

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

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 study was conducted in three West Bengal districts: Birbhum, Jalpaiguri, and Nadia. 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. 20 farmers for each extension advisory service provider, totaling 80 from every district, and ultimately, 240 respondents from three study districts were examined. The study revealed that information about the Varietal Aspects, Government's schemes, Crop Production Techniques, and Market information are the mostly sought needs. When Farmer's Extent of Needs are Multiplied by the percentage of farmers choosing any EAS for the information need, a Magnitude Score is generated, 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.

Key Words: Pluralistic Extension, Information Need, Extension and Advisory Service (EAS), Need Mitigation Score

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. (Babu et al., 2021)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 (Shukla et al., 2024)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 (Malulu et al., 2021)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 (Madhvan, 2017)⁴. Improved Access to information leads to high productivity (Nikam et al., 2022)⁵. Despite the Extensive Pluralistic nature of Extension, there is a huge gap between the knowledge base and information sharing with the farmer (Glendenning et al., 2010)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 (Sajesh et al., 2018)⁷. From the NSSO Survey 77th Round⁸, 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., 2024⁹ 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. Saahue et al., 2024¹⁰ argued about the high need mitigation capability of private extension agencies. While Jose et al., 2024¹¹ 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.

Materials and Method

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

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

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 Provider are compared and ranked accordingly.

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 102 (42.5%) and for ATMA & DoA, 117 farmers (48.75%) are found to get benefit from the above organization.

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 and Figure 1 shows 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.

Table 2: Extent of Information Need perceived by Farmers

| Sl No. | Information Needs | Groups | Normalized Extent of Needs |
|--------|--|-------------------------------|----------------------------|
| 1 | Varietal Aspects | Very High ($>$ Mean + SD) | 0.76 |
| 2 | Government Welfare Schemes | | 0.76 |
| 3 | Crop Production | | 0.72 |
| 4 | Market Information | | 0.68 |
| 5 | IPM | High (Mean to Mean + SD) | 0.66 |
| 6 | Application of Fertiliser (Dose / Amount / Time / Mix) | | 0.64 |
| 7 | Weather Forecasting | | 0.64 |
| 8 | Weed Management | | 0.52 |
| 9 | ICT Based Advisory Services | | 0.52 |

| | | | |
|----|------------------------------|----------------------------------|------|
| 10 | Modern Cultivation Practice | Medium (Mean to Mean - SD) | 0.48 |
| 11 | INM | | 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 | |

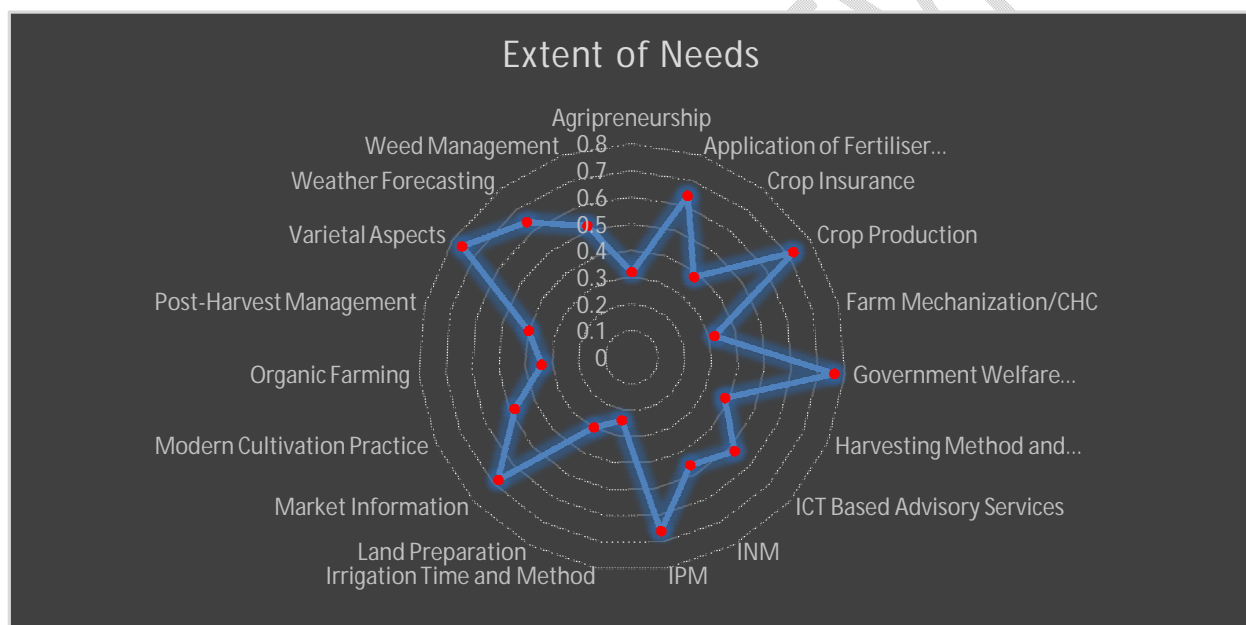


Fig 1: Extent of Information Need perceived by Farmers

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.

Table 3: Most Preferred Information Need Mitigator

| Sl 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 |

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 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 |

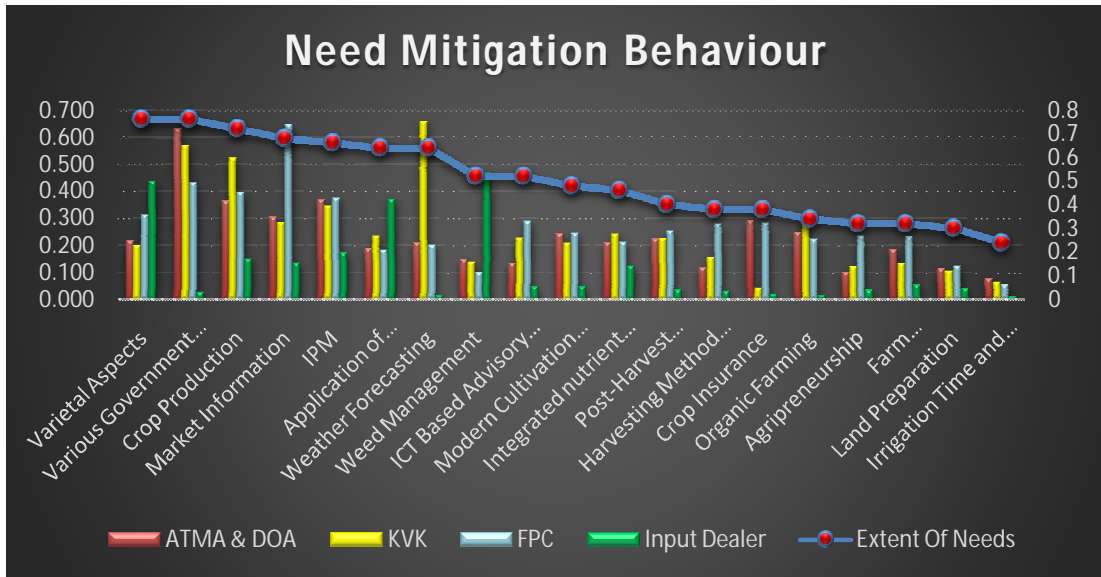


Fig 2: Need Mitigation Behaviour

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.

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UNDER PEER REVIEW

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