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DIMENSIONS AND DETERMINANTS OF KNOWLEDGE ON RECOMMENDED WHEAT PRODUCTION TECHNOLOGY AMONG FARMERS IN EASTERN PLAIN ZONE OF UTTAR PRADESH, INDIA

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Abstract

Wheat is the most widely grown cereal crops with an ever increasing demand globally. It occupies a prime position among the food crops across the globe. Uttar Pradesh is the largest wheat producer state in India. The study was conducted in the eastern plain zone of Uttar Pradesh to evaluate the dimensions and determinants of knowledge on recommended wheat production technology among the practising farmers. The study included multistage sampling. Out of total thirteen wheat growing districts under the eastern plain zone of Uttar Pradesh, two districts *viz*. Azamgarh and Jaunpur districts were randomly selected. From each of the selected districts two community blocks were randomly selected and three villages were randomly selected from each of the selected blocks. From each of the selected villages 12 farmers were randomly selected so as to constitute a sample size of 144 wheat growing farmers for the present study. Data were collected through pretested structured schedule by conducting personal interview. The findings revealed that majority (94.44%) of the respondents had medium level of overall knowledge level of the recommended wheat production technology. Majority (98.36%) of the farmers had the highest knowledge in harvesting time methods and handling of wheat crop whereas none of them possessed adequate knowledge on healthy seed selection for sowing. The study revealed that variables age, education, family size, size of land holding, annual income, extension contact, experience in wheat cultivation, livestock possession and training exposure had significant association with the knowledge level on recommended wheat production technology. The variables extension contact, adoption and experience were found important in explaining the variations in knowledge level of farmers with respect to recommended wheat production technology.

Key words : Wheat cultivation, knowledge dimensions, determinants, strategy.

Introduction

Wheat is the most widely grown cereal crops feeding the people across the globe. It is grown on over 240 million hectares worldwide, which is more land area than any other crop, and over 80 percent of this land is located in the developing world. Improving the yield levels and preventing diseases specific to wheat is of paramount importance in this context. Though wheat is being cultivated globally, in India, it is the second important food crop next to rice. In 2013-14, total area under wheat crop at global level was 222.6 million ha with a total production of 716.1 million tonnes. India ranked first in the world with a total area of 31.2 million ha (14.02% of the global area under wheat) followed by china with 24.1 million ha (10.83% of the global area under wheat). China ranked first at global level with total wheat production of 126.2 million tonnes followed by India with 96.64 million tonnes. India's wheat production has increased at CAGR of 3.07 per cent in the last ten years (2005-6 to 2015-16) years (Anonymous, 2017). World productivity of wheat is recorded at 3.22 t/ha. Germany ranked first in productivity of wheat at global level with 7.95 t/ha followed by United Kingdom with 7.80 t /ha and Denmark with 7.4 t/ha. Wheat productivity in India was found to be 3.08 t/ha (Sendhil *et al*., 2014). India shares about 13.15 per cent of the total wheat production globally. Wheat plays an important role in diets across the globe because of its adaptability. It can be grown at high or low altitudes and thrives in diverse climate regimes. Wheat is easily stored and can be transformed into an enormous variety of foods. With higher protein content than both maize and rice, wheat is a main source of protein in the human diet. It is also an important source of fiber and

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carbohydrates and contains various vitamins, minerals and fats and plays a major role in food security. 'Eastern Plain Zone' of Uttar Pradesh state is relatively having low wheat productivity than other parts of the state. Therefore, it was inquisitive to examine the socio–economic factors and knowledge dimensions which might attribute towards increasing productivity of wheat in the concerned region. Therefore, a research study was undertaken with an objective to evaluate the dimensions and quantify the factors affecting knowledge of the wheat growing farmers which may help to formulate specific strategy for increasing production and productivity of wheat in the eastern plain zone of Uttar Pradesh, India.

Materials and Methods

The present study was conducted in the Eastern Plain Zone of the State of Uttar Pradesh, India. This zone was selected for the study as it accounted for low productivity of wheat than other wheat growing zones in the state of Uttar Pradesh (India). The state occupies an important place in the polity and economy of India. The economy of U.P is predominately agrarian. It lies between 25^0-31^0 N latitude and 77^0-84^0 E longitude. Out of thirteen districts in this zone, two districts *viz*., Azamgarh and Jaunpur were randomly selected for present study. From each of the selected districts two community blocks were randomly selected and further three villages were randomly selected from each of these selected blocks. From each of the selected villages 12 farmers were randomly selected so as to constitute a sample size of 144 wheat growing farmers for the present study. Data were collected through pretested structured 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 wheat cultivation package and practices recommended by State Agriculture Department of Uttar Pradesh. It was measured by calculating 'Knowledge Index' as follows:

Knowledge Index

$$= \left(\frac{\text{Cumulative knowledge score obtained}}{\text{Maximum knowledge score}} \right) \times 100$$

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 wheat 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 wheat cultivation technology based on mean score and standard deviation.

Results and Discussion

Knowledge level of farmers on recommended wheat production technology

Table 1 revealed that majority (94.44%) of the respondents had medium level of knowledge about recommended wheat production technology followed by high (4.167%) and low (1.389%) knowledge levels. Knowledge is considered as one of the important elements in adoption of innovation. The study further revealed that only 4.167 per cent of the wheat growers had high knowledge with respect to the recommended wheat production technology, which may be considered as an area of concern inviting proper attention and undertaking requisite measures for its improvement. Rudra *et al*. (2004) in his study also found that lack of technical knowledge and skill, resulted in low productivity of wheat. Dubey and Srivastava (2007) also reported that trained farmers had high (100%) level of knowledge in wheat production, whereas among non-trained respondents majority (52%) had high level of knowledge followed by medium level (44%) and 4 per cent with low level of knowledge.

Table 1 : Knowledge on recommended wheat production technology by the farmers.

S. no.	Level of knowledge	Frequency	Percentage	
1.	High	6	4.167	Mean : 194.07 Sd: 117.10
2.	Medium	136	94.44	
3.	Low	2	1.389	
	Total	144	100	

Dimensions of farmers' knowledge on recommended wheat production technology

Table 2 revealed about the 'Knowledge' of wheat growers with respect to nineteen dimensions of wheat production technologies as recommended by the state department of agriculture, state of Uttar Pradesh. It was evident from table 2 that mean knowledge score of the respondents was highest (0.983) in case of harvesting time, methods & handling followed by sowing time(0.979), seed rate (0.954), storage (0.946), suitable soil (0.868), insect pest and disease management (0.828), weeding (0.819), fertilizers and manuring (0.816), land preparation (0.796), sowing method (0.672), irrigation & water management (0.604), water need during critical stages of wheat growth (0.593), varieties(0.345), soil treatment & yield (0.291), seed treatment (0.175), spacing (0.083),

Table 2: Knowledge of respondents on the recommended package and practices of wheat production.

N = 144

S. No.	Recommended Practices		Knowledge of wheat farmers		
		Mean score	Overall mean score	Percentage	Rank
1.	**Land preparation**				
	i) Use of rotavator in field	0.847			
	ii) Decomposing paddy stunts by urea	0.611	0.796	79.6	IX
	iii) Sowing of seeds after pulverization of soil	0.93			
2.	**Suitable soil**				
	i) Wheat cultivation in heavy soil	0.923	0.868	86.8	V
	ii) Wheat cultivation in loam soil	0.812			
3.	**Varieties**				
	i) PBW-343Production: 60-65 q/ha	0.638			
	ii) PBW-443Production: 50-55 q/ha	0.243	0.345	34.5	XIII
	iii) U.P-2338	0.173			
	iv) K-307	0.326			
4.	**Healthy seed selection**				
	i) Seed viability test	0	0	0	XVIII
	ii) Embryo culture method	0			
5.	**Seed treatment**				
	i) Seed treatment for loose smut and other soil disease control:carboxin 37.5%+thayram 37.5% D.S/W.S 3.0g/kg seed	0.194	0.175	17.5	XV
	ii) 2% salt wet method (200g salt with 10 L water)	0.159			
6.	**Sowing time**				
	i) Sowing seed from November first week to second week	0.979	0.979	97.9	II
	ii) Late sowing till 25 December	0.979			
7.	**Seed rate**				
	i) Seed rate @100 kg /ha	0.958	0.954	95.45	III
	ii) Late sowing seed rate @125 kg/ ha	0.951			
8.	**Soil treatment**				
	i) Control of soil disease and seed disease by biopesticides *Tricoderma viride* 1% W.P 2.5 kg /ha 60-70 kg and use of dung manure 8-10 shed dry after last ploughing	0.291	0.291	29.1	XIV
9.	**Sowing method**				
	i) Broadcast method	0.993			
	ii) Ridge	0.631			
	iii) Drilling method	0.298	0.672	67.23	X
	iv) Ferti seed drill method	0.493			
	v) Zero till	0.618			
	vi) Furrow behind the plough (kera, Pora, Keep).	1			

Table 2 continued...

Table 2 continued...

10.	**Spacing plant to plant & row to row)**				
	i) Normal sowing plant to plant and row to row spacing	0.083	0.083	8.3	XVI
	ii) Late sowing plant to plant and row to row	0.083			
11.	**Plant population**		0.034	3.4	XVII
	i) 490000/ha	0.034			
12.	**Weeding**		0.819	81.9	VII
	i) Control of *Phalaris minor* and A*vena fatua*, by isoproturon 75% W.P 1.2 5kg /ha	0.888			
	ii) Control of broad leaf *Anagallis arvensis, Argemone maxicana*, *hirankhuri* and *Chinopodium alba* by 2,4 D sodium salt 80% technical 625g/ha	0.75			
13.	**Fertilizers and manures**		0.816	81.66	VIII
	i) N.P.K 150:60:40	0.784			
	ii) Use of 60q/ha manures before sowing 15 days	0.847			
	iii) Nitrogen ½ first dose at the time of sowing	0.847			
	iv) Nitrogen 1/3 use after first irrigation	0.840			
	v) ¼ nitrogen use after second irrigation	0.763			
14.	**Irrigation and water management**		0.604	60.4	XI
	i) Flooding irrigation	1.00			
	ii) Border irrigation	1.00			
	iii) Digging method of drainage	0.201			
	iv) Herringbone method of drainage	0.215			
15.	**Water need during critical stages**		0.593	59.366	XII
	i) First irrigation 20-25 DAS, critical stage	1.00			
	ii) Second irrigation 40-45 DYS, till ring stage	1.00			
	iii) Third irrigation 60-65 DAS, joint stage	0.854			
	iv) Fourth irrigation 80-85 DAS, flowering stage	0.229			
	v) Fifth irrigation 100-105 DAS, milking stage	0.118			
	vi) Sixth irrigation 115-120 DAS, dough stage	0.361			
16.	**Insect pest and disease management**		0.828	82.87	VI
	i) Control of termites by chlorpyriphas 20 E.C 2-3 litre /ha	0.888			
	ii) Control of aphids by thyomithon 25% E.C 1 litre/ha 750 litre water	0.909			
	iii) Control of rust by zenab or dithane m-45 0.2% (2kg/1000 litre/ water)	0.687			
17.	**Harvesting time, methods & handling**		0.983	98.36	I
	i) General harvesting march to April become hard and dry/ brittle	0.986			
	ii) Combine	0.875			
	iii) By riper	0.881			

Table 2 continued...

Table 2 continued...

	iv) By thresher power driven	0.965			
	v) By Ox	1			
	vi) By sickle	1.201			
18.	**Yield**		0.291	29.1	XIV
	i) Yield 50-65q/ha	0.291			
19.	**Storage**				
	i) 10% moisture - ideal storage	0.805			
	ii) Kissan kothi	0.979	0.946	94.66	IV
	iii) In tin drum	1.055			

Table 3 : Association of independent variable and knowledge of respondents about recommended wheat production technology.

S. no.	Variables	Correlation coefficient (r)
1	Age	-0.240**
2	Education	0.209*
3	Family size	-0.400**
4	Social participation	0.150^{NS}
5	Size of land holding	0.255**
6	Annual income	0.196*
7	Attitude	0.010^{NS}
8	Extension contact	0.400**
9	Sources of information utilized	0.297^{NS}
10	Experience in wheat cultivation	0.455*
11	Livestock possession	0.058^{NS}
12	Training exposure	0.167*

** Significant at 1 % level of probability, * Significant at 5 % level of probability, NS = Non Significant

required plant population of wheat/ha (0.034), whereas none of them had knowledge about method of healthy seed selection.

It was also observed from table 2 that respondents had more than 50% knowledge in only ten out of nineteen recommended practices. Thus, there is an urgent need to organize need based training programme for the wheat farmers in the specific areas of concern. Tiwari *et al*. (2002) in their study on the knowledge level of wheat production technology of different socio-personal profile of farmers revealed that majority of the farmers had low to medium knowledge of wheat production technology and lack of exposure through training, visit and extension workers were the main causes for unawareness about the recommended practices.

Table 4 : Multiple regression of predictor variables with response variable, knowledge of farmers on recommended wheat production technology.

S. no.	Variables	(b)	SE (b)	(t) value
1.	Age	-0.339	0.208	-1.63^{NS}
2.	Extension contact	8.611	2.074	4.15**
3.	Experience in wheat cultivation	0.756	0.206	3.66**
4.	Adoption	0.756	0.017	42.88**

a= -33.22 **, F= 663.87**, R^2 =0.953

** Significant at 1 % level of probability, * Significant at 5 % level of probability, NS = Non Significant.

Determinants of farmers' knowledge on recommended wheat production technology

Table 3 revealed that the variables size of land holding and extension contact had positive and highly significant association; age and family size had negative and highly significant association with knowledge at 1% of probability, whereas the variables education, annual income, experience in wheat cultivation and training exposure had significant association with knowledge of wheat farmers at 5% of probability. Further the variables social participation, attitude, sources of information utilized and livestock possession were found non-significant. Singh *et al.* (2014) in their study included fourteen independent variables to find association with knowledge, adoption behaviour and attitude towards HYV of wheat and found that age, family size and urban contact had negative and significant associations.

Table 4 revealed the analysis of multiple regression equation which included predictor variables *viz*., age, extension contact, experience in wheat cultivation and adoption explained to the extent of 95.3 per cent of the variations in the knowledge level of the respondents about recommended practices of wheat cultivation. The 'F'

value (663.87) was found to be highly significant at 1% level of probability. Therefore, these variables may be considered important in explaining the knowledge level of farmers with respect to recommended practices of wheat cultivation. Noorivandi (2012) reported that 89.56 per cent of wheat farmers had moderate to very high level of perception and 44.79 per cent of farmers had moderate to very high level technical knowledge. His findings revealed that extension contact, rate of using communication channels, level of education, income, social participation, social status and job satisfaction explained for 64.9% changes (R^2=0.649) in perception and technical knowledge of wheat farmers.

Conclusion

The study concluded that majority (94.44%) of wheat farmers had medium level of knowledge on recommended wheat production technology. Majority (98.36%) of the farmers exhibited high knowledge in harvesting time, methods and handling of wheat crop whereas none of them possessed adequate knowledge of selecting healthy wheat seed for sowing. The study also envisaged that variables age, education, family size, size of land holding, annual income, extension contact, experience in wheat cultivation, livestock possession and training exposure had significant association with the knowledge level of wheat farmers for adopting recommended wheat production technology. The variables extension contact, adoption and experience were found important in explaining the variations in knowledge level of farmers with respect to recommended wheat production technology. Thus, it may concluded that need based training should be conducted in the specific areas identified in the present study so that wheat farmers develop adequate technological knowledge and skills for achieving higher productivity and profitability in wheat cultivation.

References

Anonymous (2017). *Commodity profile of wheat*. http://agricoop.nic.in/sites/default/files/Wheat.pdf. Accessed on 26.04.2017.

Dubey, A. K. and J. P. Srivastava (2007). Effect of training programme on knowledge and adoption behaiviour of farmers on wheat production technologies. *Indian Res. J. Ext. Edu.*, **7 (2&3)** : 41-43

Noorivandi, A. N., A. Ajili, M. Chizari and M. Bijani (2009). The socio-economic characteristics of wheat farmers regarding adoption of sustainable soil management. *J. Hum. Ecol.*, **27(3)** : 201-205.

Rudra, B. C., A. Ghosh and P. Mukhopadhyay (2004). Impact of training on adoption of improved package of practices by the farmers in wheat cultivation. *Environ Ecol.*, **22(3)** : 579-585.

Sendhil, R., R. Singh, S. Singh, A. Kumar and I. Sharma (2014). *Wheat scenario- A snippet*. Directorate of Wheat Research, Karnal, **1** : 1-6.

Singh, P., M. Choudhary and J. P. Lakhera (2014). Knowledge and attitude farmers towards improved wheat production technology. *Indian Res. J. Ext. Edu.*, **14(2)** : 54-59.

Tiwari, G. K., A. K. Pade and N. K. Raghuwanshi (2002). Association between farmers socio-personal traits and knowledge of wheat production practices. *JNKVV Res. J.*, **36(1/2)** : 69-72.