



Analyzing Farmers' Perceived Information Need and its Mitigation by Extension and Advisory Service (EAS) Providers in Pluralistic System

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Agriculture is one vital component of national growth. Access to information related to agriculture is crucial for the betterment of farmers. A complex web of connections among Extension and Advisory Service (EAS) providers mitigates the farmers' diverse information needs. Many EAS providers, working alone or in tandem, facilitate this information need in a pluralistic extension scenario. This study attempted to clarify farmers' information needs and provide a comparative evaluation of EAS providers' ability to mitigate those needs. The research was carried out in the Birbhum, Jalpaiguri, and Nadia districts in West Bengal. Four Extension and Advisory Service providers, namely, ATMA & Dept of Agriculture, KVK, Input Dealer, and FPC, from each district were compared based on the farmers' preferences regarding the specific information that each farmer needed. Twenty farmers for each extension advisory service provider, totaling Eighty from every district, and ultimately, two

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hundred and forty respondents from three study districts were examined. The study revealed that information about the Varietal Aspects, Government welfare schemes, Crop Production Techniques, and Market information are the most sought needs. The farmer's Extent of Needs is Multiplied by the percentage of farmers choosing any EAS for the Information Need, to generate a Magnitude Score, and after summing them, a Need Mitigation Score for all the EAS Providers is generated. Based on this score, FPCs emerged as the best need mitigator, followed by ATMA & DoA, KVK, and Input Dealer in descending order.

Keywords: Pluralistic Extension; Information Need; Extension and Advisory Service (EAS); Need Mitigation score.

1. INTRODUCTION

Agriculture is considered one of the main pillars of national growth. It involves a diverse set of information for better decision-making by the farmer to make it from plough to plate. This need is mitigated through a complex set of Extension and Advisory Service (EAS) Providers. Farmers' needs are multifaceted, encompassing aspects like Pest Management, Variety Selection, Market Information, etc. [1]. Farmers in India can access reliable farm information through prioritized channels like Integrated Disease/Pest Management, market insights, credit accessibility, weather forecasting, and government schemes, aiding informed decision-making [2]. Since farmers are the primary stakeholders in agriculture, the effectiveness of these EAS Providers mostly depends on their capacity to address the farmers' needs [3]. The ever-evolving agricultural landscape needs a thorough understanding of the Farmers' information needs, and the lack of Agricultural information is a deterrent to farmers [4]. Improved Access to information leads to high productivity [5]. Despite the Extensive Pluralistic nature of Extension, there is a huge gap between the knowledge base and information sharing with the farmer [6]. In the Indian setting, pluralism in agricultural extension—the existence of a diversity of organizations, models, and institutional arrangements (public, private, community-based, NGOs, etc.) meeting farmers' demands for information, advice, and support services [7]. From the NSSO Survey 77th Round [8], it was found that almost 60% of farm families used the various categories of extension service sources to obtain agricultural information and most of the farmers (35.78%) resorted to private agencies for a variety of needs; input dealers accounted for the majority (33.98%), with the remaining farmers being sparsely distributed among NGOs, Agri Clinic- Agri-Business Centre, private processors, and private commercial

agents. Needuraman et al., [9] stated that the public sector is India's primary provider of extension services and still, it has a limited reach and is overburdened with non-extension duties, which makes it difficult for farmers to mitigate their needs effectively. Saahu et. al, [10] argued about the high need mitigation capability of private extension agencies. While Jose et. al, [11] found that Since meeting farmers' demands requires flexibility, scaling up FPCs is an important task.

In such a context, assessments are needed, where farmers' diverse need for information prevails and which EAS providers are trying to mitigate the same. The study is conducted to assess the farmers' need for information and the most preferred source of mitigating the information need among four Extension and Advisory Service Providers, i.e., Agricultural Technology Management Agency (ATMA) & Dept of Agriculture (DoA), Krishi Vigyan Kendra (KVK), Farmer Producer Companies (FPC) and Input Dealers.

2. MATERIALS AND METHODS

Three Districts of West Bengal were selected purposely based on Cropping Intensity. For Higher Cropping Intensity Nadia ($>Mean+SD$) district, Medium Level of Cropping Intensity Birbhum ($Mean+SD$ to $Mean -SD$) and low Cropping Intensity Jalpaiguri ($<Mean-SD$) were selected. Four EAS Providers, ATMA & DoA, KVK, FPC, and Input Dealer, were selected from each district. From Each EAS Provider, 20 beneficiary farmers were selected, totaling 80 farmers from each district and 240 total farmers. 19 types of information needs regarding agriculture were considered, and their extent of needs was taken on a 5-point scale normalized by Max-Min Normalization and categorized according to their mean and SD distribution. Need Mitigation Score of each Need was calculated using the following formula:

$$\text{Need Mitigation Score of EAS Provider} = \sum \frac{X_i * Y_j}{N_j}$$

Where X_i = Normalized Extent of Need of i th item

Y_j = Frequency of Being the most preferred source of j th EAS Provider

N_j = Number of Beneficiaries of the j th EAS Provider

Based on this Need Mitigation Score, EAS Providers are compared and ranked accordingly.

3. RESULTS AND DISCUSSION

Table 1 shows the beneficiary distribution across the four EAS providers taken for this study. It is evident that all the 240 Farmers i.e. 100% are beneficiaries of Input Dealer, although 60 beneficiaries were taken under KVK but later found that in total 103 farmers (42.91%) are found to be associated with KVK. Similar findings for FPC total of 102 (42.5%), and for ATMA & DoA, 117 farmers (48.75%) are found to be beneficiaries from the above organization.

Table 2 and Fig. 1 show the extent of perceived needs across 19 different needs. After distribution based on their Mean and SD; information regarding Varietal Aspects (76%), Govt Welfare Schemes (76%), Crop Production (72%), Market Information (68%) are perceived as Very High (> Mean + SD) in nature. While IPM (66%), Application of Fertiliser (Dose / Amount / Time / Mix) (64%), Weather Forecasting (64%), Weed Management (52%), ICT Based Advisory Services (52%) fell in the High (Mean to Mean + SD) category. Again, Medium (Mean to Mean - SD) information needs include Modern Cultivation Practice (48%), INM (46%), Post-Harvest Management (40%), Harvesting Method and Timing (38%), Crop Insurance (38%) in descending order of importance. Finally, Organic Farming (34%), Agripreneurship (32%), Farm Mechanization/Custom Hiring Centre (32%), Land Preparation (30%), Irrigation Time and

Method (24%) are categorized into low (< Mean - SD) perceived need.

In Table 3 each information needs frequencies of being most preferred EAS Provider are depicted and percentage are also shown, and it was taken based on beneficiary number. For Example, 57.50 % farmer among the beneficiaries of Input Dealer (240) choose Input Dealer as their most preferred source for Information need regarding Varietal Aspects and 82.91% farmer among the beneficiaries of ATMA & DoA (117) choose ATMA & DoA as their most preferred source of Information need about Govt Welfare Schemes. For all the need Input dealer ranked first (1038) with highest time being best mitigator of information needs like, Varietal Aspect, IPM, Application of Fertiliser (Dose / Amount / Time / Mix), INM, and Weed Management. While FPC ranked second (1035) with highest time being best mitigator of information needs like, Market information, ICT Based Advisory Services, Harvest Method & Timing, Agripreneurship, and Farm Mechanization. ATMA & DoA ranked third (1001) by being most preferred source of information needs like, Govt Welfare Scheme, Modern Cultivation Practice, Post Harvest Management, Crop Insurance, Land Preparation, Irrigation Time and Method. While KVK stood at fourth position (936) with being most preferred source of information needs like, Crop Production, Weather Forecasting, and Organic Farming.

Presuming that one EAS provider will have an advantage over another in terms of need mitigation if they have a greater preference for a specific information need that farmers view as being of a higher extent of need (Fig. 2). For this, the extent of needs was multiplied with percentage of being most preferred need mitigator and magnitude score against each information need, and overall Need Mitigation score for each EAS provider is generated by summing the magnitude score. Based on Need Mitigation Score FPC (5.079) ranked top, KVK (4.772) ranked second, ATMA & DoA (4.351) and Input Dealer (2.241) ranked third and fourth respectively as shown in Table 4.

Table 1. Beneficiary distribution

District	Input Dealer	KVK	FPC	ATMA & DOA
Birbhum	80	33	32	31
Jalpaiguri	80	35	34	45
Nadia	80	35	36	41
TOTAL	240(100%)	103(42.91%)	102(42.5%)	117(48.75%)

Table 2. Extent of information need perceived by farmers

SI No.	Information Needs	Groups	Normalized Extent of Needs
1	Varietal Aspects	Very High	0.76
2	Government Welfare Schemes	(> Mean + SD)	0.76
3	Crop Production		0.72
4	Market Information		0.68
5	IPM	High	0.66
6	Application of Fertiliser (Dose / Amount / Time / Mix)	(Mean to Mean + SD)	0.64
7	Weather Forecasting		0.64
8	Weed Management		0.52
9	ICT Based Advisory Services		0.52
10	Modern Cultivation Practice	Medium	0.48
11	INM	(Mean to Mean - SD)	0.46
12	Post-Harvest Management		0.4
13	Harvesting Method and Timing		0.38
14	Crop Insurance		0.38
15	Organic Farming	Low (< Mean - SD)	0.34
16	Agripreneurship		0.32
17	Farm Mechanization/CHC		0.32
18	Land Preparation		0.3
19	Irrigation Time and Method		0.24
		Mean= 0.50	
		S.D= 0.165	

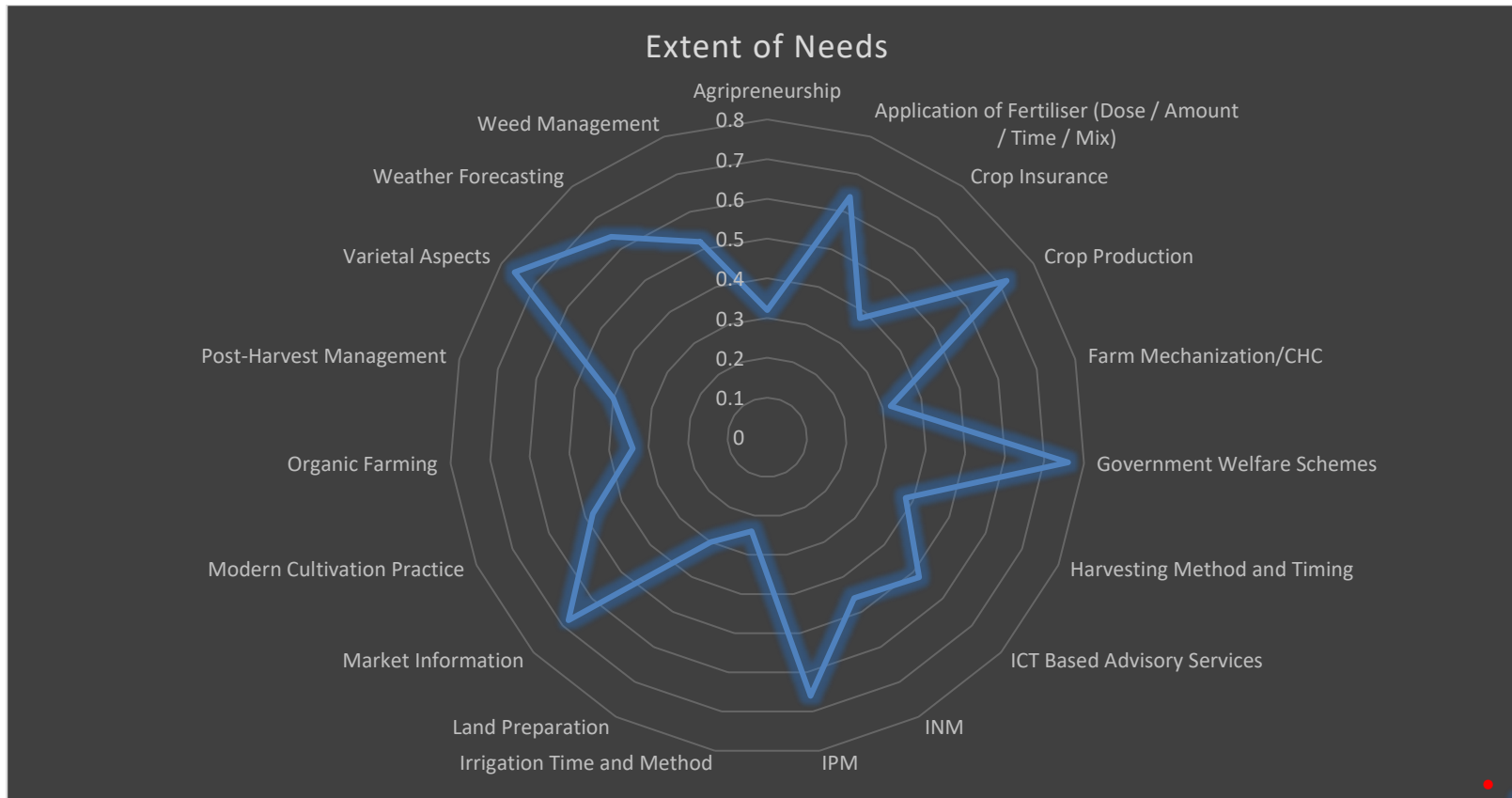


Fig. 1. Extent of Information Need perceived by Farmers

Table 3. Most Preferred Information Need Mitigator

SI No.	Information Needs	Frequency of being Most Preferred Need Mitigator			
		ATMA & DoA (n=117)	KVK (n=103)	FPC (n=102)	Input Dealer (n=240)
1	Varietal Aspects	33 (28.21%)	27 (26.21%)	42 (41.18%)	138 (57.5%)
2	Government Welfare Schemes	97 (82.91%)	77 (74.76%)	58 (56.86%)	8 (3.33%)
3	Crop Production	59 (50.43%)	75 (72.82%)	56 (54.9%)	50 (20.83%)
4	Market Information	52 (44.44%)	43 (41.75%)	97 (95.1%)	48 (20%)
5	IPM	65 (55.56%)	54 (52.43%)	58 (56.86%)	163 (67.91%)
6	Application of Fertiliser (Dose / Amount / Time / Mix)	34 (29.06%)	38 (36.89%)	29 (28.43%)	139 (57.92%)
7	Weather Forecasting	32 (27.35%)	89 (86.41%)	27 (26.47%)	5 (2.08%)
8	Weed Management	27 (23.08%)	22 (21.36%)	16 (15.69%)	175 (72.92%)
9	ICT Based Advisory Services	30 (25.64%)	45 (43.69%)	57 (55.88%)	22(9.17%)
10	Modern Cultivation Practice	59 (50.43%)	45 (43.69%)	52 (50.98%)	24(10%)
11	INM	53 (45.3%)	54 (52.43%)	47 (46.08%)	89 (35.41%)
12	Post-Harvest Management	65 (55.56%)	58 (56.31%)	64 (62.74%)	21 (8.75%)
13	Harvesting Method and Timing	36 (30.77%)	42 (40.78%)	75 (73.53%)	20(8.33%)
14	Crop Insurance	90 (76.92%)	12 (11.65%)	76 (74.51%)	13 (5.42%)
15	Organic Farming	85 (72.65%)	89 (86.41%)	67 (65.69%)	11 (4.58%)
16	Agripreneurship	36 (30.77%)	39 (37.86%)	75 (73.53%)	27(11.25%)
17	Farm Mechanization/CHC	67 (57.26%)	43 (41.75%)	74 (72.55%)	42 (17.5%)
18	Land Preparation	44 (37.61%)	36 (34.95%)	42 (41.18%)	32 (13.33%)
19	Irrigation Time and Method	37 (31.62%)	28 (27.18%)	23 (22.55%)	11(4.58%)
	Total	1001	916	1035	1038
	Rank	3	4	2	1

Table 4. Need Mitigation Score of EAS Providers

	Information Needs	Normalized Extent Of Needs	Magnitude Score			
			ATMA & DOA	KVK	FPC	Input Dealer
1	Varietal Aspects	0.76	0.214	0.199	0.313	0.437
2	Government Welfare Schemes	0.76	0.630	0.568	0.432	0.025
3	Crop Production	0.72	0.363	0.524	0.395	0.150
4	Market Information	0.68	0.302	0.284	0.647	0.136
5	IPM	0.66	0.367	0.346	0.375	0.173
6	Application of Fertiliser (Dose / Amount / Time / Mix)	0.64	0.186	0.236	0.182	0.371
7	Weather Forecasting	0.64	0.208	0.657	0.201	0.016
8	Weed Management	0.52	0.148	0.137	0.100	0.467
9	ICT Based Advisory Services	0.52	0.133	0.227	0.291	0.048
10	Modern Cultivation Practice	0.48	0.242	0.210	0.245	0.048
11	INM	0.46	0.208	0.241	0.212	0.125
12	Post-Harvest Management	0.4	0.222	0.225	0.255	0.035
13	Harvesting Method and Timing	0.38	0.117	0.155	0.279	0.032
14	Crop Insurance	0.38	0.292	0.044	0.283	0.021
15	Organic Farming	0.34	0.247	0.294	0.223	0.016
16	Agripreneurship	0.32	0.098	0.121	0.235	0.036
17	Farm Mechanization/CHC	0.32	0.183	0.134	0.232	0.056
18	Land Preparation	0.3	0.113	0.105	0.124	0.040
19	Irrigation Time and Method	0.24	0.076	0.065	0.054	0.011
	Need Mitigation Score		4.351	4.772	5.079	2.241
	Rank		3	2	1	4

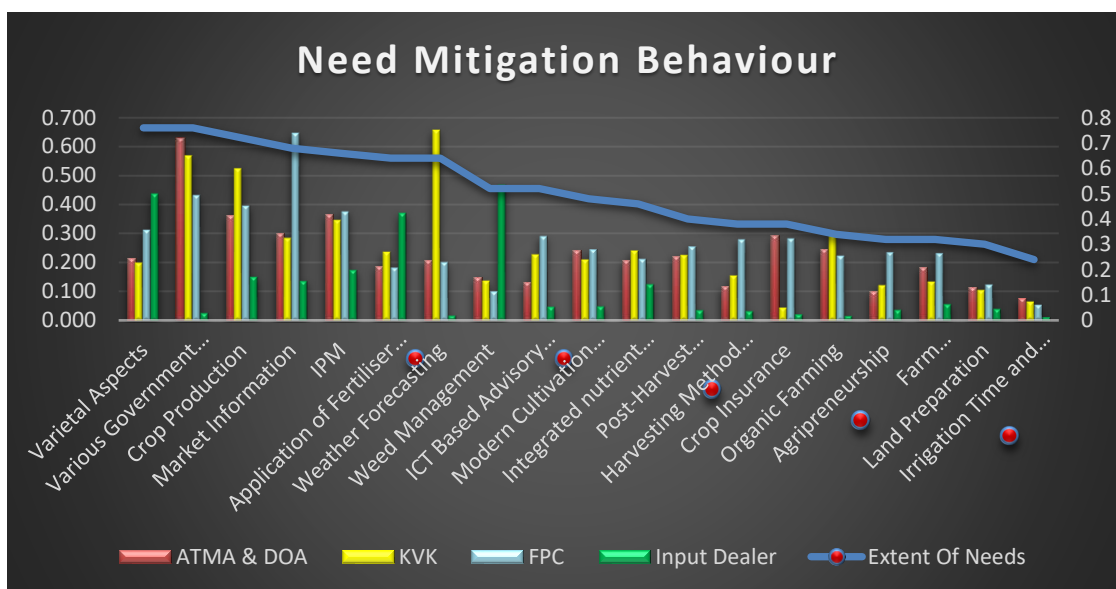


Fig. 2. Need Mitigation Behaviour

4. CONCLUSION

In pluralistic extension system, multiple actors exist to mitigate the farmers' need. Among the above-mentioned EAS providers, Input Dealers have a great penetration in rural areas. It is the most preferred and most accessible option to the maximum of farmers. But when we incorporate two other factors, i.e., the Percentage of Beneficiaries preferring the EAS Provider and the Extent of Needs perceived, the results are altogether different, pushing the Input Dealer into the fourth position. While Farmer Producer Companies (FPC), a community-based organization conceptualized to transfer information to their members effectively, is performing in a great way and ranked top in terms of Need Mitigation score. For Different Information needs, Different EAS Provider is preferred, thus exuding the importance of having pluralism for better access to Information and mitigation of perceived needs of the farming communities.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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