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IMPACT ASSESSMENT OF EXTENSION AND ADVISORY SERVICE PROVIDERS IN A PLURALISTIC EXTENSION SCENARIO

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ABSTRACT

Agriculture has had an enormous effect on national development. To increase productivity, promote food security, and create market linkage, it is imperative to ensure the Impactful Extension and Advisory Services (EAS). There is a wide variety of EAS providers in the pluralistic extension scene, including governmental, private, and non-governmental organizations. Each provider works with distinct mandates and initiatives to support farmers in various agricultural and associated endeavors. Given the heterogeneous landscape, assessing various EAS providers' impact across various metrics is essential. This study primarily evaluates the impacts of these EAS providers: Input dealers, KVK, FPC, ATMA & DoA, either alone or in different combinations in three Districts of West Bengal, considering 80 farmers from each district, a total of 240. Different beneficiary groups are categorized according to their beneficiary status to embrace the Impact Assessment's spillover effect. A composite measure of changes in cropping intensity, practices, skill development, awareness, knowledge, and adoption of innovations was calculated to create the Impact Index. The groups were then compared with respect to the metrics and their Impact Index. An ANOVA was used with a post-hoc test to understand the Impact Index's variance. The outcomes showed notable differences in the impacts that recipients experienced in various combinations. Also demonstrated that influence is generated higher when the Extension mechanism is more pluralistic and how different EAS providers are facilitating in creating meaningful impact.

Keywords: *impact assessment, extension and advisory services (eas), pluralistic extension, ANOVA post-hoc, spill-over effect*

INTRODUCTION

Extension and Advisory Services (EAS) in uplifting farmers' livelihoods is well acknowledged. Extension and advisory services (EAS) have undergone significant changes over the last century, from exclusively public advisory services to pluralistic approach with more significant roles for private, non-governmental, and community-based organizations (Davidson, 2007; Swanson, 2008; Rivera, 2008; Cristovão et al., 2012; Singh et al., 2014; Faure et al., 2016; Rohit et al.,2017). Examining the impact of pluralistic extension approaches is essential to promote cooperation, learning, and sustainable agricultural development; it includes assessing the results of various rural advising service providers and serves as a guide for improvements in extension services. (Christopolos et al., 2012). Davis et al. (2020) argued that the impact assessment of extension services is essential to evaluate their effectiveness, inform policy reforms, enhance financial sustainability, and improve agricultural outcomes for small-scale farmers and rural communities. Faure et al. (2016) concluded that one important outcome of advisory services should be changes in farmers' capacities. The desired change in Awareness, Knowledge, and Skills is argued to be one of the main impact indicators. (Jasinskas & Simanavičienė,2008; Dooley,2020; To-The., & Nguyen-Anh.,2021; Kerr et al.,2022). However, the Impact Assessment of EAS has a spill-over effect because beneficiaries receive information from multiple sources (Anderson & Feder, 2004; Vinaya et al., 2017). This paper will shed light on assessing the impacts of different combinations of four EAS providers in West Bengal State in three districts, namely Agricultural Technology Management Agency & State Department of Agriculture (ATMA & DoA), Krishi Vigyan Kendra (KVK), Farmer Producer Company (FPC) and Input Dealer based on their beneficiaries while embracing the spillover effect. KVK serves as technology transfer training facilities with the goal of minimizing the delay between the creation of new technologies and their dissemination (Chaudhury et al., 2024; Lade et al., 2024; Machapathri et al., 2024; Purnima et al., 2023). FPCs are seen as the primary means of enhancing the sustainability, profitability, and productivity of the country's small and marginal farms (Dechamma et al.,2022). The input dealer is a key touchpoint and one of the most significant information sources for farmers among the several EAS providers (Madhu et al.,2022). As a district-level registered society, ATMA is in charge of organising the district's extension initiatives (Kharade et al.,2021)

OBJECTIVE

To know the impact assessment of extension and

advisory service providers in a pluralistic extension scenario

METHODOLOGY

Samples are selected purposively to represent all Extension and advisory service (EAS) providers, with 20 beneficiaries from each provider and 80 respondents from each District, i.e., Birbhum, Jalpaiguri, and Nadia. In total, 240 beneficiaries are selected. Subsequently, respondents were classified into ${}^4C_4+{}^4C_3+{}^4C_2+{}^4C_1=1+4+6+4=15$ groups based on their utilization of services from other providers. In this case, beneficiaries are distributed in 8 different groups, and the remaining 7 groups have no beneficiaries for the sample shown in Table 1 and Fig. 1. This grouping is done to embrace the spillover effect as it will consider combinations of EAS providers shown in Fig. 1.

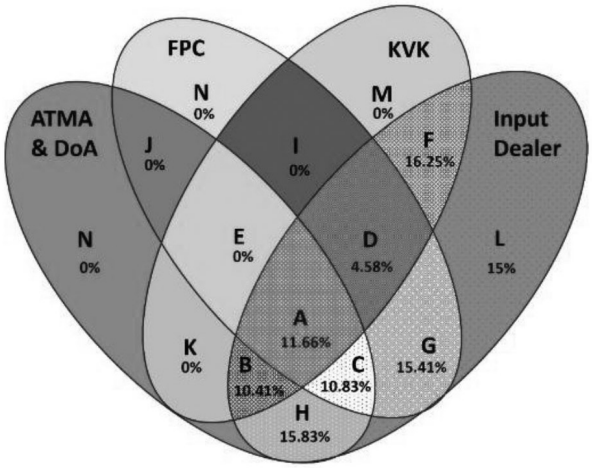

Fig. 1: Beneficiary Distribution in the combination of EAS Providers

Birner et al.'s (2009) analytical framework for analyzing pluralistic agricultural advisory services is adapted according to the study's requirements for impact assessment. For this study, factors for Impact Index were created by taking means of Change in cropping intensity, Change in practices, Skill development, Awareness level, Knowledge level, and Adoption of Innovation. All this data is taken through a structured schedule and normalized with Max-Min Normalization for better comparability. The Impact Index and all factors are compared among the groups to gain insights. Given three or more groups, one-way ANOVA is employed to analyze whether their means significantly differ. It is followed by a post-hoc test to identify significantly different groups and the Facilitating Organization behind the difference.

RESULTS AND DISCUSSION

Table 1: Distribution of beneficiaries among the groups (n=240)

Sr. No.	Group	Label	Number of respondents	Percentage
1	ATMA & DoA + KVK + FPC + Input Dealer	A	28	11.66 %
2	ATMA & DoA + KVK + Input Dealer	B	25	10.41 %
3	ATMA & DoA + FPC + Input Dealer	C	26	10.83%
4	KVK + FPC + Input Dealer	D	11	4.58 %
5	ATMA & DoA + KVK + FPC	E	0	0 %
6	KVK + Input Dealer	F	39	16.25 %
7	FPC + Input Dealer	G	37	15.41 %
8	ATMA & DoA + Input Dealer	H	38	15.83 %
9	KVK + FPC	I	0	0 %
10	ATMA & DoA + FPC	J	0	0 %
11	ATMA & DoA + KVK	K	0	0 %
12	Input Dealer	L	36	15 %
13	KVK	M	0	0 %
14	FPC	N	0	0 %
15	ATMA & DoA	O	0	0 %

As pluralistic extension emphasizes multiple sources of information after categorizing them, it is found that 11.66 % of the respondents are beneficiaries of all the Four EAS providers labeled as A. In contrast, B, C, D, and E groups found to have 10.41%, 10.83%, 4.58%, and 0%, respectively. In total, 25.82% of the sample are beneficiaries of any three EAS providers. F, G, H, I, J, and K are the groups of any two EAS providers and account for 16.25%, 15.41%, 15.83%, 0%, 0%, and 0%, respectively, totaling 47.49%. While L, M, N, and O groups are the beneficiaries of only one organization and account for 15%, 0%, 0%, 0%, and, in total, 15% (Table 1). After categorizing them, it is evident that all the beneficiaries are availing advisory services of Input Dealer (Fig. 1), and the combinations without Input Dealers have no beneficiaries. It shows the high dependence of Farmers on Input Dealers.

Table 2: Comparison of mean among different groups (n=240)

Group		Change in cropping intensity	Change in practice	Skill development	Awareness level	Knowledge level	Adoption of innovation	Impact index
A (n=28)	Mean	**.2760***	.4970	.4944	**.5561***	.1428	.5218	**.4147***
	Std. Dev.	.16179	.26658	.23663	.28129	.06423	.16186	.10770
B (n=25)	Mean	.2306	.4922	**.5150***	.4114	.1350	.4556	.3733
	Std. Dev.	.08377	.26200	.24559	.25859	.07681	.21352	.10052
C (n=26)	Mean	.1923	.5726	.5060	.4044	.1474	.5203	.3905
	Std. Dev.	.08261	.26470	.20842	.20827	.06665	.20928	.09010
D (n=11)	Mean	.2468	**.6616***	.3409	.4519	**.1610***	**.5985***	.4101
	Std. Dev.	.05867	.23101	.14077	.32840	.04379	.13909	.08062
F (n=39)	Mean	.1429	.3540	.3077	.3443	.1410	.4466	.2894
	Std. Dev.	.07178	.25127	.17525	.23590	.05202	.20693	.05799
G (n=37)	Mean	.1828	.4174	.4139	.3000	.1024	.4189	.3059
	Std. Dev.	.07793	.23069	.24478	.21887	.05215	.15499	.06881
H (n=38)	Mean	.1735	.5007	.3438	.4117	.1382	.4013	.3282
	Std. Dev.	.10078	.25545	.22906	.26931	.16024	.21358	.09963
L (n=26)	Mean	.1042	.2870	.2543	.3250	.0792	.3133	.2272
	Std. Dev.	.08609	.21155	.17553	.24714	.05615	.22049	.09690
Total	Mean	.1829	.4458	.3882	.3884	.1265	.4398	.3286
	N	240	240	240	240	240	240	240
	Std. Dev.	.10757	.26343	.23041	.25831	.08662	.20721	.10623

* Highest among the groups

Table 2 & Fig. 2 shows that Group A, with the beneficiary of all the EAS providers, i.e., KVK, ATMA & DoA, FPC, and Input Dealer combined, is the highest on the overall Impact Index (.4147), Change in Cropping intensity (.2760) and Awareness level (.5561). For Change in Practice (.6616), Knowledge level (.1610), and Adoption of Innovation (.5985) are highest for the beneficiaries of FPC, Input Dealer, and KVK combined (Group D). Moreover, for the Skill Development (.5150) group B, which includes beneficiaries from KVK, ATMA & DoA, and Input Dealer, it is the highest. Whereas group L consists only of Input Dealer, is lowest in Impact Index (.2272), Change in Cropping intensity (.1042), Change in Practice (.2870), Skill Development (.2543), Knowledge level (.0792), Adoption of Innovation (.3133). While for the Awareness level (.3000), group G consists of Input Dealer, and FPC is the lowest. As shown in Table 3, the number of EAS providers, i.e., Pluralism, has a positive and significant correlation with all the indicators and the Impact Index. So, it is evident that when a farmer goes for Pluralism or multiple EAS providers, the Impacts will be higher.

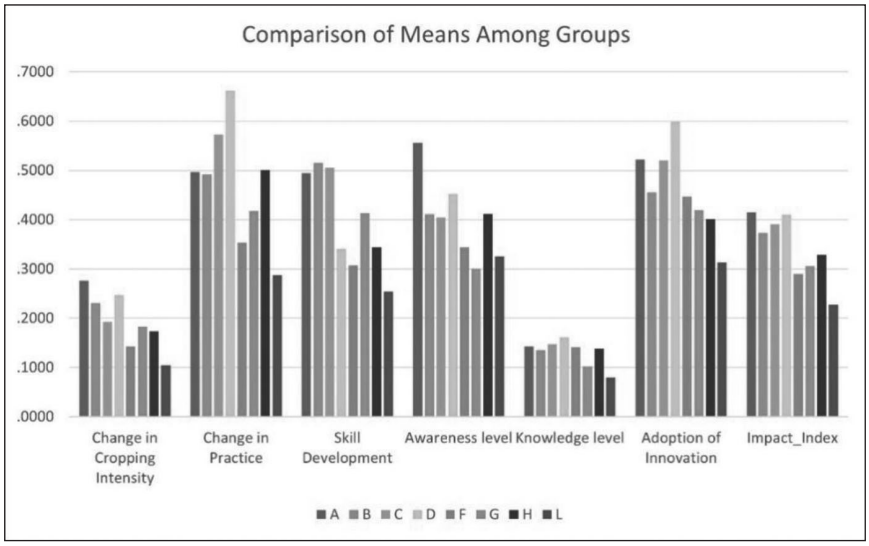

Fig. 2: Comparison of means among different groups

Table 3: Correlation of Impact Index and Indicators with Pluralism (n=240)

Particular	Pluralism	
	Pearson Correlation	Sig. (2-tailed)
Impact Index	.546**	.000
Change in Cropping Intensity	.454**	.000
Change in Practice	.281**	.000
Skill Development	.343**	.000
Awareness level	.248**	.000
Knowledge level	.207**	.001
Adoption of Innovation	.310**	.000
**, Correlation is significant at the 0.01 level (2-tailed). *, Correlation is significant at the 0.05 level (2-tailed).		

Table 4: ANOVA of Impact Indicators (n=240)

ANOVA						
Particular		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Change in Cropping Intensity	Between Groups	.636	7	.091	9.894	.000
	Within Groups	2.130	232	.009		
	Total	2.766	239			
Change in Practice	Between Groups	2.439	7	.348	5.713	.000
	Within Groups	14.147	232	.061		
	Total	16.586	239			
Skill Development	Between Groups	2.101	7	.300	6.576	.000
	Within Groups	10.587	232	.046		
	Total	12.688	239			
Awareness level	Between Groups	1.382	7	.197	3.145	.003
	Within Groups	14.564	232	.063		
	Total	15.947	239			
Knowledge level	Between Groups	.149	7	.021	3.004	.005
	Within Groups	1.644	232	.007		
	Total	1.793	239			
Adoption of Innovation	Between Groups	1.291	7	.184	4.768	.000
	Within Groups	8.971	232	.039		
	Total	10.262	239			

Table 4 shows all the Impact indicators, i.e., Change in cropping intensity. Change in practice, Skill Development, Awareness Level, Knowledge level, and Adoption of Innovation with F Value 9.894, 5.713, 6.576, 3.145, 3.004, and 4.768, respectively, which show significant differences are there among the groups for all the indicators. The Impact Index is created by taking the mean of all these indicators. Table 5 shows that the Impact Index also significantly differs among the groups, with an F value of 16.037.

Table 5: ANOVA of Impact Index (n=240)

ANOVA – Impact Index					
Particular	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	.880	7	.126	16.037	.000
Within Groups	1.818	232	.008		
Total	2.697	239			

The Post Hoc test will determine which group has a significant difference, while the ANOVA verifies whether the groups are significantly different or not. Table 6 only considers the groups with statistically significant differences. For instance, a positive mean difference (0.085) exists between the ATMA & DoA + FPC + Input Dealer (C) group and the FPC + Input Dealer (G) group. Given that both groups share an input dealer and FPC, it implies that ATMA & DOA facilitate these significant differences. Every significant mean difference underwent a similar experiment, and it was discovered that various EAS providers helped with the change for every one of them. The Facilitating EAS Provider, or their spillover impact on the beneficiary, is shown in Fig. 6 as ATMA & DOA coming up 9 times, FPC coming up 7 times, KVK coming up 6 times, and Input Dealer coming up 0 times.

Table 6: Post Hoc Test of Impact Index (n=240)

(X) Group	(Y) Group	Mean Difference (X-Y)	Std. Error	Sig.	Facilitating EAS Provider
ATMA & DoA + FPC +Input Dealer (C)	FPC+ Input Dealer (G)	0.085*	0.023	0.006	ATMA & DOA
ATMA & DoA + FPC + Input Dealer (C)	Input Dealer (L)	0.163*	0.023	0	ATMA & DOA, FPC
ATMA & DoA + Input Dealer (H)	ATMA & DoA + KVK + FPC + Input Dealer (A)	-0.087*	0.022	0.003	KVK, FPC
ATMA & DoA + Input Dealer (H)	Input Dealer (L)	0.101*	0.021	0	ATMA & DOA
ATMA & DoA + KVK + FPC + Input Dealer (A)	FPC + Input Dealer (G)	0.109*	0.022	0	ATMA & DOA, KVK
ATMA & DoA + KVK + FPC + Input Dealer (A)	Input Dealer (L)	0.188*	0.022	0	ATMA & DOA, FPC, KVK
ATMA & DoA + KVK + FPC + Input Dealer (A)	KVK + Input Dealer (F)	0.125*	0.022	0	ATMA & DOA, FPC
ATMA & DoA + KVK + Input Dealer (A)	Input Dealer (L)	0.146*	0.023	0	ATMA & DOA, KVK
ATMA & DoA + KVK + Input Dealer (B)	KVK + Input Dealer (F)	0.084*	0.023	0.006	ATMA & DOA
FPC + Input Dealer (G)	Input Dealer (L)	0.079*	0.021	0.005	FPC
KVK + FPC + Input Dealer (D)	FPC + Input Dealer (G)	0.104*	0.030	0.016	KVK
KVK + FPC + Input Dealer (D)	Input Dealer (L)	0.183*	0.030	0	KVK, FPC
KVK + FPC + Input Dealer (D)	KVK + Input Dealer (F)	0.121*	0.030	0.002	FPC
KVK + Input Dealer (F)	ATMA & DoA + KVK + Input Dealer (B)	-0.084*	0.023	0.006	ATMA & DOA

*, Significant at 0.05 level

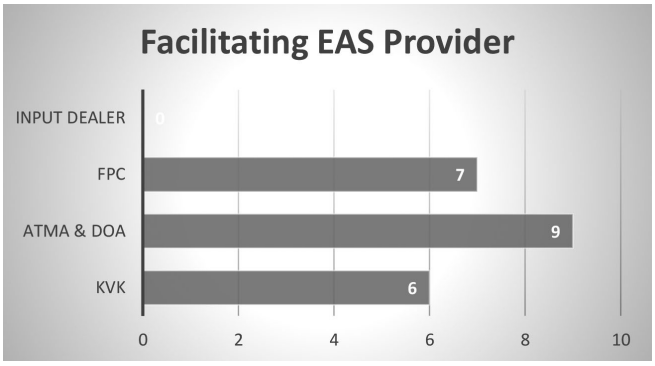

Fig. 3: Frequency of Impact Facilitating EAS Providers

CONCLUSION

Extension and Advisory Service providers have numerous impacts on farmers. The aim of pluralism in extension services is to accept a more expansive mandate for agricultural extension while appreciating the existence and importance of other organizations with differing goals, realities, and behaviors. Evaluating the impact of various providers in a pluralistic environment provides insight into their purpose and efficacy. This technique will consider the spillover effect by grouping the farmers based on their overall beneficiary status. The distribution shows how reliant the farmers are on their input dealers. varied groups with varied combinations of EAS providers were the highest for each metric. Nevertheless, the study indicates that as pluralism increases, so does its overall impact. The groups appear to have very different impacts based on empirical data. Additionally, a post-hoc analysis assisted in identifying the Facilitating EAS provider with the most impact. ATMA & DOA, followed by FPC, KVK, and input dealers, are the most frequently emerging EAS providers facilitating Impact. Despite having a stronger reliance on input dealers, they could not establish themselves as an EAS provider that facilitates impact generation. Therefore, it is obvious that to have a positive impact, the government should encourage greater convergence amongst the EAS providers.

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CONFLICT OF INTEREST

The authors of the paper declare no conflict of interest.

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