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Assessing Smallholder Households' Perception towards Effectiveness of Agricultural Extension and Advisory Services in Ensuring Food Security during COVID-19

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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

The study aims to assess the farm households' perception towards Agricultural Extension and Advisory Services (EAS) during the pandemic and identify the socio-economic factors influencing the perception of smallholder households in selected rural areas of Tamil Nadu. For the purpose of the research, 270 rural households belonging to farm families were selected through a multistage stratified random sampling method. The perception towards EAS effectiveness was assessed based on parameters such as communication, technological interventions and mobilizing farmers. The results revealed that information about government schemes was perceived to be the more effective intervention of EAS with a mean rank of 2.29 followed by online training activities (Mean

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rank of 2.16). Socio-economic characteristics such as education, livestock holding, landholding and income of the households were the significant factors that influenced perception. The results also revealed that 64% of households perceived Extension and Agricultural Services as moderately effective during COVID-19. The results could be improved further by adopting specific interventions such as public-private partnerships, nutrition-oriented extension activities such as promoting nutritive gardens, the use of Information and Communication Technologies (ICT) and promoting gender equality for improving food security of the farm households. Future studies can be done on the impact of the pandemic on pluralistic agricultural systems.

Keywords: EAS; perception; effectiveness; food security; farm households.

1. INTRODUCTION

Agricultural Extension and Advisory Service (EAS) is an important determinant that helps various actors in the agricultural value chains such as farmers to increase agricultural production and productivity, thereby improving income, eradicating poverty and enhancing food security [1]. Agricultural extension services are the whole of organizational structures, commonly known as agricultural advisory services that encourages and involves individuals in agriculture production, selling, processing, and consumption while enhancing their potential to enhance their standard of living [2]. Studies have shown that agricultural extension plays a significant role in improving diet diversification, enabling sustainable agriculture, adopting advanced technologies and improving food security [3].

Especially during the pandemic period, the role of EAS became indispensable. As the governments in various countries struggled to deal with the impending food crisis, EAS made critical contributions in minimizing the impact of COVID-19 on the agricultural food systems. EAS played a significant role in creating awareness in rural areas, advocated solutions to the needs of the farmers, ensured continuous support even during strict lockdowns and social distancing measures and helped to provide uninterrupted market access [4]. With the onset of COVID-19, the dynamics of extension services underwent a transformation where face-to-face interaction became difficult and the delivery of extension was carried out through Zoom meetings, webinars, virtual training and podcasts [5]. The agricultural sector faced major challenges and it was mostly the smallholder farmers who faced the risk of food security. The network comprising EAS includes both government and non-government organisations, which played a pivotal role in bridging the gap between the government and the farmers during the crisis. Hence, the study aims to assess the farm households' perception towards EAS during the pandemic and identify the socio-economic factors influencing the perception of smallholder households.

2. MATERIALS AND METHODS

2.1 Study Area

Coimbatore and Tiruvallur districts in Tamil Nadu were selected for the study. One block from each district was purposefully selected for the study based on the District Human Development Report 2017.

2.2 Theoretical Framework

The study focused on the effectiveness of Extension Advisory Services during COVID-19 and how the smallholder farmers perceived it. This aspect has been less addressed in previous studies. To measure the objective of the study, the framework for the performance of pluralistic agricultural extension was integrated with effectiveness and perception through Roger's Diffusion of Innovations Theory, as information dissemination forms the core of the extension mandate. The study focused on the nutritive-sensitive aspect of extension. For this purpose, socio-economic indicators such as gender, age, education, occupation, landholding, and cropping pattern were identified through relevant literature.

2.3 Sampling Procedure

Through multistage stratified random sampling, 270 households were selected for the purpose of the study. The respondents include farm labourers, and small and marginal farmers. The exclusion criteria include big farmers and non-farm families. From selected blocks, four villages from each block were randomly selected for the study based on the recommendations of the State Department of Agriculture. A total of eight villages were selected for the study.

2.4 Data Collection and Data Analysis

Data was collected using a structured interview schedule. The field survey was done between

the months of October and December, 2022. A set of explanatory variables gender, age, education, occupation, landholding, cropping pattern, livestock holding, income and assistance from government were measured using frequency and percentage. Perception towards the effectiveness of the EAS was measured through parameters such as communication methods, technological interventions and mobilizing farmers with relevant statements in a four-point continuum scale. Friedman test was used to calculate the mean score and mean rank between the perceptions of rural households towards the effectiveness of EAS. To analyse the indicators contributing towards perception, multiple linear regression analysis was used [6]. Data analysis was performed using SPSS software.

3. RESULTS AND DISCUSSION

3.1 Perception of Households towards the Effectiveness of EAS

The results showed that (Table 1 and Fig. 1) more than two-fourths of the households (63.30 per cent) perceived that timely information through WhatsApp, and SMS was slightly effective with a mean score of 1.93 (mean rank IV). Communication through local leaders was perceived to be slightly effective by 44.80 per cent of farmers, whereas 21.10 per cent perceived it to be effective (Mean score 1.78 and mean rank V). More than 50 per cent of the household perceived information about government schemes to be slightly effective and 36.70 per cent of the households perceived it as effective (Mean score 2.29 and mean rank I). With regard to technological interventions, nearly 40 per cent of the farmers perceived online training activities during lockdown as effective and 6.70 per cent found them highly effective. Similarly, 45.60 per cent of them perceived helping to find market access during lockdown periods to be effective with a mean rank of 2.12. Nearly two-thirds (45.60 per cent) of the households perceived partnering with NGOs and other stakeholders to provide food aid to be effective. Around 37 per cent of them perceived online Zoom meetings as ineffective, 31.10 per cent perceived it as effective, and only 2.20 per cent perceived it as highly effective (Mean score 1.41 and mean rank VIII).

Table 1. Perception of households towards the effectiveness of EAS (n=270)

Statements	**Percentage**					
Communication	**NE**	**SE**	**E**	**HE**	**Mean score**	**Mean rank**
Contact through WhatsApp, and SMS to deliver timely information	16.70	63.30	15.20	4.80	1.93	IV
Communicating with local leaders or key informants	34.10	44.80	21.10	0	1.78	V
Provided information about government schemes on food and other aids	7.40	54.10	36.70	1.90	2.29	I
Technological interventions						
Online training activities during lockdown periods	14.80	38.10	40.40	6.70	2.16	II
Helped to find market access during lockdown periods	21.90	26.70	45.60	5.90	2.12	III
Arrangement of logistics for direct sales of products	15.90	62.20	20.40	1.50	1.72	VI
Mobilising farmers						
Partnered with other stakeholders	19.60	45.60	5.90	5.90	1.59	VII
Conducting regular zoom meetings	**37.80**	**31.10**	**2.20**	**2.20**	**1.41**	**VIII**

Source: Survey data

NE-Not Effective, SE*-Slightly Effective, E*-Effective, HE*-Highly Effective*

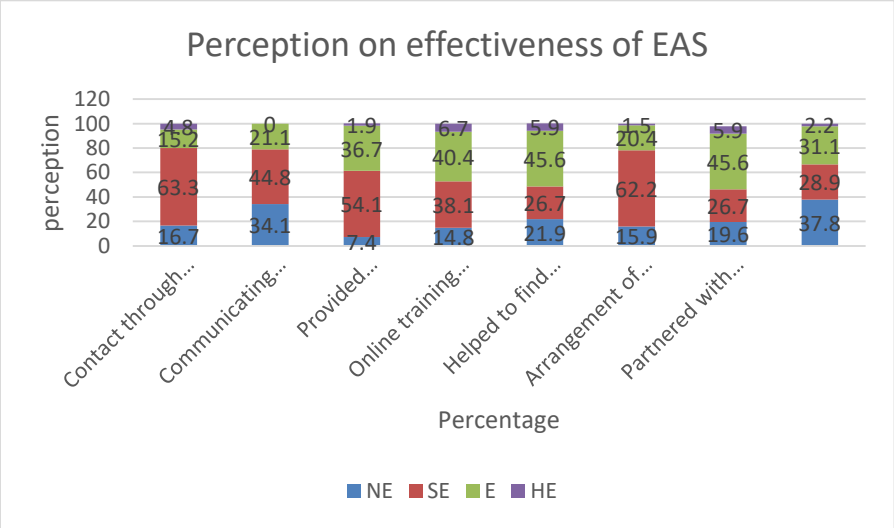

Fig. 1. Households' perception towards EAS effectiveness

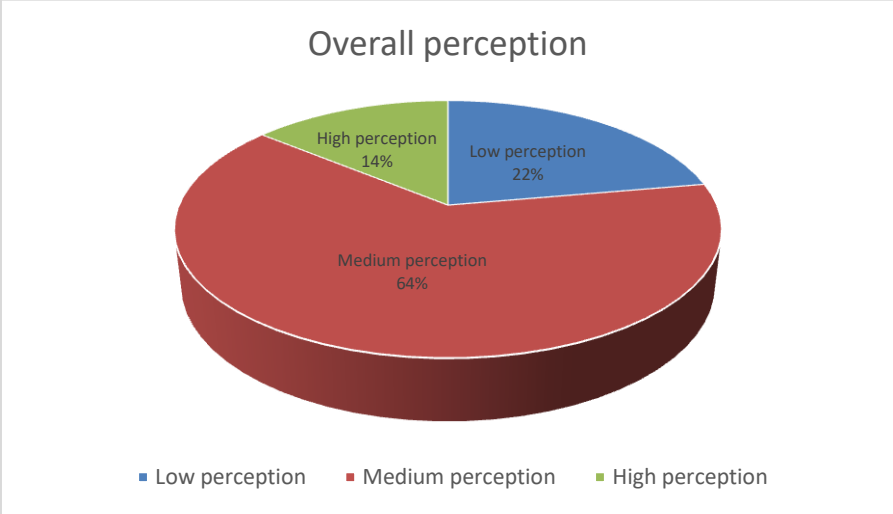

Fig. 2. The overall perception of households towards EAS during the pandemic

The overall perception of households towards EAS (Fig. 2) was found to be around 64 per cent (63.70%), followed by low perception (22.20%) and high perception (14.10%) towards Extension and Advisory Services during the pandemic period.

The findings revealed that households perceived online training activities, market access, direct sales, and partnership with other stakeholders during the pandemic period to be effective. This indicated that the public extension system has proved its importance during crisis situations and such collaborative efforts, public-private partnerships, and institutional collaborations have proved to be a significant value in providing extension services to small-scale farmers. However, it could be noted more pragmatic approach is needed with regard to communication and the usage of Information and Communication Technologies (ICT). The study suggests that the integration of ICT and participatory approaches could be emphasised more to get the desired outcomes [7]. Gender inclusiveness, community-based extension services for food safety and nutrition and focus on community-based kitchen gardens will help in having a maximum impact on the food system. Training also should focus on food safety and sanitation, which will help in alleviating malnutrition in rural areas. The finding is in line with Somanje et al. [8].

Table 2. Indicators influencing farmers' perception towards EAS

Descriptive variables	B coefficient	t	Significance
Gender	.239	1.928	.052
Age	-.003	-.703	.482
Education	.112*	1.875	.042
Occupation	.155	1.658	.098
Landholding	.295*	2.503	.013
Cropping pattern	.088	.903	.367
Livestock holding	.174*	2.267	.024
Income	.249*	2.813	.005
Government assistance	**.008**	**-.188**	**.851**

** Significant at 5%*
R2=0.412
R=0.384

3.2 Measuring the Contribution of Profile of the Households towards EAS through Regression

A multiple linear regression analysis was carried out to find out the extent of the contribution of profile characteristics towards the perception of households on EAS.

The results as per Table 2 revealed that education, landholding, livestock holding and income of the household had a positive and significant relationship with the perception of the households towards Extension and Agricultural Services.

The multiple correlation coefficient (R-value) was 0.384, indicating a positive contribution between the independent variables and perception. The coefficient of determination (R-square) is a measure of goodness of fit that determines how much variation in the dependent variables is explained by the fitted sample regression equation. Thus, the R-square value of 0.412 indicated that all independent variables together explained about 41.2 per cent of the variation in the perception of the households towards EAS.

From the equation, the strength of the variables can be explained as *ceteris paribus*. i.e., an increase of one unit in education, landholding, livestock and income of the households would increase the perception of the households towards EAS by 0.122. 0.295, 0.174 and 0.249 units respectively.

4. CONCLUSION AND POLICY IMPLICATIONS

We found that 64% of households perceived Extension and Agricultural Services as moderately effective during COVID-19. The results could be improved further by adopting specific approaches based on the farmers' occupation, landholding, education and income. Using ICT-based extension services will increase the participation of farmers in sustainable agricultural production. For instance, the Ama Krushi digital advisory system in India provided agro advisory services to farmers through SMS and hotline. After the imposition of the COVID-19 lockdown, the portal added 40,000 to 50,000 more farmers to its customer base. Similarly in Kenya, many farmers have increased their digital usage during covid [9]. The COVID-19 crisis has exposed the vulnerabilities of the agricultural food system, especially the need to accentuate agricultural market access and value chains. Digital technologies can help supply chains function more effectively [10]. Agricultural EAS should focus on encouraging farmers to join Farmer Producer Organisations (FPOs) and provide guidance through digital solutions. They should also collaborate with agri-tech start-ups to improve supply chains [11,12].

The study identified some important policy interventions.

1. The results found that public-private partnerships had proved effective during COVID-19. Extension officials partnered with the horticultural department, and non-governmental organisations and helped in direct sales and market access during the pandemic. They also provided food aid and vegetable kits to vulnerable populations and ensured unhindered food supply during the crises. Such interventions could be continued in future and this will provide a significant difference in the lives of small-scale farmers.
2. Promotion of nutrition-sensitive extension interventions is the need of the hour. EAS should identify the nutritional needs of the households and sensitize them to the importance of dietary diversity. Involving

the community in developing nutritive-sensitive kitchen gardens and creating awareness of the importance of sanitation are other measures that foster food security.

3. Involvement of women in channelling household resources by engaging them in microenterprises and entrepreneurial activities will help in their financial and social empowerment. Extension agents should coordinate with Self Help Groups in addressing this gender gap and focus on the equitable participation of women.
4. All the extension methods should be easy, simple and cost-effective as it involves households. So, all these interventions should focus on such doable actions.

Future studies can be done on the impact of the pandemic on pluralistic agricultural systems.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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