

## KNOWLEDGE LEVEL OF FARMERS' REGARDING PHOTOVOLTAIC WATER PUMPING SYSTEM: COMPARATIVE STUDY BETWEEN HISAR, ROHTAK AND JHAJJAR DISTRICTS OF HARYANA STATE

Anil Kumar<sup>1</sup>, Ashok Kumar Godara<sup>2</sup> and Ashok kumar<sup>3</sup>

1 Ex P.G.Student, COA, CCS Haryana Agricultural University, Hisar-125004

2. Prof. COA, CCS Haryana Agricultural University, Hisar-125004

3 Asstt. Prof., COA, CCS Haryana Agricultural University, Hisar-125004

E-mail :anilkhas1974@gmail.com

### ABSTRACT

The study was conducted in purposively selected Hisar, Rohtak and Jhajjar districts of Haryana state with selected 61, 47 and 33 number of Photovoltaic Water Pumping System (PWPS) farmers from each district, respectively. In this way a total number of 141 respondents were selected in the sample for the study. The study revealed that maximum number of respondent fell under medium technical knowledge, general knowledge and overall knowledge in Hisar, Rohtak and Jhajjar districts. Majority of respondents favorable attitude towards PWPS in all three districts. According to aspects wise farmers' attitude towards PWPS the statement "PWPS is better than the electricity or diesel water pumping system" occupied the top position. in Hisar and Rohtak district farmers, while in district Jhajjars 'farmers the 1<sup>st</sup> rank statement is, "PWPS is most important factor to sustain the grain revolution". land holding, education, socio-economic status, extension contact, source of income, and risk orientation were found to have positive and significant regression coefficient whereas age, caste, occupation, house type, social participation, material possession, farm power, family type, change proneness and fatalism were found to have positive but non significant regression coefficient with the knowledge of PWPS farmers.

**Keywords:** knowledge, attitude, and photovoltaic water pumping system

### INTRODUCTION

Energy is essential for each and every living organism. It has always been the key to man's greatest goals and to his dream of better world. The history of solar energy utilization is so shrouded in antiquity that it is difficult to know the facts. The escalating price of oil since 1973 and its possible shortage has fuelled interest in the development of alternative energy sources such as solar energy. The development of solar energy applications is aimed primarily in the rural areas owing to a special feature of cost effectiveness as compared to conventional fuel. The factual position is that 85 per cent of the world power consumption goes to the rich and only 15 per cent goes to the 2.4 billion poor people. The population of India is increasing day by day. It has direct impact on ever increasing problems of food, fertilizer and energy consumption (fuel). Therefore, the need for developing renewable sources of energy has become necessary as the existing fossil fuel resources are fast depleting. Haryana Energy Development Agency (HAREDA) has undertaken the task of popularizing the use of solar energy in the state. It is also supplying photovoltaic water pump to the farmers with subsidy, which is compensated from the funds of Rs.2, 68,000 received from Ministry of Non-Conventional Energy

Sources, Govt. of India, on a 2 HPDC Monoblock pump of 1800 watt. In a solar PV water pumping system, PV modules convert sunlight directly into electricity and this energy can be used to run an electric motor pump set for pumping water. Photovoltaic-based water pumping system is eco-friendly in nature and pollution free technology can be more appropriate to the needs of the developing countries like India than Solar/ Thermal Energy Conversion (STEC).

### OBJECTIVE

To know the knowledge and attitude of farmers regarding Photovoltaic Water Pumping System comparative study between Hisar, Rohtak and Jhajjar districts of Haryana State

### METHODOLOGY

The study has been conducted in purposively selected Hisar, Rohtak and Jhajjar districts of Haryana state. In these districts, the highest number of farmers have adopted Photovoltaic Water Pumping Systems. A list of all the beneficiaries of Photovoltaic Water Pumping System, who have installed this system at their farm up to March 2003, has been prepared. All the beneficiaries from Hisar (61), Rohtak

## Extension Strategies for Doubling the Farmers' Income for Livelyhood Security

(47) and Jhajjar (33) have been selected in the sample. In this way, a total number of 141 respondents have been selected in the sample for the study. Data have been collected through pre-tested structured interview schedule from the respondents to assess the knowledge and attitude towards PWPS.

### RESULTS AND DISCUSSION

#### Farmers' knowledge level regarding PWPS of Hisar, Rohtak and Jhajjar district

This section is concerned with the farmers' knowledge about various aspects i.e. technical knowledge, general knowledge and overall knowledge about PWPS. The aspect wise knowledge has been presented and discussed in this section

The distribution of respondents according to their technical knowledge level of PWPS is presented in the Table 1 which shows that maximum number of respondents 67.21 per cent fell under medium technical knowledge, whereas 18.04 and 14.75 per cent respondents had high and low technical knowledge level respectively in Hisar District. The Table 1, also shows that maximum number of farmers 73.77 per cent belonged to medium level of general knowledge. Further, 22.96 per cent farmers belonged to high level of general knowledge whereas 3.27 per cent farmers were having

low level of general knowledge. The Table 1 shows that maximum number of respondents 70.49 per cent fell under medium overall knowledge group, whereas 22.96 and 6.55 per cent respondents had high and low overall knowledge level respectively in Hisar district. The study further reveals that majority of the farmers 72.34 per cent fell under medium technical knowledge whereas 21.27 and 6.39 per cent farmers had low and high technical knowledge of Rohtak district. An examination of Table 1 indicates that majority of respondents 80.86 per cent belonged to medium level of general knowledge. Further, 10.63 and 8.51 per cent farmers belong to high and low level of general knowledge respectively in Rohtak district. The distribution of respondents according to their overall knowledge has been presented in the Table 1, showing that a majority of the respondents 80.85 per cent belong to medium level of overall knowledge. Further, 12.76 and 6.38 per cent farmers belong to low and high level of overall knowledge respectively in Rohtak district.

The distribution of respondents according to their technical knowledge has been presented in the Table 1, which reveals that a maximum number of the farmers 60.60 per cent have medium level of technical knowledge; followed by 21.22 and 18.18 per cent farmers having high and low technical knowledge respectively in Jhajjar district.

**Table 1: Farmers' knowledge level regarding PWPS of Hisar, Rohtak and Jhajjar districts**

**n=141**

Variables	Categories	Score Range	Hisar (n=61)		Rohtak (n=47)		Jhajjar (n=33)	
			Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Technical knowledge	Low	Below 9	09	14.75	10	21.27	06	18.18
	Medium	9 to 16	41	67.21	34	72.34	20	60.60
	High	Above 16	11	18.04	03	06.39	07	21.22
General knowledge	Low	Below 10	02	03.27	04	08.51	03	09.09
	Medium	10 to 18	45	73.77	38	80.86	19	57.58
	High	Above 18	14	22.96	05	10.63	11	33.33
Overall knowledge	Low	Below 18	04	06.55	06	12.76	05	15.15
	Medium	18 to 34	43	70.49	38	80.85	18	54.54
	High	Above 34	14	22.96	03	06.38	10	30.31

The distribution of respondents according to their general knowledge has been presented in the Table 1, revealing that a maximum number of the farmers 57.58 per cent belong to medium level of general knowledge. Further, 33.33 per cent farmers belong to high level of general knowledge, whereas 9.09 per cent farmers are having low level of general knowledge in Jhajjar district.

The distribution of the respondents according to their overall knowledge has been presented in the Table1, revealing that a maximum number of the farmers 54.54 per cent belong to medium level of overall knowledge. Further,

30.31 per cent farmers belong to high level of overall knowledge, whereas 15.15 per cent farmers have low level of overall knowledge in Jhajjar district.

If we compare the technical knowledge, general knowledge and overall knowledge level of these districts, it is found that there is not a very large difference amongst the three districts knowledge level of the respondents regarding PWPS. This is because of the fact that when the farmer installed the PWPS on his farm, some technical points were told by the installer at that time like spv panel rotation with the movement of sun, and the cleaning of spv panel

being essential and therefore, PWPS farmers are well aware about the daily operation of it. The use of PWPS increases the knowledge level of the respondents. But the general knowledge, technical knowledge and overall knowledge level of farmers is at moderate level therefore, there is a need to increase their level of knowledge from medium level to high level of knowledge. It is recommended that there should a proper repetitive educational campaign for popularizing the PWPS. An effective training package will definitely improve the knowledge level of the farmers.

This findings are in conformity with the findings of Sangeetha et al.(2013),Parmar et al.(2014),Kaur et al. (2015), Kumari et al.(2015), Pratap et al.(2016),Altalb and Filipek (2016), Bashir et al. (2017), Rani et al.(2017).

**Farmers’ attitude towards PWPS of Hisar, Rohtak and Jhajjar district**

Table 2. That a majority (60.65 per cent) of the respondents have favourable attitude. Farmers, 22.95 % and 16.4 %, are having neutral and unfavourable attitude respectively towards PWPS in Hisar district. Further, it is evident from the Table 2 that a maximum number of

respondents, 55.32 per cent, had favourable attitude. Farmers, 25.53 % and 19.15 %, are having neutral and unfavourable attitude respectively towards PWPS in Rohtak district. In case of Jhajjar district, farmers with a majority (57.57 per cent) of the respondents had favourable attitude (Table 2). Respondents, 27.27 % and 15.15 %, are having neutral and unfavourable attitude respectively towards PWPS

The results regarding the attitude of farmers towards Photovoltaic Water Pumping System (PWPS) of irrigation reveals that a majority of farmers have favourable and positive attitude towards PWPS. The farmer understands the importance of PWPS involving one time investment: no fuel requirement; with a better technology than the electricity / diesel water pumping system.

This may be due to the fact that the farmers have realized the importance of PWPS which is an improved form of technology for the purpose of irrigation.

The findings are in line with the findings of Singh et al. (2016), Kumar and Godara (2017) and Kalita et al. (2017), who have found that maximum number of farmers have favourable attitude

**Table 2: Farmers’ attitude towards PWPS of Hisar, Rohtak and Jhajjar districts.**

**n=141**

Level of attitude	Score Range	Hisar (n=61)		Rohtak (n=47)		Jhajjar(n=33)	
		Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Favourable	45 to 60	37	60.65	26	55.32	19	57.57
Neutral	29 to 44	14	22.95	12	25.53	09	27.27
Unfavourable	12 to 28	10	16.4	9	19.15	05	15.15

**Aspects Wise Farmers’ Attitude towards PWPS of Hisar, Rohtak and Jhajjar district**

It is apparent from Table 3 that the statement, “PWPS is better than the electricity or diesel water pumping system” occupies the top position according to relative importance with a mean score of 4.88. The 2<sup>nd</sup> rank statement (mean score 4.60), “PWPS can solve / reduce the diesel requirement of the country”. The 3<sup>rd</sup> rank statement (mean score 4.57) is, “This technology is useful for the farmers”. The 4<sup>th</sup> rank statement (mean score 4.55) is, “PWPS is an eco-friendly”. The 5<sup>th</sup> rank statement (mean score 4.50) is, “Continuous availability of water motivates the farmers to shift towards diversification by adopting the fruit, vegetable, floriculture

and herbal gardening etc.” The 6<sup>th</sup> rank statement (mean score 4.40) is, “PWPS is most important factor to sustain the grain revolution”. The 7<sup>th</sup> rank statement (mean score 4.36) is, “PWPS is must for higher crop production”. The 8<sup>th</sup> rank statement (mean score 4.09) is, “PWPS technology improves the living standard of the farmers”. The 9<sup>th</sup> rank statement (mean score 3.31) is, “This technology is only scientific stunt (drama)”. The 10<sup>th</sup> rank statement (mean score 3.14) is, “PWPS does not increase the farmers income”. The 11<sup>th</sup> rank statement (mean score 2.91) is, “PWPS is difficult to operate”. The 12<sup>th</sup> rank statement (mean score 2.49) is, “It is funny to say PWPS as an eco-friendly technology”. These statements are from the farmers of Hisar district.

**Table 3: Aspects wise farmers' attitude towards PWPS of Hisar, Rohtak and Jhajjar districts**

n=141

Sr. No.	Statements	Hisar (n=61)			Rohtak (n=47)			Jhajjar (n=33)		
		Mean score	Total score	Rank order	Mean score	Total score	Rank order	Mean score	Total score	Rank order
1	Photovoltaic Water Pumping System (PWPS) is difficult to operate	2.91	178	XI	2.55	120	XII	3.12	103	XI
2	PWPS is better than the electricity or diesel water pumping system.	4.88	298	I	5.1	240	I	4.24	140	VI
3	PWPS technology improves the living standard of the farmers.	4.09	250	VIII	3.76	177	VIII	4.54	150	II
4	This technology is only scientific stunt (drama)	3.31	202	IX	2.74	129	X	3.78	125	IX
5	PWPS is most important factor to sustain the green revolution.	4.40	269	VI	3.82	180	VII	4.63	153	I
6	PWPS does not increase the farmer's income.	3.14	192	X	2.76	130	IX	3.06	101	XII
7	It is funny to say PWPS as an eco friendly technology	2.49	152	XII	2.72	128	XI	3.39	121	X
8	This technology is useful for the farmers.	4.57	279	III	4.51	212	IV	4.33	143	V
9	PWPS can solve /reduce the diesel requirement of the country.	4.60	281	II	4.59	216	III	4.45	147	III
10	PWPS is must for higher crop production.	4.36	266	VII	4.29	202	VI	3.84	127	VIII
11	Continuous availability of water motivates the farmers to shift towards diversification by adopting the fruit, vegetable, floriculture and herbal gardening etc.	4.50	275	V	4.76	224	II	4.09	135	VII
12	PWPS is an eco-friendly.	4.55	278	IV	4.38	206	V	4.36	144	IV

It is apparent from Table 3 that the 1<sup>st</sup> rank statement (mean score 5.10) is, "PWPS is better than the electricity or diesel water pumping system". The 2<sup>nd</sup> rank statement (mean score 4.76) is, "Continuous availability of water motivates the farmers to shift towards diversification by adopting the fruit, vegetable, floriculture and herbal gardening etc". The 3<sup>rd</sup> rank statement (mean score 4.59) is, "PWPS can solve / reduce the diesel requirement of the country". The 4<sup>th</sup> rank statement (mean score 4.51) is, "This technology is useful for the farmers". The 5<sup>th</sup> rank statement (mean score 4.38) is, "PWPS is an eco-friendly". The 6<sup>th</sup> rank statement (mean score 4.29) is, "PWPS is must for higher crop production". The 7<sup>th</sup> rank statement (mean score 3.82) is, "PWPS is most important factor to sustain the grain revolution". The 8<sup>th</sup> rank statement (mean score 3.76) is, "PWPS technology improves the living standard of the farmers". The 9<sup>th</sup> rank statement (mean score 2.76) is, "PWPS does not increase the farmers income". The 10<sup>th</sup> rank statement (mean score 2.74) is, "This technology is only scientific stunt (drama)". The 11<sup>th</sup> rank statement (mean score 2.72) is, "It is funny to say PWPS as an eco-friendly technology". The 12<sup>th</sup> rank statement (mean score 2.55) is, "PWPS is difficult to operate". These ranks

have been given by the farmers in Rohtak district.

It is apparent from Table 3 that the 1<sup>st</sup> rank statement (mean score 4.63) is, "PWPS is most important factor to sustain the grain revolution". The 2<sup>nd</sup> rank statement (mean score 4.54) is, "PWPS technology improves the living standard of the farmers". The 3<sup>rd</sup> rank statement (mean score 4.45) is, "PWPS can solve / reduce the diesel requirement of the country". The 4<sup>th</sup> rank statement (mean score 4.36) is, "PWPS is an eco-friendly". The 5<sup>th</sup> rank statement (mean score 4.33) is, "This technology is useful for the farmers". The 6<sup>th</sup> rank statement (mean score 4.24) is, "PWPS is better than the electricity or diesel water pumping system". The 7<sup>th</sup> rank statement (mean score 4.09) is, "Continuous availability of water motivates the farmers to shift towards diversification by adopting the fruit, vegetable, floriculture and herbal gardening etc". The 8<sup>th</sup> rank statement (mean score 3.84) is, "PWPS is must for higher crop production". The 9<sup>th</sup> rank statement (mean score 3.78) is, "This technology is only scientific stunt (drama)". The 10<sup>th</sup> rank statement (mean score 3.39) is, "It is funny to say PWPS as an eco-friendly technology". The 11<sup>th</sup> rank statement (mean score 3.12) is,

“PWPS is difficult to operate”. The 12<sup>th</sup> rank statement (mean score 3.06) is, “PWPS does not increase the farmers income”. These ranks have been given by the farmers in Jhajjar district.

**Coefficient of Regression between Independent Variables and Farmers’ Knowledge Level towards PWPS of Hisar district**

A perusal of coefficients of regression, presented in Table 4, indicates that land holding, education, socio-economic status, extension contact, source of income and risk orientation are found to have positive and significant regression coefficient whereas age, caste, occupation, house type, social participation, material possession, farm power family type, change proneness and fatalism are found to have positive but non-significant regression coefficient with the knowledge of PWPS farmers in Hisar district. The regression coefficient shows further that the entire background variable jointly explains 65 per cent variation in the farmers of PWPS. The calculated ‘F’ value in all the cases is found to be significant at 5 per cent level of significance. In other words, one unit change in the level of land holding, education, socio-economic status, extension contact, source of income and risk orientation lead to a corresponding change of 0.292, 0.864, 0.664, 0.586, 0.338 and 0.824 units in the knowledge level of

PWPS respectively.

**Coefficient of Regression between Independent Variables and Farmers’ Knowledge Level towards PWPS of Rohtak district**

A perusal of coefficients of regression, presented in Table 4, indicates that education, farm power, socio-economic status, extension contact, source of income, risk orientation, and change proneness are found to have positive and significant regression coefficient whereas age, caste, occupation, house type, social participation, land holding, material possession, family type and fatalism are found to have positive but non-significant regression coefficient with the knowledge of PWPS farmers in Rohtak district. The regression coefficient further shows that the entire background variable jointly explains 61 per cent variation in the farmers of PWPS. The calculated ‘F’ value in all the cases is found to be significant at 5 per cent level of significance. In other words, one unit change in the level of education, farm power, socio-economic status, extension contact, source of income, risk orientation and change proneness may lead to a corresponding change of 0.118, 0.853, 0.399, 0.424, 0.241, 0.636 and 0.207 units respectively in the knowledge level of PWPS.

**Table 4: Coefficient of regression between independent variables and farmers’ knowledge level towards PWPS of Hisar, Rohtak and Jhajjar district n=141**

Sr. No.	variables	Hisar		Rohtak		Jhajjar	
		b Values	t Values	b Values	t Values	b Values	t Values
1	Age	0.32	0.203	0.965	0.599	0.157	0.618
2	Caste	0.196	1.727	0.898	0.962	0.167	0.698
3	Occupation	0.964	0.951	0.118	0.954	0.745	0.468
4	House type	0.775	0.535	0.596	0.208	0.994	0.505
5	Social participation	0.342	0.128	0.657	0.942	0.746	0.359
6	Land holding	0.292*	2.233	0.312	0.528	0.253	0.106
7	Material possession	0.127	0.66	0.181	0.912	0.804	0.447
8	Education	0.864*	2.477	0.118*	2.511	0.644*	2.346
9	Farm power	0.484	1.061	0.853*	2.565	0.288	0.285
10	Family type	0.689	1.652	0.161	0.413	0.235*	2.226
11	socio-economic status	0.664*	2.238	0.399*	2.922	0.697*	2.117
12	Extension contact	0.586*	2.453	0.424*	2.186	0.216*	2.139
13	Source of income	0.338*	2.521	0.241*	2.104	0.199*	2.107
14	Risk orientation	0.824*	2.861	0.636*	2.418	0.276*	2.232
15	Change proneness	0.402	0.162	0.207*	2.667	0.181*	2.351
16	Fatalism	0.217	0.134	0.867	0.496	0.221	0.149
		R <sup>2</sup> 0.65		R <sup>2</sup> 0.61		R <sup>2</sup> 0.68	

\*Significant at the 5% level.

## *Extension Strategies for Doubling the Farmers' Income for Livelyhood Security*

### **Coefficient of Regression between Independent Variables and Farmers' Knowledge Level towards PWPS of Jhajjar district**

A perusal of coefficients of regression, presented in Table 4, indicates that education, family type, socio-economic status, extension contact, source of income, risk orientation and change proneness are found to have positive and significant regression coefficient whereas age, caste, occupation, house type, social participation, land holding, material possession, farm power and fatalism are found to have positive but non-significant regression coefficient with the knowledge of PWPS farmers in Jhajjar district. The regression coefficient further shows that the entire background variable jointly explained 68 per cent variation in the farmers of PWPS. The calculated 'F' value in all the cases has been found to be significant at 5 per cent level of significance. In other words, one unit change in the level of education, family type, socio-economic status, extension contact, source of income, risk orientation and change proneness may lead to a corresponding change of 0.644, 0.235, 0.697, 0.216, 0.199, 0.276 and 0.181 units respectively in the knowledge level of PWPS.

The findings of the study are in agreement with the findings of Jaganathan et al.(2012), Ogunjimi and Farinde (2012), Bhushan et al.(2013), Patel and Vajapara (2016), Rojhet et al.(2016), Kumar et al. (2016), Poddaret et al.(2017) and Kumar et al. (2017) who observed that age, caste, occupation, house type, material possession and farm power have positive but non-significant multiple regression with the knowledge of the respondent.

### **CONCLUSION**

It can be concluded from the results that majority of the farmers belong to medium level of technical knowledge, general knowledge and overall knowledge of Hisar, Rohtak and Jhajjar districts. There is need to increase knowledge level of farmers. Majority of farmers have favourable and positive attitude towards PWPS in all three districts.

It has been found that land holding, education, socio-economic status, extension contact, source income and risk orientation are found to have positive and significant regression coefficient whereas age, caste, occupation, house type, social participation, material possession, farm power, family type, change proneness and fatalism are found to have positive but non-significant regression coefficient with the knowledge of PWPS farmers.

### **REFERENCES**

Altalb, A.A.T. and Filipek, T.(2016).The knowledge

level of farmers towards Agricultural Extension in Lublin Province-Poland. *Int. J.Agril.Ext.and R.D.Studies*.3(1):21-29

Bashi, B.P., Venkatachalapathy,T.R., Valsanlan, J. and Rout, P.K.(2017). Impact of Training on knowledge level of Goat Keepers and New Entrepreneurs in Kerala. *Indian Res.J.Ext.Edu*.17(1): 67-70.

Bhushan, B.,Malik, J.S.,Narwal,R.S. and Chanu, T.M. (2013). Analysis of the factors responsible for the Adoption of Agricultural Indigenous Technology Practices. (ITP'S). *Agric. Sci.Digest*.33(2):118-122

Jaganathan, D.,Bahak,R.,Burman,R.R.and Lenin, V. (2012). Knowledge level of farmers on organic farming in Tmil Nadu. *Indian Res.J.Ext.Edu*.12(3):70-73.

Kalita, R.R., Das,M.D. and Bora, S.(2017). Knowledge, Attitude and Practices of farmers Vermiculture Technology. *Indian Res.J.Ext.Edu*.17(4):78-92.

Kaur, K.P.,Kaur,P. and Dhaliwal,R.K.(2015). knowledge level of farmers regarding agronomic practices of direct seeded rice in Punjab. *Int.J.Farm Sci*.5(1):2009-2015.

Kumar, A. and Godara, A.K. (2017).Knowledge and Attitude of farmers towards Zero-Tillage Technology in Haryana. *Agric. Sci. Digest*. 37(3):203-208.

Kumar, A., Rani,S., Lal,M.and Bhatia, J.(2016).Knowledge of farmers regarding Tomato crop production in Karnal district of Haryana. *Indian J.Econ. Dev*.12(1):197-200.

Kuma, V.and Bairathi.R.(2016).Knowledge of Tribal beneficiaries about employment generation activities of KVR. *Ind.J.Ext.Edu*.24: 129-133.

Kumari,V.K. and Rajan, R.R. (2015).Impact of Training on knowledge and adoption level of Chawki rearing centre owner of Karnataka State. *Agric. Sci. Digest*.35(3):203-206.

Ogunjimi,S.I.andFarinde,A,J.(2012).Farmers' knowledge level of Precautionary measures in Agro- chemical usage on Cocoa production in Osun and Edo state Nigeria. *Inter.J.Agril. and Forestry*. 2(4):186-194

Parmar,L.B.,Vihal,V.P.andPrajapati,M. (2014). Knowledge of Vermicompost technology among The Tribal Beneficiaries of National Agricultural innovation project under component-III in Banaskantha District, Gujrat. *Int.J.Agr.Ext*. 2(3):165-168.

- Patel,S.S.andVejapara,V.P.(2016). Knowledge of Ratoon Management Practices by the Sugarcane growers. *Guj.J.Ext.Edu.* 27(1):77-78.
- Poddar,P.K.,Miah,M.A.M.,Uddin,M.M and Dev,D.S.(2017). Conservation agriculture: A farm level practice in Bangladesh. *Agric.Sci.Digest.* 37(3): 197-202.
- Pratap,J.,Sagar,M.P., Chander,M., Khyalia, N.K. and Chaturvedani,A.K. (2016).Scientific knowledge about Poultry Broiler Farming in Barabanki District of Uttar Pradesh. *Ind.J.Ext.Edu.* 52(3&4): 183-187.
- Rani,S., Varma,S.K.,Yadav,V.P.S. and Lal,M.((2017). Gain in Knowledge of Rural Women Regarding Selected Vegetable cultivation Practices through Media Package in Hisar district of Haryana. *Indian Res. J. Ext.Edu.*17(1): 44-52.
- Rojh,R.,Ram,H.,Sharma,S.K.andPrasad,D.(2016). Knowledge and adoption of Improved cultivation Practices of Groundnut by the farmers of Bikaner District of Rajasthan. *Ind.J.Ext.Edu.*24: 108-110.
- Sangeetha,S., Ganesan,R. and Sridhar,P.J.(2013).Study on the knowledge level of farmers on Tomato cultivation under precision farming. *Agric.Sci. Digest.*33(4):284-288
- Singh, A.K., Singh,D., Singh, A., Singh, A., Singh, M., and Kumar , A (2016). Knowledge and Attitude of farmers towards Raised bed and other improved production Technology of Pigeonpea (*CajanusCajan*) for Climate Resilient Agriculture. *Indian Res.J. Ext. Edu.*52 (3&4):135-140.