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Impact of Training Programme on Drip Irrigation Technology in Cotton Production in Madhya Pradesh

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ABSTRACT

Water is as crucial for crops and vegetation as it is for humans and animals. Drip Irrigation is the most efficient water and nutrient delivery system for growing crops. Cotton is an important agro-industrial crop, used in making clothes and in the textile industry, occupying more than 11.3-million-hectare area in India. The technology transfer through training, demonstration and extension activities has been viewed as most important critical factors for increasing agriculture production. The study was conducted in Barwani district of West Nimar region Madhya Pradesh due to its having maximum number of trained farmers of KVK on drip irrigation in cotton production technology. In this study 60 trained and 60 untrained farmers were selected randomly, thus the total sample was consisted of 120 respondents for the study. Majority 60.00 per cent respondents (trained farmers) had medium category of knowledge about cotton production through drip irrigation technology. Out of the total 60 untrained farmers, majority 58.33 per cent respondents had medium knowledge about drip irrigation technology in cotton production category. Majority 58.33 per cent respondents (trained farmers) had medium adoption of drip irrigation technology in cotton production category.

Key words *: Training programme; Cotton production; Drip irrigation; Krishi Vigyan Kendra.*

Water is life. As such, it is a precious resource we all need to conserve and use with care. Although water is comparatively inexpensive in most places, it really is more precious than gold. Drip irrigation's popularity may continue to grow as its benefits become more evident. Increased education and awareness, the availability of more technologically-advanced products and word of mouth exposure are all keys to heightening landscape drip irrigation's role as a significant water-conserving irrigation method. Drip Irrigation is the most efficient water and nutrient delivery system for growing crops. It delivers water and nutrients directly to the plant's root zone, in the right amounts, at the right time, so each plant gets exactly what it needs, when it needs it, to grow optimally. It enables farmers to produce higher yields while saving on water as well as fertilizers, energy and even crop protection products. Drip irrigation is known to be the most efficient irrigation methods with 95-100 per cent water use efficiency. This is compared to sprinkler systems that have 80-85 per cent water use efficiency or flood and furrow that are 60-70 per cent efficient. Efficiency is related to the effectiveness of the system on crop performance and eventually on yield and profitability of the farmer.

Cotton is the most important cash crop. Cotton is the most important fiber crop not only of India but all over the world. It provides the basic raw material to cotton textile industry. Cotton crop is grown in about 70 countries across the world and planted in an area of 31.8 million Hectares. India commands highest share globally (36%) in terms of area under cultivation and the world's third largest producer of cotton after China and the USA. Currently it is grown over 6 per cent of the net sown area. The adoption of improved technology of cotton by the farmers is not uniform due to several reasons. Hence, this study is being undertaken to identify the various factors in relation

to adoption of improved agriculture technology for cotton cultivation.

Training and education are lifelong requirement to improve the living standard of large number of people in the villages. The significance of training for development and mobilization of human resources energies has been recognized long back, but finding out ways for improving effectiveness of training received attention only recently. Keeping this views, Krishi Vigyan Kendra's are the grass-root level training institutions, designed for bridging the gap between the available technologies at the one end and their application for increased production at the other.

In recent years, cultivation of cotton is very popular. The various extension agencies are continuously making efforts to create awareness among the farmers about cultivation of cotton. Krishi Vigyan Kendras and other Govt. Institutes are playing major role for promoting the cultivation of cotton and conducting Training programme, Exhibition, Kisan Mela, Sangosthi and other programme for dissemination of information about cultivation of cotton with low cost and environmentally safe condition. The success of any training programme depends greatly on the perception of the trainees towards it. Hence it is worthwhile to assess the impact of cultivation of cane training programmes in term of trainees' perception so that the farmers may adopt these technologies and enhance their production with low cost and environmentally safe condition. The success of any training programme depends greatly on the perception of the trainees towards it. Hence it is worthwhile to assess impact of training production level of cotton crop through drip irrigation in terms of trainee's perception.

The training brings out the required change in the individuals' behavior for improving his performance therefore, to determine the impact of training on cotton production technology. The present study was under taken with the following objectives:

To study the personal characteristics of trained and untrained farmers.

To determine the level of knowledge and adoption of drip irrigation technology in cotton production among the trained and untrained farmers.

To analyze the relationship between personal characteristics of trained and untrained farmers with their knowledge and adoption of drip irrigation technology in cotton production.

METHODOLOGY

In order to fulfill these objectives, the study was conducted during 2020 in purposively selected Barwani and Thikari blocks of Barwani district of West Nimar region M.P, due to its having maximum number of trained farmers in cotton production technology. A list of villages where training programmes on drip irrigation in cotton production technology were conducted by KVK was prepared and out of which 4 villages were selected randomly. A village wise list of trained farmers, who are trained about drip irrigation in cotton production technology by Krishi Vigyan Kendra was prepared and from each village fifteen trained and fifteen untrained farmers was selected by using simple random sampling method. Thus, the total sample was consisted of 120 respondents for the study. The data were collected with the help of pre-tested interview schedule. The data thus collected was tabulated and presented in the form of tables and graphs as per necessity. Keeping in view the objectives of the study and to draw logical results mean, per centage, standard deviation and correlation tests was applied where they were required.

RESULTS AND DISCUSSION

Distribution of trained and untrained farmers according to their personal characteristics : The data in Table 1 shows that that the majority of the trained farmers were of middle and young age group, educated up to middle and primary school level, had medium social participation, having small and medium size of land holding, medium range of annual income (53.33%), low and high irrigation potential, medium source of information (75.00%), medium innovativeness (58.33%) and medium cosmopoliteness (46.67%).

The data presented in Table 1 reveals that the majority of untrained farmers were in middle aged group (41.67.00%), educated up to middle and primary school level, had medium social participation (48.33%), having small size of land holding (41.67%), medium range of annual income (55.00%), low to medium irrigation potential, medium source of information (75.00%), medium innovativeness (56.67%) and medium cosmopoliteness (45.00%).

Knowledge and adoption of drip irrigation technology in cotton production :

Overall knowledge of drip irrigation technology in cotton production : The data in Table 2 shows that

Table 1. Distribution of respondents according to their personal and socio-economic characteristics

Categories	Trained farmers	Mean	SD	Untrained farmers	Mean	SD
Age						
Young	21 (35.00)			25(41.67)		
Middle	22 (36.67)	1.93	0.79	17(28.33)	1.88	0.84
Old	17 (28.33)			18(30.00)		
Education						
Illiterate	6 (10.00)			9(15.00)		
Primary school	16 (26.67)			17(28.33)		
Middle school	20 (33.33)	1.91	1.10	18(30.00)	1.73	1.18
High school	13 (21.67)			13(21.67)		
Higher second. & above	5 (8.33)			3(5.00)		
Social participation						
Low	23 (38.33)			24(40.00)		
Medium	29 (48.33)	1.75	0.67	29(48.33)	1.71	0.66
High	8 (13.34)			7(11.67)		
Size of land holding						
Marginal	13 (21.66)			13(21.66)		
Small	24 (40.00)	2.28	0.94	25(41.67)	2.30	0.97
Medium	16 26.67)			13(21.67)		
Large	7 (11.67)			9(15.00)		
Annual income						
Low	17 (28.33)			23(38.33)		
Medium	32 (53.33)	1.90	0.68	33(55.00)	1.68	0.59
High	11 (18.33)			4(06.67)		
Irrigation potential						
Low	23 (38.33)			23(38.33)		
Medium	15 (25.00)	1.98	0.87	20(33.33)	1.90	0.81
High	22 (36.67)			17(28.34)		
Source of information						
Low	8 (13.33)			9(15.00)		
Medium	45 (75.00)	4.76	1.43	45(75.00)	4.71	1.49
High	7 (11.67)			6(10.00)		
Innovativeness						
Low	11 (18.33)			11(18.33)		
Medium	35 (58.33)	6.05	1.70	34(56.67)	6.16	1.67
High	14 (23.34)			15(25.00)		
Cosmopoliteness						
Low	11 (18.33)			23(38.33)		
Medium	28 (46.67)	2.16	0.71	27(45.00)	1.78	0.71
High	21 (35.00)			10(16.67)		

Table 2. Respondents knowledge about cotton production with drip irrigation technology

Categories	Trained farmers	%	Untrained farmers	%
Low	09	15.00	17	28.33
Medium	36	60.00	35	58.33
High	15	25.00	8	13.34
Total	60	100.00	60	100.00
Mean	12.68		10.72	
SD	03.96		03.65	
t	02.014*			

*significant at 0.05 level of probability

out of the total 60 trained farmers, majority 60.00 per cent respondents had medium knowledge about drip irrigation in cotton production category, while 25.00 per cent respondents had high level of knowledge about cotton production through drip irrigation technology and only 15.00 per cent of the respondents had low level of knowledge about drip irrigation technology in cotton production. The overall mean and SD score of this category was found to be 12.68 and 3.96 respectively.

It can be also concluded that out of the total 60 untrained farmers, majority 58.33 per cent respondents had medium knowledge about cotton production with drip irrigation technology category, while 28.33 per cent respondents had low level of knowledge about drip irrigation technology in cotton production and only 13.34 per cent of the respondents had high level of knowledge about drip irrigation in cotton production technology. The overall mean and SD score of this category was found to be 10.72 and 3.65 respectively.

The t-test indicated that the mean score of trained farmers Vs untrained farmers varied significantly, from each other. Thus, it can be concluded that majority of the trained as well as untrained farmers were in medium category regarding knowledge about drip irrigation in cotton production technology. *Badodiya et al (2010), Kumar and Dohare (2017)* and *Mahmood et al (2017)* also reported majority of the respondents had medium level of knowledge.

Overall adoption regarding drip irrigation technology in cotton production : The data compiled in Table 3 revealed that out of the total 60 trained farmers, majority 58.33 per cent respondents had medium adoption of drip irrigation technology in cotton production category, while 21.67 per cent respondents

Table 3. Adoption of cotton production with drip irrigation and fertigation technology

Categories	Trained farmers	%	Untrained farmers	%
Low	12	20.00	20	33.33
Medium	35	58.33	33	55.00
High	13	21.67	07	11.67
Total	60	100.00	60	100.00
Mean	08.78		07.55	
SD	03.54		03.48	
t	02.001*			

*Significant at 0.05 level of probability

had high adoption of drip irrigation in cotton production technology and only 20.00 per cent of the respondents had low adoption of drip irrigation in cotton production technology. The overall mean and SD score of this category was found to be 8.78 and 3.54 respectively. This findings with conformity with findings of *Rajula et al (2021)*.

It can be also concluded that out of the total 60 untrained farmers, majority 55.00 per cent respondents had medium adoption cotton production cotton production with drip irrigation technology category, while 33.33 per cent respondents had low adoption of drip irrigation in cotton production technology and only 11.67 per cent of the respondents had high adoption of drip irrigation in cotton production technology. The overall mean & SD score of this category was found to be 7.55 and 3.48 respectively. The t-test indicated that the mean score of trained farmers Vs untrained farmers varied significantly, from each other.

Thus, it can be concluded that majority of the trained as well as untrained farmers were in medium category regarding adoption of cotton production technology. *Sharma (2021)* and *Chouhan et al. (2013)* also revealed that majority of the respondents found in medium category of adoption.

Relationship between personal characteristics of trained and untrained farmers with their knowledge and adoption of drip irrigation technology in cotton production : It is evident from the Table 4 that out of nine independent attributes of trained farmers i.e. education, social participation and innovativeness were found significant with knowledge about cotton production technology at 1 per cent level of significance while size of land holding, irrigation facility, source of information and cosmopoliteness were found

Table 4. Relationships between attributes of respondents with their level of knowledge about cotton production technology

Attributes	Trained farmers		Untrained farmers	
	'r'	t-value	'r'	t-value
Age	0.041^{NS}	0.312	0.102^{NS}	1.014
Education	0.738**	8.329	0.572**	5.310
Social participation	0.329**	2.653	0.357**	2.910
Size of land holding	0.234*	1.832	0.271*	2.144
Annual income	0.264*	2.084	0.269*	2.127
Irrigation potential	0.293*	2.333	0.303*	2.421
Source of information	0.289*	2.299	0.342*	2.771
Innovativeness	0.306*	2.447	0.108^{NS}	1.457
Cosmopoliteness	0.239*	1.874	0.138^{NS}	1.061

** Significant at 1% level of probability
* Significant at 5 % level

significant with knowledge about cotton production technology at 5 per cent level of significance and only one attributes found non-significant i.e. age. The findings of *Badodiya et al (2010)* and *Swetha et al (2019)* were in the same line of the present finding.

It is revealed that in case of untrained farmers, out of nine independent attributes, only education, social participation, size of land holding, annual income and irrigation potential and source of information were significant with knowledge about drip irrigation in cotton production while age, innovativeness and Cosmopoliteness were no significant relationship with knowledge about cotton production technology. The findings of *Badodiya et al (2010)* and *Swetha et al (2019)* were in the same line of the present finding.

In case of trained farmers, Table 5 shows that out of nine independent attributes, education, social participation, land holding, source of information, innovativeness and Cosmopoliteness were found significant with adoption of drip irrigation technology in cotton production at 1 per cent level of significance and rest of the attributes found significant with adoption of cotton production technology at 5 per cent level of significance except age.

It is revealed that in case of untrained farmers, out of nine independent attributes, only age and Cosmopoliteness were found no significant relationship with adoption of drip irrigation

Table 5. Relationships between attributes of trained and untrained farmers with their level of adoption of cotton production technology

Attributes	Trained farmers		Untrained farmers	
	'r'	t-value	'r'	t-value
Age	0.042 NS	0.320	0.166 NS	1.282
Education	0.612**	5.893	0.556**	5.094
Social participation	0.357**	2.910	0.309*	2.474
Size of land holding	0.395**	3.274	0.308*	2.465
Annual income	0.229*	1.791	0.313*	2.509
Irrigation potential	0.294*	2.342	0.263*	2.076
Source of information	0.264*	2.084	0.381**	3.138
Innovativeness	0.367**	3.004	0.109 NS	2.042
Cosmopoliteness	0.334**	2.698	0.055 NS	0.419

** Significant at 1% level of probability
* Significant at 5 % level

technology in cotton production and rest of the attributes were found in significant relationship with adoption of cotton production technology.

Multiple regression analysis between personal characteristics of trained and untrained farmers with their knowledge and adoption of drip irrigation technology in cotton production : The data in the Table 6 shows about untrained farmers, the coefficient of multiple determinations (R^2) indicated that only 49.60 per cent of variation in the knowledge about cotton production through drip irrigation technology could be explained due to 9 independent variables. The highly significant "F" (5.481) value reported the confirmation to the validity of R^2 (0.496) worked out with the variables identified for the study. Thus, the coefficient of multiple determinations (R^2) shows that all the 9 variables jointly explain 49.60 per cent of the variation in knowledge of cotton production technology.

Regarding untrained farmers the coefficient of multiple determinations (R^2) indicated that only 49.4 per cent of variation in the adoption of cotton production through drip irrigation technology could be explained due to 9 independent variables. The highly significant value of "F" (5.428) reported the confirmation to the validity of R^2 (0.494) worked out with the variables identified for the study. Thus, the coefficient of multiple determinations (R^2) shows that all the 9 variables jointly explain 49.40 per cent of the variation in adoption of cotton production technology.

The data in Table-7 revealed about trained farmers, the coefficient of multiple determinations (R^2) indicated that only 66.90 per cent of variation in the knowledge of cotton production through drip irrigation technology could be explained due to 9 independent variables. The highly significant calculated value of "F" (11.257) reported the confirmation to the validity of R^2 (0.669) worked out with the variables identified for the study. Thus, the coefficient of multiple determinations (R^2) shows that all the 9 variables jointly explain 66.90 per cent of the variation in knowledge of cotton production through drip irrigation technology.

Regarding trained farmers the coefficient of multiple determinations (R^2) indicated that only 62.30

Table 6. Multiple regression analysis between personal characteristics of untrained farmers with their knowledge and adoption of cotton production technology

Untrained Farmers					
Knowledge			Adoption		
Coefficients	SE	t-stat	Coefficients	SE	t-stat
-1.986458	1.923495	-1.03273	1.302952	2.006916	0.649231
0.403307	0.469097	0.859752	0.313938	0.489441	0.641421
1.498664	0.339336	4.416464	1.730076	0.354052	4.886495
0.037813	0.512074	0.073843	-0.010189	0.534283	-0.01907
1.022274	0.607628	1.6824	1.497709	0.633981	2.362389
0.470469	0.407171	1.155458	0.193426	0.42483	0.455303
0.437509	0.67723	0.646026	0.301046	0.706601	0.426047
0.381772	0.26505	1.440379	0.349551	0.276545	1.263994
0.194831	0.223176	0.872995	0.011931	0.232855	0.051237
	R^2=0.496			R^2=0.494	
	F=5.481			F=5.428	

Table 7. Multiple regression analysis between personal characteristics of trained with their knowledge and adoption of cotton production technology

Trained Farmers					
Knowledge			Adoption		
Coefficients	SE	t-stat	Coefficients	SE	t-stat
-4.2904	1.995552	-2.14998	1.3949	2.08927	0.667665
-0.5543	0.433374	-1.27894	-0.2628	0.453727	-0.57929
1.2558	0.331765	3.785145	2.3201	0.347346	6.679617
0.0211	0.405072	0.052077	0.1949	0.424095	0.459534
1.3535	0.525128	2.577437	1.4218	0.549789	2.58611
0.4575	0.359525	1.272593	-0.2665	0.376409	-0.70798
0.5631	0.470864	1.195878	0.8179	0.492978	1.659099
0.5569	0.223048	2.496937	0.3553	0.233523	1.521289
0.3116	0.216041	1.44255	0.0506	0.226187	0.223657
	R^2=0.669			R^2=0.623	
	F=11.257			F=9.191	

per cent of variation in the adoption of drip irrigation technology in cotton production could be explained due to 9 independent variables. The highly significant "F" (9.191) value reported the confirmation to the validity of R^2 (0.623) worked out with the variables identified for the study. Thus, the coefficient of multiple determinations (R^2) shows that all the 9 variables jointly explain 62.30 per cent of the variation in adoption of cotton production through drip irrigation technology.

CONCLUSION

KVK is playing most important role in dissemination of technology. Majority 60.00 per cent respondents (trained farmers) had medium knowledge about drip irrigation technology in cotton production category. Out of the total 60 untrained farmers, majority 58.33 per cent respondents had medium knowledge about drip irrigation technology in cotton production category. Majority 58.33 per cent respondents (trained farmers) had medium adoption of drip irrigation technology in cotton production category. Out of the total 60 untrained farmers, majority 55.00 per cent respondents had medium adoption of drip irrigation technology in cotton production category. Education was found very important factor and it had highly significant with knowledge and adoption of trained farmers (value of 'r' were 0.738** and 0.612** respectively). Similarly, in case of untrained farmer, education had also highly significant with knowledge and adoption of trained farmers (value of 'r' were 0.572**and 0.556** respectively).

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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