

Perception of Prospective Users about the Performance of Agricultural Expert System

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ABSTRACT

To assess the perception of prospective users in using the agricultural expert system-‘Diagnos-4’, developed by Kerala agricultural University. Prospective users included forty researchers from all over India and sixty each from the category of extension personnel and farmers from the Palakkad District of Kerala, South India, formed the sample of the study. The results showed that the last ranked dimensions such as retrievability ‘relevancy of information’, ‘information content’, ‘information treatment’ and ‘mode of presentation’ needed modifications by involving the prospective users during the development process of agricultural expert system. At the same time, content and relevancy of information provided in the ‘Diagnos-4’ should be improved by providing more information on preventive measures, biological control measures and cultural practices considering chemical control methods as the last option. Highly significant agreement among the perception of researchers in TOT, extension personnel and farmers about the performance of Agricultural Expert System was observed. The prospects and better performance of Agricultural Expert System was perceived more at the lower category of stakeholders in the dissemination of agricultural information.

Keywords: Perception; Prospective Users; Performance; Agricultural Expert System;

Speedy dissemination of technological information from the Agricultural Research System to the farmers in the field, reporting of farmers’ feedback to the research system and thereby reducing the gap between research and client system are the main functions of Extension system. It is known that many Agricultural Research Institutes are involved in the development of Agricultural Expert System (AES) to satisfy the information needs of stakeholders, viz; farmers, extension personnel and researchers. The researchers who are involved in developing Agricultural Expert System conduct validation studies to ensure the precision of knowledge base provided in the system. Whereas the research studies at the users’ level in assessing the performance of the system are limited and mostly a forgotten area. Many farmers were ready to adopt computer technology by the way in which farmers assess new technology and make decision about their farming businesses (*Hamilton et al., 1991*).

Kerala is one of the leading states in the literacy

level of India. It is also a pioneer in implementing ICT projects. Kerala Agricultural University developed an Agricultural Expert System for diagnosing pests and diseases of nine major crops of Kerala called ‘DIAGNOS-4’ which has drawn tremendous attraction from extension personnel. The modified version of it is released recently for the benefit of all the stakeholders involved in agricultural development. One of the questions while releasing Agricultural Expert System was what would be the perception of stakeholders in the transfer of technology about the performance of Agricultural Expert System in the present situation. Therefore a study was conducted with an objective of assessing the performance of agricultural expert system based on the perception of prospective users.

This study would identify whether the intention of developing Agricultural Expert System is met at the prospective users’ point of view. Before the formal release of the system, it was more appropriate to conduct an assessment study by the prospective users

so that suitable modifications could be made appropriate to the needs of users. In future, Agricultural Expert System is going to be an important extension tool in transfer of technology. Assessment of this tool from the different perspectives of all the stakeholders would enable the researchers to strengthen the system with more appropriate package of information, making it more user-friendly.

METHODOLOGY

'Diagnos-4' is the Agricultural Expert System, specially designed software for tackling the problems in transfer of technologies related to plant protection aspects of important crops of Kerala. A 'Tutorial page' has been provided to familiarize the users about this package, before using 'Diagnos-4'. The home page designed for this tutorial is developed in such away that it leads the users to all the features of the package. Navigating from the home page, the user will know about the expert system, operation of expert system and cultivation practices of selected crops. While navigating on the graphical button 'Crop Protection System', a well-animated page appears with a list of all possible complaints of the selected crops. The user when selects a complaint, a list of symptoms will appear on the screen. While answering questions with 'YES' or 'NO' appearing in each new window will finally lead to an advice page with a list of management measures including cultural practices, chemical and biological control methods. Video clippings, photographs and graphics are provided in the software to help the users to confirm the symptoms.

The first phase of the research was conducted among the researchers of the Agricultural Research Institutes from all over India, who are in the development of AES and Transfer of Technology. Second phase of the research was conducted among the extension personnel and farmers in the Palakkad district of Kerala, South India. Forty researchers and sixty each from the category of extension personnel and farmers formed the sample of the study. The respondents were selected purposively who were having awareness about the performance of agricultural expert system. Kendall's co-efficient of concordance was used to verify whether there was agreement among the respondents in providing their responses to the study.

RESULTS AND DISCUSSION

Perception of TOT Researchers regarding the Performance of Agricultural Expert System : The results of the perception of researchers regarding the performance of Agricultural Expert System are presented in Table 1. Analysis of the data in the table showed that the researchers in TOT ranked first (9.45 mean scores) to the attribute 'settings in the Agricultural Expert System'. It could be inferred that researchers were satisfied with the settings of the Agricultural Expert System that they had seen. They were of the opinion that the Agricultural Expert System was able to provide complete guidance for the user to make use of the system. They expressed satisfaction over the appropriateness of the pictures given in the system to the subject and the colour combination of background, pictures and letters. Second rank was given to (9.27 mean scores) the 'future prospects of the AES'. They perceived that AES would strengthen the expertise of the researchers because of the synergetic effect of the expertise of several human experts. They presumed that AES would provide greater information support for taking suitable decisions, acting as a complementary extension tool for disseminating agricultural technologies.

Table 1. Perception of TOT researchers about the performance of Agricultural Expert System (N=40)

S. No.	Performance related attributes	Researchers in TOT	
		Mean	Rank
1	Settings in the AES	9.45	I
2	Retrievability of information	6.30	IV
3	Serviceability of the system	6.18	V
4	Relevancy of information	2.86	VII
5	Practicability of information	8.23	III
6	Information content	2.81	VIII
7	Information treatment	2.54	IX
8	Mode of presentation	2.31	X
9	Provision for updating information	5.05	VI
10	Future Prospects	9.27	II

'Practicability of information' was ranked as third (8.23 mean scores) by the researchers in Transfer of Technology stream. They felt that information given in AES was feasible and applicable to the users' situations. 'Retrievability of information' was ranked fourth (6.30 mean scores) by the researchers in TOT. They did not

feel any difficulty in locating and retrieving information from AES. ‘Serviceability of information’ was given fifth rank with a mean score of 6.18. Researchers in TOT substantiated that AES could serve the information needs of users like researchers, teachers, students, extension personnel and farmers. *Rao et al. (1999)* reported that majority of the respondents felt that expert systems were relatively easy to handle and use.

‘Provision for updating information’ in the system was ranked sixth (5.05 mean scores) by the researchers in TOT. They suggested to create a permanent mechanism to up date the information as and when package of practices were revised. The last ranked dimensions such as ‘relevancy of information’, ‘information content’, ‘information treatment’ and ‘mode of presentation’ needed modifications. These dimensions could be modified by involving the prospective users during the development process of AES.

Perception of Extension Personnel and Farmers regarding the Performance of Agricultural Expert System : Perception of extension personnel and farmers regarding the performance of the Agricultural Expert System is given in the Table 2. Extension personnel and

Table 2. Perception of extension personnel and farmers regarding the performance of the Agricultural Expert System

S. No.	Performance related attributes	Extension personnel (n=60)		Farmers (n=60)	
		Mean	Rank	Mean	Rank
1.	Settings in the AES	7.02	III	6.82	III
2	Retrievability of information	2.21	IX	1.48	IX
3	Serviceability of the system	4.62	V	4.55	V
4	Relevancy of information	2.24	VIII	1.66	VII
5	Practicability of information	6.00	IV	6.15	IV
6	Information content	2.90	VII	1.55	VIII
7	Information treatment	4.38	VI	4.45	VI
8	Mode of presentation	8.03	II	8.00	II
9	Future Prospects	8.95	I	9.00	I

farmers ranked first the future prospects of AES among all the nine dimensions with a mean score of 8.95 and 9.00 respectively. It clearly indicated that the extension personnel and farmers perceived that AES would perform best of its functions for taking suitable decisions and would be an efficient extension tool in disseminating agricultural technologies. They also believed that AES would serve the purpose of confirming technical recommendations in the absence of human experts. Mode of presentation was ranked second by extension personnel and farmers with a mean score of 8.03 and 8.00 respectively. ‘Settings in AES’ was ranked third by extension personnel (7.02 mean scores) and farmers (6.82 mean scores). Extension personnel and farmer respondents perceived that the instructions given in tutorial page had to be improved for more clarity. Systematized presentation of information would enhance users’ understanding. The system should be included with more real photographs wherever needed, especially the symptoms with more clarity and zooming effect.

‘Practicability of information’ was ranked fourth by both categories of respondents. They agreed that the information provided in AES was adoptable and feasible to users’ situations. ‘Retrievability of information’, ‘relevancy of information’, ‘information content’ and ‘information treatment’ were the dimensions ranked last by extension personnel and farmers. It indicated that extension personnel and farmers were not satisfied with the ‘retrievability of information’. Therefore the pathway of retrieving information should be made easier. They suggested to include an index page next to tutorial page with appropriate, clear photographs of symptoms with the label listed from seed to seed stage along with subcategories of problems from root, stem, leaf, flower, fruit and seed. Each sub category should be linked to the list of symptoms and management measures. Extension personnel and farmers criticized that the users could not locate the information easily, it grabbed more time of users in diagnosing symptoms and getting suitable solutions and therefore users required a thorough orientation to retrieve the required information easily. *Rao et al. (1999)* reported that majority of the respondents felt that expert systems were relatively easy to handle and use, which was differing to the findings of the study.

Regarding the information content, both categories of respondents were in need of biological control measures in detail and that was found lacking in the system. Few respondents pointed out that some of the chemicals that earlier created several issues in the field were still included in the package, eg: Endosulfan. Majority of the respondents complained that few chemicals given in the system were not available locally eg: Ediphenfos. Their complaint was that the system did not consider the users' resources and could not provide reasons for the given solutions. They felt that the system with little modifications would become acceptable by the users. Highly crop specific recommendations based on users' available resources were expected by both categories of respondents over the general packages. With regard to information treatment, all the respondents felt that AES should be released in local language that is in Malayalam. The interpretation of scientific or technical terms needed more attention of the scientists who were involved in developing AES. These findings are in line with the results of *Balasubramanian (2004)* and *Sunil (2006)*.

It could be concluded that extension personnel and farmers were very confident of the future prospects of the better performance of the 'Diagnos-4'. They were also very much satisfied with the mode of presentation, settings in the AES, practicability of information and serviceability of the system. The areas that needed modifications were: retrievability, relevancy and content of information. At the same time, content and relevancy of information provided in the 'Diagnos-4' should be improved by providing more information on preventive measures, biological control measures and cultural practices considering chemical control methods as the last option.

Comparison of Mean Scores between the Perception of Researchers in TOT, Extension Personnel and Farmers regarding the Performance of AES : The results of agreement between the perception of researchers in TOT, extension personnel and farmers towards the performance of AES are given in the Tables 3, 4 and 5. The tables showed that there was highly significant agreement among the perception of researchers in TOT, extension personnel and farmers towards the performance of AES. Therefore the null

hypothesis of no significant agreement among the perception of farmers, extension personnel and researchers towards the performance of the AES would get rejected. Among the prospective users, farmers ranked (30.49 mean scores) higher towards the performance of AES, followed by extension personnel (24.81 mean scores) and researchers in TOT (17.79 mean scores). The reason might be that extension personnel were expected to be the main users of AES. They realized the potentials of AES and hence perceived higher about the performance of AES. From the light of above findings, it could be concluded that as we trickle down the different categories of stakeholders in the TOT system, the prospects and performance of AES was perceived more at the lower category of stakeholders in the dissemination of agricultural information.

Table 3. Comparison of Mean scores between the perception of researchers in TOT and extension personnel regarding the performance of AES

S. No.	Category of respondents	Mean scores	Std. error mean	t-value
1	Researchers in TOT (n=40)	17.7928	0.7955	7.684*
2	Extension personnel (n=60)	24.8110	0.4488	

*- Significant at 5 % level

Table 4. Comparison of Mean scores between the perception of researchers in TOT and farmers regarding the performance of AES

S. No.	Category of respondents	Mean scores	Std. error mean	t-value
1	Researchers in TOT (n=40)	17.7928	0.7955	12.879*
2	Farmers (n=60)	30.4940	0.5829	

*- Significant at 5 % level

Table 5. Comparison of Mean scores between the perception of extension personnel and farmers regarding the performance of AES

S. No.	Category of respondents	Mean scores	Std. error mean	t-value
1	Extension personnel (n=60)	24.8110	0.4488	7.725*
2	Farmers (n=60)	30.4940	0.5829	

*- Significant at 5 % level

CONCLUSION

The last ranked dimensions such as 'relevancy of information', 'information content', 'information treatment' and 'mode of presentation' needed modifications by involving the prospective users during the development process of AES. Extension personnel and farmers suggested that the areas needed modifications were: retrievability, relevancy and content of information. At the same time, content and relevancy of information provided in the 'Diagnos-4' should be improved by providing more information on preventive measures, biological control measures and cultural practices considering chemical control methods as the last option. Highly significant agreement among the

perception of researchers in TOT, extension personnel and farmers about the performance of AES was observed. The prospects and better performance of AES was perceived more at the lower category of stakeholders in the dissemination of agricultural information.

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