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Impact of agricultural technology management agency (ATMA) on farmers' information-seeking behavior and decision-making in the Bundelkhand region

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Abstract

Agriculture remains the backbone of rural livelihoods in India, particularly in the Bundelkhand region, which faces challenges such as semi-arid conditions, erratic rainfall, and degraded soil fertility. Farmers in this region struggle with limited access to modern farming technologies, inadequate extension services, and low awareness of scientific practices. The Agricultural Technology Management Agency (ATMA) plays a crucial role in bridging these gaps by facilitating the dissemination of knowledge and technology through collaborations with research institutions, NGOs, and farmers. This study investigates the impact of ATMA interventions on farmers' knowledge, decision-making, and adoption of innovative agricultural practices. A sample of 120 farmers from the Jhansi and Banda districts of Bundelkhand was categorized into those engaging with ATMA and those not, to analyze the differences in factors such as socio-economic status, mass media exposure, and farming knowledge. The results revealed no significant difference in factors like age, farming experience, landholding size, or income between the two groups. However, farmers engaging with ATMA demonstrated significantly higher levels of agricultural knowledge. These findings underscore the importance of improving farmer education and outreach through ATMA, suggesting that tailored strategies and greater integration with other extension services are essential for enhancing adoption of modern agricultural practices and improving farm productivity in the region.

Keywords: ATMA, Bundelkhand, information-seeking behavior, decision-making

Introduction

Agriculture remains the backbone of rural livelihoods in India, and its sustainability is crucial for ensuring food security and economic stability. The Bundelkhand region, spread across Uttar Pradesh and Madhya Pradesh, is characterized by semi-arid conditions, erratic rainfall, frequent droughts, and degraded soil fertility, making agricultural productivity highly uncertain. Farmers in this region face multiple challenges, including limited access to modern farming technologies, inadequate extension services, and lack of awareness regarding scientific agricultural practices. In response to these issues, the Agricultural Technology Management Agency (ATMA) has been playing a pivotal role in bridging the gap between farmers and research institutions to promote technology-driven and knowledge-based farming. ATMA operates as a decentralized institution that facilitates collaboration between research organizations, extension departments, NGOs, and farmers to ensure the effective dissemination of modern agricultural technologies. By focusing on capacity building, participatory learning, and sustainable farming practices, ATMA has played a crucial role in improving farm incomes and enhancing agricultural resilience in Bundelkhand.

ATMA helps farmers in Bundelkhand adopt improved cultivation techniques, climate-resilient crops, and efficient resource management practices. The agency also leverages mass media, ICT tools, and community-based networks to facilitate faster and more effective information sharing among farming communities. Despite ATMA's initiatives, the adoption of improved agricultural technologies is influenced by several factors, including farmers' socio-economic status, experience, education, access to extension services, and exposure to information sources.

This research article aims to analyze the impact of ATMA interventions on farmers’ knowledge, decision-making, and adoption of innovative practices. It further examines the role of mass media, research institutions, and farmer traits such as critical thinking, innovativeness, and experience in influencing their engagement with ATMA programs. The findings will contribute to understanding the determinants of technology adoption and the effectiveness of extension services in the region.

Materials and Methods

Among the seven districts of Bundelkhand region of U.P, Jhansi and Banda districts are purposively selected for study purpose due to the location of ICAR research institutes and agricultural universities. The present study was purposively conducted in the Jhansi and Banda districts of Bundelkhand region due to its proximity with different research institutes and agricultural universities. From each districts three villages were randomly selected. From each village 20 respondents

were selected, thus the total sample was 120. Data were collected from a sample of 120 farmers, categorized into two groups: those who contact ATMA (n=82) and those who do not (n=38). The study employed a combination of t-tests and Mann-Whitney U tests to determine the statistical significance of differences between these groups.

Results and Discussion

The group of farmers contacting and not contacting ATMA for getting information related to agriculture were tested for finding any significant difference in terms of age, farming experience, size of land holding and income to find out the determinants for selecting that particular Agri-KIT. ‘t’ test statistics revealed(from the table 1) that there is no significant difference between the farmers contacting and not contacting the ATMA in terms of age (t= -1.270, p=.226), farming experience (t=-2.132, p=.084), land holding (t=-1.785, p=.138) and income (t=-.418, p=.680)

Table 1: Test of significance for age, farming experience, size of land holding and income of the farmers contacting and not contacting ATMA

Agricultural officer/line departments	N	Mean	Std. Error Mean	Levene's Test for Equality of Variances		T	t-test for Equality of Means		
				F	Sig.		Df	Sig. (2-tailed)	
Age (Years)	Farmers _Not contacting	5	35.60	2.694	.114	.736	-1.102	118	.273
	Farmers _Contacting	115	39.12	.655			-1.270	4.487	.266
Farming exp (Years)	Farmers _Not contacting	5	15.00	1.581	2.204	.140	-1.252	118	.213
	Farmers _Contacting	115	18.60	.594			-2.132	5.204	.084
Landholding (Ha)	Farmers _Not contacting	5	3.20	.663	1.715	.193	-1.296	118	.197
	Farmers _Contacting	115	4.43	.196			-1.785	4.729	.138
Income (Rupee)	Farmers _Not contacting	5	108000.0	4898.979	5.520	.020	-.113	118	.910
	Farmers _Contacting	115	111173.9	5806.218			-.418	21.63	.680

Mass media exposure

Further they were asked to mark their frequency of selected seven mass media exposure in a three point continuum i.e. regularly (3), occasionally (2) and never (1). The frequency,

percentage and mean rank of the response of the farmers who are contacting and not contacting the ATMA working in the study area is as given in the table 2.

Table 2: Summary for Mass media exposure of the farmers contacting and not contacting ATMA

Mass media exposure	Farmers _Not contacting			Farmers _Contacting		
	N	f	Mean Rank	N	F	Mean Rank
Radio	5	4.17	55.00	115	95.83	60.74
Newspaper	5	4.17	60.00	115	95.83	60.52
Television	5	4.17	55.60	115	95.83	60.71
Farm magazine	5	4.17	68.20	115	95.83	60.17
Bulletins	5	4.17	70.00	115	95.83	60.09
Books	5	4.17	47.00	115	95.83	61.09
Films	5	4.17	43.00	115	95.83	61.26

Based on the mean rank of the different mass media it was further analysed to test the significance of these media to influence the farmers to choose and not to choose the ATMA

as the credible agriculture related information source by employing the Wilcoxon Mann-Whitney U test.

Table 3: Test Statistics for Mass media exposure

	Radio	News Paper	TV	Farm Magazine	Bulletins	Books	Films
Mann-Whitney U	260.000	285.000	263.000	249.000	240.000	220.000	200.000
Wilcoxon W	275.000	300.000	278.000	6919.000	6910.000	235.000	215.000
Z	-.671	-.035	-.389	-.578	-.751	-1.035	-1.327
Asymp. Sig. (2-tailed)	.502	.972	.698	.563	.453	.301	.184

Test Statistics is given in the table. From the table 3, it is clear that, all the media (p value for all > 0.00) were not having significant influence in the farmer’s decision to choose ATMA as information source.

Comparison of Knowledge level of the farmers contacting and not contacting ATMA

In order to assess the level of knowledge and its impact of the decision-making behaviour of the farmers to contact and not to contact the ATMA to gather the information regarding agriculture and allied subjects a tested tool consisted of items

were used. The responses were recorded in a five point continuum starting from strongly agree to strongly disagree. Total mean rank of knowledge level of the contacting farmers was 61.99 and mean rank for the farmers who are not contacting the state departmental official for information was 26.20. This has been further analysed to test the significance.

Table 4: Test Statistics for Knowledge level

Total Knowledge level	
Mann-Whitney U	116.000
Wilcoxon W	131.000
Z	-2.309
Asymp. Sig. (2-tailed)	.021

The test statistics revealed that ($z = -2.309$, $p = .021$) knowledge level of these two groups (farmers contacting and farmers not contacting agri. input dealers) are significantly different. Farmers contacting ATMA have more knowledge compared to the farmers who were not contacting. Because of this we can state that present knowledge regarding the farming practices were influencing the farmers' decision to contact or not to contact ATMA for agriculture related information seeking.

Comparison of Critical thinking traits of the farmers contacting and not contacting ATMA

In order to assess the level of Critical thinking traits and its impact of the decision making behaviour of the farmers to contact and not to contact the ATMA to gather the information regarding agriculture and allied subjects, a tested tool consisted of 20 items were used. The responses were recorded in a five point continuum starting from strongly agree to strongly disagree. Total mean rank of Critical thinking of the contacting farmers is 61.23 and mean rank for the farmers who are not contacting the ATMA for information is 43.70. This has been further analysed to test the significance.

Table 5: Test Statistics for critical thinking

Mann-Whitney U	203.500
Wilcoxon W	218.500
Z	-1.107
Asymp. Sig. (2-tailed)	.268

The test statistics of Mann-Whitney U test showed that ($z = -1.107$, $p = .268$) critical thinking pattern of these two groups (farmers contacting and farmers not contacting ATMA) were not significantly different. It can be inferred that critical thinking ability of the farmers were not influencing their decision to contact or not to contact the ATMA for agriculture related information seeking

Comparison of Innovativeness of the farmers contacting and not contacting ATMA

Level of innovativeness and its impact on the decision making behaviour of the farmers to contact and not to contact the agri. ATMA to collect the information regarding agriculture and allied subjects were assessed with the help of a tested tool consisted of 10 items. The responses were noted in a five point continuum starting from strongly agree (5) to strongly disagree (1). Total mean rank of innovativeness of the contacting farmers is 60.57, and mean rank for the farmers who are not contacting the ATMA for information is 58.80. This has been further analysed to test the significance on the decision making.

Table 6: Test Statistics for Innovativeness

Mann-Whitney U	279.000
Wilcoxon W	294.000
Z	-.112
Asymp. Sig. (2-tailed)	.911

The test of significance using Mann-Whitney U showed ($z = -.112$, $p = .911$) a non-significant difference between these two groups (farmers contacting and farmers not contacting ATMA) in terms of innovativeness

Conclusion

The study aimed to analyze the impact of farmers' engagement with the Agricultural Technology Management Agency (ATMA) in obtaining agricultural information and its influence on their decision-making. The results indicated no significant difference between farmers contacting and not contacting ATMA regarding their age, farming experience, landholding size, and income. Similarly, mass media exposure did not significantly influence the decision to seek information from ATMA. However, knowledge level was found to be significantly higher among farmers who contacted ATMA, suggesting that awareness and education play a crucial role in information-seeking behavior.

Furthermore, the results demonstrated no significant differences in critical thinking and innovativeness between farmers engaging with ATMA and those who did not. This suggests that while ATMA plays a role in disseminating knowledge, other factors, such as personal motivation and local advisory services, may also influence farmers' adoption of modern agricultural practices.

Overall, the study highlights the importance of strengthening ATMA's role in farmer education and outreach. To enhance its effectiveness, tailored strategies should be developed to improve awareness, accessibility, and the perceived credibility of ATMA among farming communities. Policymakers should also focus on integrating ATMA with other agricultural extension services to maximize its impact on farmers' decision-making and agricultural productivity.

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