

**RESEARCH ARTICLE :**

Strategies for capacity building of agricultural extension personnel in using information and communication technologies for transfer of technology

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SUMMARY : A study was conducted among 150 agricultural extension personnel from five districts of Kerala to identify the constraints faced by the agricultural extension personnel in using information and communication technologies (ICTs) in transfer of technology and suggested strategies for their capacity building. Lack of proper training facility was recorded as the most experienced constraint with a mean score value of 9.48, followed by inadequate computer facility (8.82) available to them. The other major constraints experienced by the extension personnel were poor technical know how and conducting trainings at inappropriate times with a mean score of 8.32 each and lack of financial resources formain taining the ICT tools with the mean score of 8.03. It is suggested to categorise the extension personnel into two groups viz., those extension personnel who need the basics of ICTs and those extension personnel who require the knowledge on advanced ICTs. Target specific training modules, hands on experience, well established infrastructure, adequate funds and personnel for repair and maintenance, computer based trainings and advanced circulation of annual training calendars among extension personnel by the training organizations are the suggested strategies for the capacity building of extension personnel of Kerala in using ICTs.

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BACKGROUND AND OBJECTIVES

Agricultural extension personnel are the direct link bridging the communication gap between the agricultural researchers and the farmers. In order to perform this role effectively and efficiently, agricultural extension personnel must have steady access

to upto date agricultural information. This creates the need for a comprehensive and well articulated agricultural extension programme which ensures adequate and timely delivery of services to farmers, if meaningful growth is to be achieved in the agricultural sector.

The common problems in adoption of information and communication technologies (ICTs) generally are lack of awareness, non-availability of relevant and localized contents in their own language, accessibility of ICT tools, non-willingness for adoption of new technologies, remote areas, fast changes etc. Extension personnel must be equipped in using the latest ICTs to tap the full potential of ICTs in agricultural sector. Thus, there is a need to know the accessibility and utilization of ICT tools and training needs of extension personnel for onward transfer of technologies. The findings of the proposed research study will be of immense utility to the extension personnel, researchers, administrators and policy makers to formulate and execute suitable strategies for enhancing the use of ICT tools among extension personnel for effective transfer of technologies in the agricultural sector.

Extension personnel will have to learn to work with different needs of farmers and their organizations to help them invest in appropriate business opportunities. Hence, forth, there is an urgent need to formulate a comprehensive programme of capacity building for extension functionaries across the country in order to enhance their skills in mobilization and formation of producer groups, linking groups to post-production activities that allow farmers to capture greater value and to link directly with terminal markets.

Leveraging ICTs to reach out to farmers by the extension personnel will streamline information flow, reduce load on manpower and provide for real time information to farmers. Accordingly, a variety of ICT initiatives/schemes aimed at providing information to the farmers on various activities in the agricultural value chain were introduced (Singh and Roy, 2018).

In this context, a study was conducted to identify the constraints faced by the agricultural extension personnel in using ICTs. The analysis of the existing situation among extension personnel using ICTs constraints in using ICTs and thereby formulation of strategies for the capacity building of extension personnel in using ICTs will be useful in equipping the extension personnel to meet the challenges of introducing latest technologies in ICTs in the Department of Agriculture Development and Farmers' Welfare.

RESOURCES AND METHODS

Five districts were randomly selected, one each from

the five agro-climatic zones of Kerala for conducting the study. Kannur from the north zone, Wayanad from the high altitude zone, Thrissur from the central zone, Thiruvananthapuram from south zone and Alappuzha from the problem zone were the districts selected for the study. All the Krishi Bhavans in Kerala are computerized to utilize the advances in information and communication technologies (ICTs) for the transfer of technologies and administrative purpose. Hence, agricultural officers being one of the most important stakeholders of these technologies, they were selected as respondents. From each district, 30 agricultural officers were selected randomly, logically covering agricultural officers from one third of the districts, constituting 150 respondents.

Constraints were operationalised as the limitations that severely restrict the scope/extent/activity experienced by the extension workers from achieving the potentials of information and communication technologies in technology transfer with reference to its goals. Based on discussion with agricultural officers, experts from the Department of Agriculture Development and Farmers' Welfare and also through review of literature, the major constraints experienced were identified. The identified constraints were listed and grouped into 3 categories *viz.*, infrastructural constraints, training constraints and health constraints. The respondents were asked to rank the listed constraints. Mean rank was worked out to prioritise the identified constraints faced by extension personnel in using ICTs. The major constraints identified by the respondents were verified using Kendall's co-efficient of concordance to confirm their agreement among them.

OBSERVATIONS AND ANALYSIS

From Table 1 it is evident that lack of proper training facility was recorded as the major constraint with a mean score value of 9.48. This reveals that the need for strengthening training facilities to provide extension personnel with trainings more of hands on experience in using various ICT tools.

The second most challenge identified by the end users was inadequate computer facility (8.82) available to them. The major constraints experienced by the extension personnel were poor technical know how and conducting trainings at an appropriate time with a mean score of 8.32 each and lack of financial resources for purchasing and maintaining the ICT tools with the mean

score of 8.03. These findings are in agreement with the findings of Ravikishore (2014) and Kabir and Roy (2015).

Extension personnel play an important role in the dissemination of agricultural technologies among the farming community. There is no doubt that tapping the potential of ICTs in agriculture sector will open up new vistas in enhancing agricultural production as well as the income of the farming community. Kerala state is far ahead of introducing the ICTs in all the sectors including agriculture sector. Still a lot more to be done to harness the full potential of ICTs in agriculture sector. Identification of constraints faced by extension personnel in using ICTs will be useful to strengthen the extension system and empower the extension personnel to utilize the maximum potential of ICTs for the development of agriculture sector.

Agreement among the extension personnel in ranking the constraints for using ICT tools:

The Kendall's co-efficient of concordance was found to verify whether there was agreement among the extension professionals in providing their rankings

on the the constraints faced by them for using ICTs. From the Table 2, it was clear that there was concordance in the ranking of constraints faced by them for using ICT applications by extension personnel at 1 per cent level of significance.

Strategies for capacity building of extension personnel for using ICTs:

The most important utility between the whole of ICT networks and their application is to ultimately benefit the end users who are beneficiaries of these initiatives. In case of ICT initiatives aimed at agricultural and rural development the main stakeholders are farmers. The extension personnel act as the link between farming community and the research system. The overview of the results of investigation indicated that majority of the extension personnel were moderately aware of the recent updates in the field of ICTs. Developing information services by understanding their clientele and their information needs will enhance the efficiency of the information system.

For the effective delivery of ICT based extension

Table 1: Distribution of respondents according to the constraints faced by extension personnel in using ICT tools		(n=150)
Sr. No.	Constraints	Mean rank
Infrastructural constraints		
1.	Inadequate computer facility	8.82
2.	Poor communication infrastructure and network	8.03
3.	Insufficient power supply	7.92
4.	Lack of financial resources for purchasing and maintaining ICT gadgets	8.03
5.	Lack of time for using ICT tools	5.86
Training constraints		
6.	Lack of proper training facilities	9.48
7.	Poor technical know-how	8.32
8.	Conducting training at inappropriate time	8.21
9.	Fear of ICT Usage (Technophobia)	4.53
Health constraints		
10.	Back ache/body pain	7.23
11.	Adverse effect on eye sight	5.45
12.	Hand /finger pain	5.28
13.	Head ache	5.00

Table 2 : Consistency among extension personnel in ranking the constraints for using ICT tools		
Category	Kendall's co-efficient of concordance	X ² value
Extension personnel (n=150)	0.245**	191.39

** indicate significance of value at P=0.01

services, the following strategies are formulated based on the findings of the study, suggestions offered by extension personnel as well as the observations on the existing conditions of ICT initiatives. It is hoped that the implementation on the following strategies systematically will help the effective delivery of ICT based extension services contributing to the overall development of agriculture.

Target group specific modules:

Based on the findings of the study, it is suggested to categorise the extension personnel into two groups viz., those extension personnel who need the basics of ICTs and those extension personnel who require the knowledge on advanced ICTs. Training programmes may be organized separately for those groups with target group specific modules on ICTs.

Module for training of extension personnel on the basics of ICT tools:

Presentation of information using word processing and report preparation:

- Creating word files, copy, cut, paste and move text
- Formatting text like bold, italic, underline, justify, change font
- Incorporate tables, images, clip art
- How to make use of document formatting features like headers, footers, bullet points
- How to use mail-merge facilities into a document.

Organisation and analysis of numerical information using excel sheet:

- Formatting cells to match data types
- How to cut, copy, paste and move data between cells, rows and columns
- How to insert and delete rows and columns
- How to enter and replicate formulas
- How to use simple functions like sum, average, standard deviation etc,
- How to produce charts with labels such as axis titles, legends
- How to print selected areas and various options of print.

Organisation and presentation of information using multimedia software:

- Establishing structure and navigation route through

the presentation

- Creating components of the presentation with text files, images and sound files
- Producing the individual frames/layers/backgrounds/slides
- Editing the separate components and the final presentation.

Searching and selection of information using the internet:

- Using e-mail for communication between individuals and groups
- Applying the main search principles of internet search engines
- Applying the main features of browser software, such as forward and back buttons, book marking etc.
- Capturing and enhancing graphic images, monitoring and recording physical and financial data for analysis and interpretation.

File management and maintenance of ICT tools:

- Keeping information secure from viruses, loss and theft
- Protecting confidentiality and preventing unauthorised access to documents or records
- Respecting copyright and not using the work of others without permission
- Documenting and saving work regularly and use different filenames
- Respecting copyright and not using the work of others without permission
- Documenting and saving work regularly and use different filenames
- Up keeping dated backup copies of files in another location
- Managing effectively appropriate filenames and locations
- Safe handling of accessories.

Information management through the applications of ICT tools for technology transfer:

- Techniques of knowledge gathering from related sources
- Storing and retrieving information as and when required
- Utilizing community radio, tele and video-conferencing, information kiosks, multimedia, mobile technologies, on-line courses, hosting and conducting

webinars, community radio forums and knowledge centres for the transfer of technologies.

Module for training of extension personnel on the advances of ICT tools in agriculture:

Applications of ICTs in agricultural development such as.

Geographical information system (GIS):

Geographical information system (GIS) is the most important and useful system for decision making in agricultural sector. GIS will help to ascertain the ground level realities with the help of spatial data obtained from various resources. It would be more appropriate to use GIS applications in agro-based enterprise to ascertain the scope of activities and monitoring of activities.

Remote sensing (RS):

The remote sensing provides various platforms for agricultural survey. Satellite imagery has unique ability to provide the actual synoptic views of large area at a time, which is not possible for conventional survey methods and also the process of data acquisition and analysis are very fast as compared to the conventional methods. The importance of remote sensing applications to agricultural sector involve land use pattern, crop production, crop yield determination, and crop monitoring.

E-Governance:

E-Governance refers to the use of information and communication technologies (ICTs), particularly web based applications to provide access to and deliver information/ service to the public, business, other agencies and governmental entities faster, cheaper, easier and more efficient way.

Cyber extension:

The on-line information access on research, market demand, input-supply and the latest international know-how on crop-specific issues will help the extension officials to a very great extent. The availability of frequently asked questions (crop-specific, area specific) will help the officials at district and block level to provide latest information to the farmers with more accuracy and efficiency. The researchers will also get quick feedback on their recommendations and they can plan action research projects on more interactive basis.

Hands on experience:

Lack of training facility was the major constraint reported by most of the extension personnel. Even though several training programmes on ICTs were organized by various institutions viz., SAUs, SAMETI, RATTs and MANAGE for the extension personnel, the respondents were of the opinion that those trainings were more of theoretical orientation than practical orientation. Therefore, it is suggested to introduce more number of trainings with practical orientation. Each trainee should get hands on experience to get more confidence in using ICT tools.

Establishment and maintenance of infrastructure facilities:

For providing hands on experience to the trainees, the training centres should be strengthened with necessary infrastructure and improved connectivity facilities. Infrastructure should be established in such a way that each and every individual extension personnel should get an opportunity to receive the hands on experience. In the same way, recurring funds and the availability of technical personnel should be ensured to maintain and tap the maximum potential of ICT tools.

Computer based trainings:

As and when changes occur in the applications of ICTs, there should be a mechanism to update the extension personnel continuously. Once the extension personnel are oriented with the basics of ICTs, computer based trainings or e-trainings may be conducted to refresh and update them on the latest technologies. Computer based training (CBT) is an interactive method of learning that provides a series of self-paced, hands-on web-based courses.

Conclusion:

Training constraints such as proper training facility, inadequate computer facility, poor technical know-how and conducting training at in appropriate times were identified as the major constraints reported by extension personnel for using the information and communication technologies.

Target specific training modules, hands on experience, well established infrastructure, adequate funds and personnel for repair and maintenance, computer based trainings and advanced circulation of annual training calendars among extension personnel by

the training organizations are the suggested strategies for the capacity building of extension personnel of Kerala in using ICTs.

If modern ICT facilities are not adequately built into the mainstream of agricultural extension system, there is likely to be stagnation in the dissemination, utilization and application of scientific agricultural information for purposeful development of the system. Information communication technologies access implies not only the physical availability of communication equipment and methods but also the existence of the right conditions for their use in getting information. These conditions include the ease of use of the technologies, regular electric power supply, adequate funds and ensuring technical personnel for repair and maintenance, availability of spare parts. In this regard, government should take necessary steps to build the basic infrastructural facilities in the extension centres. The study also indicated low level of operational e-literacy and this has provided a huge gap in the operational knowledge of the extension agents; hence, adequate training on efficient operation of contemporary

ICTs should be organised for the extension personnel of the Department of Agriculture Development and Farmers' Welfare.

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