Significant

Conclusion

Findings included that the majority of 73.611 per cent of respondents had medium level of overall knowledge level**.** It was also found that independent variables namely education, size of land holding, annual income, attitude, source of information utilized, training, extension contact, and training exposure had significant association with knowledge level of respondents in chickpea production technology.

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