PERCEPTION OF AGRICULTURAL OFFICERS AND SELECTED PROGRESSIVE FARMERS ON COMPUTER MEDIATED COMMUNICATION: A SOCIO - PSYCHOLOGICAL ANALYSIS

By
S. GRACE SARALA

THESIS

Submitted in partial fulfilment of the
requirement for the degree of

Master of Science in Agriculture

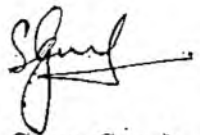Faculty of Agriculture
Kerala Agricultural University, Thrissur

Department of Agricultural Extension
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
KERALA, INDIA
2008

DECLARATION

I, hereby declare that this thesis entitled "**Perception of agricultural officers and selected progressive farmers on computer mediated communication: A socio-psychological analysis**" is bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma , associateship or fellowship to other similar title, of any other University or Society.

S. Grace Sarala

CERTIFICATE

Certified that this thesis entitled **"Perception of agricultural officers and selected progressive farmers on computer mediated communication: A socio-psychological analysis"** is a record of research work done independently by **Ms. S. Grace Sarala,** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma , associateship or fellowship to her.
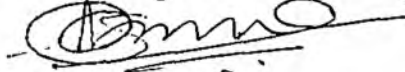
Dr. Sreevalsan J. Menon
(Major Advisor, Advisory Committee)
Assistant Professor
Agricultural Technology Information Centre
Mannuthy
Thrissur - 680656

CERTIFICATE

We, the undersigned members of the advisory committee of **Ms. S. Grace Sarala,** a candidate for the degree of **Master of Science in Agriculture,** with major field in Agricultural extension, agree that the thesis entitled **"Perception of Agricultural Officers and selected progressive farmers on computer mediated communication: A socio-psychological analysis"** may be submitted by **Ms. S. Grace Sarala,** in partial fulfillment of the requirement for the degree.

Dr. Sreevalsan J. Menon

(Major Advisor)

Assistant Professor

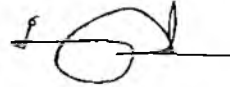Agricultural Technology Information Centre

Mannuthy

Dr. F.M.H. Kaleel

Professor and Head

Department of Agricultural Extension

College of Horticulture

Vellanikkara

Dr. M. Jayasree Krishnankutty

Assistant Professor

Department of Agricultural Extension
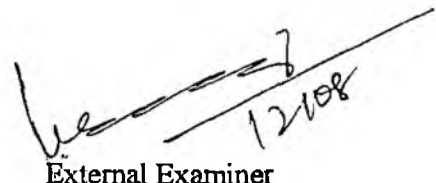
College of Horticulture

Vellanikkara

Sri. S. Krishnan 12/1/08

Assistant Professor

Department of Agricultural Statistics

College of Horticulture

Vellanikkara.

External Examiner

ACKNOWLEDGEMENTS

I am ever grateful to Dr. S. Bhaskaran, Associate Professor and Head, Central Training Institute, Mannuthy, for his support. I also express my heartful gratitude to Dr. Joy Mathew, Associate Professor and Head, Central Training Institute, Mannuthy, for his warm concern and moral support during the study.
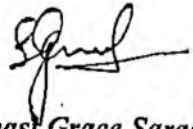
I specially thank to Dr. Alexander George, Associate Professor, Central Training Institute, Mannuthy and his family for their support and wise counsel.

My special thanks to Dr .K. Aravindakshan, Officer on special duty, ATIC, Mannuthy and staff of ATIC for their concern.

Warn thanks to my friends Jaliya, Kavya, Shinoji, Margaret, Shibi, Reshmi, Nisha and Saisree.

The award of KAU Jr. Fellowship is duly acknowledged.

I am in dearth of words to express my gratitude to my beloved Papa, Mummy, siblings Sunandana, Daniel and Susan for their moral support, constant encouragement, affectionate concern, constant prayers and blessings at every juncture.

Sanasl Grace Sarala

CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Dedicated to
My
Beloved Family

LIST OF ABBREVIATIONS

IT	-	Information Technology
IKM	-	Information Kerala Mission
ICTs	-	Information and Communication Technologies
KISSAN	-	Karshaka Information Systems Services And Networking
FRIENDS	-	Fast, Reliable, Instant, Efficient, Network for Disbursement of Services
MCTCs	-	Multi Purpose Community Technology Centres
CROPES	-	Comprehensive Resource Planning System
GIS	-	Geological Information System
PC	-	Personal Computer
ATINS	-	Agriculture Technology Information Network System
www	-	World Wide Web
WAICENT	-	World Agricultural Information Centre
MPEG	-	Motion Picture Expert Group
IPM	-	Integrated Pest Management
PMISNET	-	Pest Management Information System
DSS	-	Decision Support System
EADSI	-	European Association of Development Research and Training Institute
ISRO	-	Indian Space Research Organisation
ICAR	-	Indian Council of Agricultural Research
MANAGE	-	National Institute of Extension Education and Management
PETIS	-	Potato Extension & Technology Information System

INTRODUCTION

INTRODUCTION

The advances in information technology are permeating every sphere of human activity almost transcending the constricting social and geographical parameters. In so far as integration of these advancements to societal needs are concerned, it is apparent that the secondary and tertiary sectors have been foremost in exploiting information technology. Not withstanding these significant changes, information technology is yet to impact on agriculture and ordinary rural lives in terms of information access, development communication or local governance (Arunachalam, 2000).

In recent years agriculture production has become a complex business requiring the accumulation and integration of knowledge and information from many sources. The challenge therefore is to remove the urban skew and extend the benefits of science and technology using modern tools to the majority of rural people who have far greater stake in the fruits of science and technology (Swaminathan, 2003).

Agricultural extension systems have constantly tried to reach out to the farming millions through various media and other contact methods. Some states like Kerala can boast of an organised extension machinery at the *panchayat* level and a proactive media for agriculture. Inspite of this, information on crop protection and management to support farmers' decision-making, is generally inaccessible at a given point of time.

A farmer with the primary objective of gaining profits is an information monger. With convergence of communication technologies, any institution involved in the process of agricultural extension worth the name is bound to serve the farmer with the requisitioned information at the requisitioned time. This

necessitates the use of computer-mediated demonstrations related to agriculture -that offer hassle free and user-friendly access to farmers.

The provision of such access presupposes that a sizeable section of the farming community will be in a position to access the Internet and this will be shortly provided by States like Andhra Pradesh, Karnataka and Kerala as part of strengthening of their respective information technology networks at the *panchayat* level.The State of Kerala has gone far ahead in launching Information Kerala Mission (IKM) - a project in e- governance that aims to bring about transparency and accountability (Adhiguru and Birthal, 2006). Therefore cyber extension services and users' end is well matched. Scientists across the world have stressed the importance of Information Technology in agriculture (Wensui, 1999, Zaliwski 2000, Grbavac, 2004).

Traditional communication channels have all along been used successfully, but these have mostly been monologue and have not allowed for much interaction with users. Computer mediated communication offers great potential as an interactive mass medium.

The hallmark characteristics of this computer-mediated communication have been its ability to deliver individualised messages to an infinite number of people. Each one involved shares reciprocal control over that content. It is essential that information availability is demand driven rather than supply driven. The challenges are not only to improve the accessibility of communication technology to the rural population but also develop content for local development (Balit *et al* 1999).

Application of ICT (Information and Communication Technologies) in support of agricultural and rural development fall into five main areas, as outlined by (Richardson, 1998). These are economic development of agricultural

producers, community development, research and education, small and medium enterprises development and media networks

The Kerala State Department of Agriculture was restructured in 1987, replacing the T&V system. Accordingly, 'Krishi Bhavans' were started in every *panchayat* of the state. At the base level, village *panchayat* is the basic unit for development and hence all the agricultural development programmes are conceived, developed and implemented through the *panchayat* level Krishi Bhavan. At the Krishi Bhavan level, the Agricultural Officer is the prime mover of agricultural developmental activities.

The extension agent has to look into basically two aspects of extension: the education function which aims to help farmers gain knowledge, acquire skills and change attitude for their own benefit, and the communication function which transfers information about suitable technologies to farmers and offers them alternative solutions to improve their situations. Therefore the aim is to transform the information into knowledge timely and accurately to create an environment for farmers to use it. Information technology would then bring about a sea change in agriculture and rural development by reducing cost, enhancing easiness of use and create linkages (Zijp, 1994).

The Agricultural Officer plays an important role as an expert in the field and as a network coordinator of various stakeholders and their knowledge in computers is much essential. Therefore, utilising computer mediated communication towards farm progress, becomes an essential component in the effectiveness of the extension agent namely the Agricultural Officer.

This study has the following specific objectives:

1. To study the socio-psychological characteristics of Agricultural Officers

2. To study the attitude of Agricultural Officers towards computer mediated communication

3. To study the perception of Agricultural Officers towards computer mediated communication

4. To study the relationship between socio-psychological characteristics, perception, attitude and computer use efficiency of Agricultural Officers

5. To study the comparison between the Agricultural Officers of Akshaya introduced and non-akshaya introduced districts of Kerala

6. To identify the characteristics of an effective computer mediated communication

Scope and importance of the study

The present study is an attempt to understand the attitude and perception of the Agricultural Officers towards computer mediated communication in the Kerala farming sector. The study would help in bringing out suggestions to improve the performance of Agricultural Officers by effectively utilising computer mediated communication. The determinants of an effective computer mediated communication delineated, will help in formulating wise polices and effective strategies for the development of agriculture.

Limitations of the study

This study was conducted in a systematic way following the procedure and approach of social science research. However since the project was undertaken as a part of the requirements of masters degree project of the researcher the concept could not be studied in greater depth due to constraints of time and resources. Since the investigation is based on the perceptions of the respondents in the Krishi Bhavan there could be personal bias, which might have affected the study even though all possible care was taken to avoid them.

Presentation of the study

The thesis is presented in five chapters. *Chapter I* deals with introduction highlighting the objectives, scope and importance, and limitations of the study as already seen. *Chapter II* presents the theoretical orientation covering the review of literature pertaining to this study, while *Chapter III* comprises of the methodology used in the research work including the selection of respondents and variables, operationalization and empirical measurement of the selected variables, techniques of data collection, and statistical procedures used for the study. *Chapter IV* furnishes results of the study while *Chapter V* covers their discussions. Finally Chapter *VI* describes the summary of the research work emphasizing the salient findings. The references, appendices and abstract are given at the end.

REVIEW OF LITERATURE

CHAPTER II
REVIEW OF LITERATURE

Any scientific endeavour becomes valid and concrete, when it is supported by pertinent studies conducted earlier in that regard. Review of such efforts, either theoretical or empirical would help to outline the new problem areas and develop a conceptual framework for the study. Keeping this in mind, a comprehensive review of the available literature having direct or indirect bearing on this study has been carried out in accordance with the objectives of this study. It is presented under the following sub-headings:

2.1 Perception

2.1.1 Importance of perception in extension

2.2 Computer mediated communication

2.3 Kerala state initiatives

2.4 Classification of computer mediated communication

2.5 Socio psychological variables

2.6 Characteristics of effective computer mediated communication

2.1 PERCEPTION

Crow and Crow (1956) defined perception as the meaningful sensation that assumes an important role in the life of an individual.

According to Attneave (1962), perception had to do with the input side of the organism, with short-term consequences of variations in stimulating conditions.

According to Blalock (1963) perception had the following characteristics:

It is an individual matter. Thus there may be as many perceptions as there are individuals. It must be dealt within terms of what an individual actually experiences. It involves not only perceiving the stimuli but also interpreting and describing these stimuli in terms of that are meaningful to the individual. Various external and internal factors may influence both the interpretation of the stimulus and the response it is likely to evoke. It is a dynamic phenomenon that may be continually changing within an individual.

Bhatia (1965) reported that perception is a response to stimuli and interpreting the sensory input. The major processes are those of hearing, seeing, smelling, touching and the like.

Theodorson and Theodorson (1970) defined perception as the selection, organisation and interpretation by an individual of specific stimuli in situation according to prior learning, activities, interests and experience.

Issacson and Hutt (1971) opined that the word perception is used to describe mental experiences and to designate an area of behavioural research.

Harrison (1972) stated that the perception refers to the inferred psychological process that organises, structures and interprets the incoming information.

Heimstra (1972) considered perception as the process where by sensory input is organised into meaningful experience. Meaningful experience is attained by identifying and categorising the sensory input into separate classes based on various attributes of the stimuli.

Belcher (1973) described perception as the process by which sensory information is interpreted.

David and Engen (1975) reported that perception consists of experience of whole objects or events by means of interpretations of sensations.

Anon (1978) interprets perception as a dynamic process in which the physical characteristics and a stimulus and the performance of an individual together determine what is perceived and how it is perceived.

Luthans (1981) defined perception, as a very complex cognitive process that yields a unique picture of world that might be quite different from reality.

According to Kaste and Rosenwing (1982) perception is basic to understanding behaviours because it is the means by which stimuli affect an organization or individual.

Van den Ban *et al.* (1988) opined that perception is the process by which we relate information or stimuli from our environment and transform it into psychological awareness.

Ray (1991) pointed out that perception is selective, and one perceives what one wants to perceive. This happens because before one perceives a stimuli, he needs to give attention to the stimuli.

2.1.1 Importance of perception in extension

Thakur *et al.* (1972) endorsed the importance of perception stating that if the programme is to be successful, it is highly important that those charged with the responsibilities of executing have clarity of concept and objectives.

Patel and Patel (1993) opined that image of any programme as a whole in the hands of people concerned with the programme, is one of the important factors which influences on the impact of these programmes.

2.2 COMPUTER MEDIATED COMMUNICATION

Computer mediated communication is operationally defined as all agricultural information communicated through the medium of a computer. Agricultural information, here largely consists of agricultural sites in the Internet, agricultural DVD's and CD's, interactive CD ROMs, programmes that support decisions, presentations and analysis, expert systems etc.

Chistopher *et al.* (1995) indicated that Ohio State University Extension service offered computer record keeping course for farmers. Eleven competencies related to computer record keeping were given to farmers. The eleven competencies included) a general understanding of computer record keeping for a small business and personal finances, (b) establishing accounts, (c) establishing and using categories and classes, (d) developing tax reports, (e) using the calculator with the computer, (h) entering split transactions, (i) using the computer for budgeting and payroll, and (j) using the "quick-keys" for short-cuts.

The ICAR Institutes had developed various software systems, viz. (i) *Database Management Systems*: for (a) Genebank Management, (b) Identification and Management of Nematodes in India, (c) Poultry Disease Diagnostics and Remedy; (d) AGRI-IS on Animal Genetic Resources of India, (e) Agricultural Pest Information System, (f) Pulse Information System for UP, and (g) Potato Pests CD; (ii) *Application Software Systems*: for (a) Implementing the HACCP by Seafood Processing Plants, and (b) Identification of Eggs and Larvae of Parasites, (iii) *Expert Systems*: (a) Expert Systems for Grape, Cabbage, Mushroom Cultivation Expert Systems, (b) Cotton Insect Pest Management System, (c) Statistical Quality Control for Dairy plants. A Decision Support System (DSS) had

been developed for integrating and utilizing the knowledge base of a large number of agricultural disciplines for agricultural planning and development (ICAR, 2004).

Mathew (2007) stated that E-krishi web site is integrated with the Karshaka Information Systems Services and Networking (KISSAN) developed by the Indian Institute of Information Technology and Management - Kerala and the Virtual University for Agricultural Trade (VUAT) attached to the Kerala Agricultural University. The web site intends to provide the farmer with information on market demand, prices, good agriculture practices, quality agriculture inputs and expert advice.

2.3 KERALA STATE IT POLICY MISSION

The government of Kerala formulated an information technology policy in 1998. The information technology policy aims at increased application of information technology in all walks of life, enhancing the IT industry base, creating a robust state information infrastructure and creating human resources for IT . The government encourages dissemination of information technology services not only as a tool for improving governance and creating more jobs, but also more significantly as a means to enhance the standard of living of the people.

2.3.1 Akshaya

Kerala Governement launched e literacy programme AKSHAYA in one of the back ward districts *Malappuram* on November 2002. Anon (2003) stated that as part of Akshaya project one person form each family in Malappuram district having no computer trained members will be selected and provided with specially designed training for e-literacy. About 6 lakh persons will be trained accordingly, through the Multi Purpose Community Technology Centres (MCTCs) established. A specially designed five day package will be used for

training. The trainees will be selected by the families through the authorities of concerned LSGB. The age limit preferred is 20-30 years.

2.3.2 Information kerala mission

Computerisation of village level administration was given a high priority in the information technology policy of Kerala. The Kerala Information Mission, which was set up in 1998, is a trendsetter in the deployment of technology at the grassroots level and a model for participatory governance through the effective use of information technology. The project aims at modernisation and integration of government functions using information technology by networking and computerising the local self governments to expedite project implementation and transactions like issue of certificates, licenses, tax collection etc.

2.3.3 KISSAN KERALA

Karshaka Information Systems Services And Networking is a project by the Department of Agriculture, Government of Kerala. This project for agriculture is a pilot implementation of application of information technology through relevant Information systems and networking to aggregate, share and disseminate information of importance and interest to farmers, agriculture workers and officials in ways that enhances the total agricultural development and farmers welfare in the state.

2.3.4 FRIENDS

FRIENDS (Fast, Reliable, Instant, Efficient, Network for Disbursement of Services) is set up in every district head quarters by the IT department. FRIENDS is unique project taken up by the government to provide the benefits of IT to the common man. This offers the citizen an integrated point for utility payments for specific services such as electricity charges, water charges, property

tax, professional tax etc. The server of the FRIENDS centre is being linked to the server of the concerned departments for updating on a real time basis. A friendly 'Help Desk' helps the customers to fill up forms and clarify their doubts.

2.3.5 KISSAN CALL CENTRE

It is the latest development in the field of ICT agriculture. As per the IT policy of Central government of Kissan call centres has started functioning for the past one year. In Kochi a Kissan call centre is functioning to answer to the queries of farmers from Kerala and Lakshdeeves. A toll free no.1551 is allotted for the Kissan call centre, It is functioning at six levels. At the call centre B.Sc. (Ag.), graduates are appointed to receive the calls. Queries that cannot answer by the graduates will directed to higher levels such as KAU, ICAR institutions and Commodity Boards according to the nature of the query.

2.4 CLASSIFICATION OF COMPUTER MEDIATED COMMUNICATION

The review covers aspects such as training, extension, pest and disease control, education and technology.

2.4.1 Training

Wijekoon *et al.* (1998) described the development and application of two interactive multimedia CDROM's for training extension workers in the production of audio-visual material. It reports on a series of recent case studies undertaken in Sri Lanka, which used various CDROMs in various training scenarios. The results indicate that distance education utilising multimedia courseware alone is not enough.

Rao *et al.* (1999) reported that majority of the farmers and agricultural officials were willing to undergo training for using expert system in TOT as it directly concerns them. The potential for designing short training session for using

expert system for TOT and related activities need to be exploited on a priority basis. The recommendation without graphics was preferred by farmers whereas Extension officials preferred it with graphics for interpretation analysis in TOT. Interactive video type expert system had been preferred by all for effective training. Expert systems which were highly crop specific or technology specific were preferred over the general packages. Increased accessibility to computer certainly increases the effectiveness of expert system.

Devaraj (2001) reported that information retrieval multimedia system for agriculture and industry, enhance turnover, reduce training costs and improve the morale of an employee thereby increasing the efficiency and effectiveness of training programmes.

Carter *et al.* (2003) designed a training programme for practising field agronomists. The focus of the training was to provide knowledge in spatial technology and information systems. This was done using a combination of computer, classroom and field exercises. Results indicated that individuals were more knowledgeable, but were still in the learning stage for GIS (Geological Information System) and remote sensing.

Meera *et al.* (2004) conducted a study that examined the performance of three ICT projects in India. The projects studied, varied with respect to the type of services provided including marketing information, extension advice, information about rural development programmes, and other information from government and private sources. The study also proved that ICT projects to serve resource poor farmers require qualified and well-motivated staff to serve an interface with computer systems.

2.4.2 Extension

Nathniel (1991) mentioned that computer conferencing is an extension of e-mail. Yet, unlike e-mail, the messages do not have to be viewed in the same

orders as they are received. Computer conferencing allows individuals to select the messages they wish to answer and the order of their response. Messages can be stored until the recipients can assess them.

Murali (1993) developed a database on telephone based interactive voice response system (Audiotex) which contains information pertaining to the farmer, the agronomic condition of the field, individual field observation, recommendations, model constants and weather data. The user enters the field observations using a touch-tone telephone and pre-recorded message are used to guide the user during the data entry and for advising control measures.

Mohan and Arumugam (1994) developed a personal computer based expert system (CROPES) for selecting crops in a region in Tamil Nadu, India. This system acts as an intelligent consultant by asking a set of questions and then suggests appropriate crops to farmers based on location, climate, soils and available resources.

Hahnweonsik *et al.* (1998) developed a database on Agriculture Technology Information Network System (ATINS) which comprises an agricultural technology dictionary, weekly agricultural information, information on national agricultural research, integrated technology information and international research information on crops, livestock, price information and weather information.

Bhaskar and Venkatarao (1999) reported the Warna wired village project covered 70 villages in Maharashtra and the existing cooperative structure was used with the state of the art infrastructure to prove information access to cooperative societies. This project provided information to the villagers by establishing network booths in the villages.

Anon (2001d) reported that the Chennai based group has set up a portal (www.indiaagriline.com) for the dissemination of agriculture related information to the villages. A farmer can use the touch screen kiosk to access information in Tamil or English on agri-related topics. It aims to bring on-line trading in agriculture commodities, trading in rural industry manufactures, on-line banking and retailing, news updates and on-line consulting.

FAO established the World Agricultural Information Centre (WAICENT) for agricultural information management and dissemination in an effort to fight hunger. WAICENT is FAO's strategic programme for improving access to essential documents, statistics, maps and multimedia resources to millions of users around the globe according to the http://www.fao.org (2001a)

Singh *et al.* (2003) reports that the Central Institute of Agricultural Engineering, Bhopal has produced a number of videos on agricultural machinery. They have been recorded on conventional tapes and an effort was made to collect the best quality videos from the tapes so as to digitalise them and make it compatible for viewing on a computer screen. The videos are kept in MPEG (Motion Picture Expert Group) and DAT format, which are the most common and compatible format for digital videos

Singh (2004) stated that agricultural expert system is a decision support tool for agricultural extension agents who have to decide on the advice to farmers. It is one of the most efficient extension tools to take the technology from scientist to the farmers directly without any dilution of content.

2.4.3 Pest and disease control

Norton (1998) showcases a series of crop based multimedia CD-ROMs for citrus and cotton with the identification of pests and disease and to highlight the

benefits of Integrated Pest Management. It is also providing a series of training modules for grain store managers.

Schumann (1998) reported that turf grass disease CD-ROM consists of an illustrated key to disease in which the user answers a series of questions and is brought to a likely disease or a shortlist of diseases that are listed at periods when they are most likely to occur.

Sweetmore *et al.* (1998) stated that the electronic crop protection compendium, a multimedia related database on CD-ROM was released in 1997. Information contained in the compendium was of two types (i) detailed data sheets on 1000 pests, beneficiaries, crops and countries/regions and (ii) basic data comprising 20,000 species names and links with hosts and geographic data.

Das *et al.* (2002) investigated the possibilities of a pest management information system. Integrated pest management is a sustainable approach to manage different pest related problems in the agriculture. However, information on IPM (Integrated Pest Management) is not readily available to the end user, a farmer or an extension worker. With the rapid growth of internet, it is now possible to put the information in electronic format so that users can access it anywhere any time. The present investigation was carried out with the idea of developing an online Pest Management Information System (PMISNET) on major agricultural crops containing information on various aspects of IPM.

Deveson and Hunter (2002) used a geographical information system based decision support system (DSS) to coordinate the collection, processing, analysis and display of a range of spatial data for the forecasting of locust population development and to assist control operations. The resultant forecasts were used to help locate population aggregations early in a breeding sequence to enable effective preventive control of the insect pests. The data collection of the DSS

includes wireless direct transfer of locust survey data from the field and daily collection of weather data.

Mahaman *et al.* (2002) developed a rule-based expert system to diagnose pests of honeybees (*Apis mellifera*) and to suggest appropriate treatments. The system is used as a diagnostic tool for beekeepers and as for educational and extension purposes. It provides a diagnosis based on the description of the external appearance or behaviour of the affected colony. Corresponding pictures accompany the most important symptoms and certain measures to be taken are proposed. The expert system was evaluated following the conventional expert system evaluation methodologies.

Pratheepa *et al.* (2004) mentioned that 'Helico-Info' is a windows-based unique computer database which enables researchers to have easy access to information on aspects of bionomics, distribution in India, host plants, effect of abiotic factors on the population, list of natural enemies relating to *Helicoverpa armigera*. The feasible biocontrol measures for the pest on different crops are also provided. The database gives a comprehensive list of other Helicoverpa species. 'Helio-Info' is a user friendly computer software and persons having basic computer knowledge can utilise it effectively.

A computer- aided software named "Diagnos-4" incorporating all the modern features with multimedia and graphics had been developed. This package would help in identifying the pest and diseases of major crops. The package was user- friendly and easy to operate, more attractive and aesthetic. It was hoped that this package would support the agricultural extension workers for decision-making and help them in suggesting suitable control measures of the major pest and disease of major crops of Kerala. (Ganesan, 2004 and Ganesan *et al*, 2005).

2.4.4 Education

Lambert (1992) listed the advantages of computer aided learning as given under: It caters for individualised instruction. It allows for interaction with the

courseware material. It requires fewer tutor/educator resources. The content is easily adaptable. The material may be easily updated and expanded. It is reliable and. It may have long term cost advantages.

Balit (1998) opines that with new Information and Computer Technologies (ICTs), rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they make decisions for their own development.

Johnson *et al.* (2000) compared agricultural students with respect to their computer related experience, computer self efficacy, and computer knowledge. A higher percentage of seniors had studied each of eight computer topics than had freshmen. Seniors also had a higher level of overall computer self efficacy than freshmen. Seniors also scored higher 52.0 per cent correct on a 35 item computer knowledge exam than did freshmen (39.6 per cent correct). Recommendations for enhancing the computer education of agriculture students were made as a result of this study.

Tung and Tung (2000) examined the influential factors on floricultural growers' perception of computerisation based on information from members of the agricultural production and marketing group, Taiwan. A factor analysis was employed to extract information on use of training in information technology, the operation and maintenance of information technology, ownership of information technology, and importance of information technology. It was found that farmers possessing higher job status, education levels and income, tend to have better qualification in computerisation and a greater perception of computerisation as a tool.

Shihjui (2000) found that farmers possessing higher job status, education levels and income tend to have better qualifications in computerization and a greater perception of computer as a tool.

2.4.5 Technology

Singh and Pathak (1994) developed a PC-based Decision Support System (DSS) to aid in decision making in management of chopper harvesting system for sugarcane in Thailand. Graphical representation between harvesting costs and material capacity at different daily working hours showed the nature of cultivation. The DCC also simulates the harvest and transportation operation and determines the optimum number of trucks for a given set of transportation conditions. This DSS is designed to make optimum decisions for economic use of the harvester and its management.

Jensen *et al.* (1997) observed that Pl@ntelnfo (www.planteinfo.dk) is a decision support system, which uses the World Wide Web to supply farmers and agricultural advisers with timely information and decision support for crop management.

Anon (2001c) has launched its agricultural portal named http://www.uttamkrishi.com. The portal aimed at rendering services to the ultimate user i.e. farmers. It is in local language and provides information on weather conditions soil fertility, crop production, input management, prices of different commodities through internet kiosks at block/district levels.

Anon (2001b) reported that it has recently launched its websites, (http://www.fertindia.com) which provides information on fertilizers and agriculture. In addition to this, facilities like message box, statistical data, and latest trend in agriculture and fertilizer use, calendar of events etc., are available.

Wilkins *et al.* (2001) PRICE (Pesticide Residues in Irrigated Cereal Ecosystem) was a DSS, developed to determine environmentally acceptable and relevant herbicide for use in irrigate rice in the high potential Indo- Gangetic plains of Northern India and Bangladesh. The DSS was available on a CD- ROM.

Witt *et al.* (2001) gave an account of the Nutrient Decision Support System (NUDSS) for irrigated rice. It was part of IRRI's initiative to provide decision support for site specific nutrient management (SSNM) in the irrigated lowlands. The NUDSS was a user friendly software package to help users develop improved fertilizer strategies that aim at efficient fertilizer use and increased farmers' profit.

Havrland and Kapila (2002) developed agricultural technology management software, AGRO-EXPERT. This software allows an extension manager to quickly design a proper technology and verify the technological concept through economic calculations and efficiency tests.

Hoe *et al.* (2002) mentions about Agroviet, the official website of Vietnamese ministry of agriculture and rural development, which offers information in the agriculture, rural development and agro product trade promotion. It is to build a bridge between producer, traders and decision makers on the one hand and customer investors on the other hand.

Chengming *et al.* (2004) stated that GIS, a management system of spatial data, is not only a subject, but also a technology. They studied the application and advancement of GIS in agricultural production.

Manhas *et al.* (2005) reported that information village concept of M.S.Swaminathan foundation which provides integrated information support to rural people including farmers, gnan dooth pilot project of Madhya Pradesh; which provides e-governances facilities to villages, Pondicherry government initiative to connect all the agriculture markets in the state, Warna wired village projects of Maharastra which provide cyber extension facilities to farmers, market tele intelligence reports provided to farmers of Andhra Pradesh, one way video and two way audio interactive e-sessions conducted in Madhya Pradesh with the help of ISRO Bhoomi project of Karnataka in which entire land records are

computerised, are attempts made in the field of agriculture extension to utilize information technology. Private sector too taken interest in using information technology for the benefit of farmers which includes e-choupal of ITC, Rallies Kisan Kendras of Rallies, Kisan Bharath Kendras of United Phosphorus Limited, cyber extension service of Paty's.

Vijayalakshmi *et al* (2006) commented that the expert system would be useful in designing extension programme, which would save the time of both the extension worker and farmers. This expert system could be installed in agricultural extension centers. The farmers could get easy accessibility whenever they need. The farmers' problems were solved by providing recommendations in response to a user's request thus acting as a decision support tool. This kind of expert systems were introduced not to substitute the experts but to assist them in solving the farmers' problems.

Anon (2007) reports that ATIC of the Kerala Agricultural University has developed a comprehensive DVD ROM called "Karshika Jalakom" containing agriculture, veterinary and fisheries that covers over 40 crops, major domestic animals, poultry, inland fishery and ornamental fish culture, pest and disease management, agro-based small enterprises. The content is in Malayalam and caters to the farmers of Kerala in general and Palakkad in particular.

2.5 REVIEW OF STUDIES ABOUT INDEPENDENT VARIABLES

2.5.1 Education

There is a large body of evidence to support the proposition that modern ideas, attitudes and values are found more frequently among the better educated. So far as we know, Lerner (1958) was the first to articulate a model of modernization and explain the role of education in it. Other studies which looked upon education as an initiator of modernity were Tumin and Arnold' study (1961) in Puerto Rico and Kahl's investigation in Brazil and Mexico.

There are innumerable findings which provide empirical support to the positive influence of education on agricultural modernity (Manjula 1995, Menon 1997 Palem 2002, Kumar *et al.* 2003)

2.5.2 Trainings undergone

Sharma (2000) found that the content of the training programme was according to the needs and interest of the Agricultural Assistants.

Mani (2001) concluded that majority of the respondents preferred only two content areas namely message on latest technologies and practical field problem.

A majority of the trainees perceived the information given in the training programme as more adequate, highly practical, more useful, highly understandable, presented in order and very well explained (Karthikeya, 1997).

2.5.3 Knowledge about computer mediated communication

Impressive contributions of scientists stressing the importance of knowledge of improved practices in agriculture have grown over the years. Rogers (1969) employed practical knowledge as one of the variables of agriculture modernisation. Knowledge of innovations significantly contributed to explaining adoption behaviour of farmers (Sethy *et al.*, 1984). Review on works by Seshaiah (2003), Supriya and Srinath (2003) show significant relationship of knowledge with modern technologies.

2.5.4 Communication ability

Communication ability is a powerful stimulus for agricultural modernisation and social change. Studies by Kokate and Nand (1991), Manilal (2002) showed significant relationship between communication ability and attitude towards modern technologies.

2.5.5 Information source utilisation

Information source utilisation as a component for measuring progressiveness of farmers was used by Roy (1965). Several scientists have also reported that progressiveness of farmers (Danda 1972, Dwarakinath *et al*. 1975, Shilaja 1981, Jaleel 1992, Parimala 2003) are characterised by frequent external agency contact.

2.5.6 Studies on independent variables age, achievement motivation, creativity, innovativeness and computer use efficiency.

Independent variable	Researcher	Dependent variable
Age	Vinayagam (1998)	Attitude
	Jayalekshmi (1996)	Attitude
	Gajbhiye (2002)	Perception
	Patil (2002)	Perception
Achievement motivation	Murthy (2002)	Job satisfaction
	Rajendran (2003)	Job satisfaction
	Supriya and Srinath (2003)	Depersonalisation
Creativity	Murthy (2002)	Job satisfaction
	Rajendran (2003)	Job satisfaction
	Seshaiah (2003)	Knowledge gain
Innovativeness	Vishwas (2000)	Symbolic adoption
	Jyothi (2003)	Knowledge retention
	Seshaiah (2003)	Knowledge gain
Computer use efficiency	Pratap (2003)	aptitude to learn computers
	Sebastian (2002)	effectiveness of presentation
	Anandaraja (2002)	effectiveness of transfer of technology

2.6 CHARACTERISTICS OF EFFECTIVE COMPUTER MEDIATED COMMUNICATION

Motion picture as tested by Chandargi and Channe gowda (1990) significantly influenced the participants in gaining knowledge on mixed farming.

Wilson (1992) stated that the combined colour images from related videos with sound, text and animation in such a way that the experiments and site visits which were now almost impossible to organise could at least be simulated on the computer.

Bortolussi *et al.* (1999) reported that beef producers of north Australia preferred computer printed materials particularly, if, illustration technology such as annotated graphs are included.

The Potato Extension & Technology Information System (PETIS) designed principally for the small scale potato growers, is equipped with audio files that provide information in English. Illiterate users have an option of the content in Creole and Bhojpuri. Icons and pictures enable most rural users to navigate the site easily (Lukuram *et al.*, 2000).

Sriram (2000) found that lecture with slide show plus demonstration plus discussion forum resulted in maximum mean knowledge gain followed by lecture plus field visit plus discussion forum and lecture plus video plus discussion forum.

Rao and Prasad (2003) reported that National Institute of Extension Education and Management (MANAGE) developed, an extension system Rice Crop Doctor in collaboration with National Institute of Information Technology, to diagnose rice pests as diseases and to suggest curative and preventive measures. The rice crop doctor diagnoses the pest or diseases depending on the systems identified by the user with the help of photographs and textural information. The system suggests chemical, cultural and biological measures along with the method of application and dosage with alternative options wherever possible. It gives information on favourable conditions under which particular pest and diseases

prosper and help the user to know the possible pest and disease, which can infect on certain weather conditions so that appropriate action can be taken in advance.

Sharma and Arya (2005) carried out a study in Andhra Pradesh to ascertain the utilisation of internet communication among livestock farmers. Psychological constrains such as domination of English language, complexity of information, information unsuitable to village conditions, power supply and training needs in computer handling were the major impediments to internet communication.

Ganesan (2006) developed Nutrient Recommendation System for Rice, 'NRSR' would aid as a decision support system for calibrating the required dose of fertilizers and organic sources for a particular area of land and also the total expenditure to be incurred. Information on organic farming, biofertilizers, and fertilizer guide, guidelines for maximizing fertilizer use efficiency, Malayalam terminology and abbreviations were also incorporated in the software to make it more users friendly.

Sunil (2006) reported that the final testing of content and design of the information and decision support system revealed a "very good" rating by the respondents. The respondents liked both the content and design part of the system. And among the different components of the system, the appealing graphical design was liked by most of the respondents. This was followed by the clarity of content information presented through the system. Among the different uses perceived by the researchers, the most important one was as a tool to enhance the learner participation. This was followed by such uses like a tool for the single window extension counters, material for reference purpose, distance education, and academic teaching tool in the order. The important utility of the system as perceived by the farmers was a tool to diagnose various plant protection problems, a calculator to estimate chemicals and also a management tool in identifying various concerns.

METHODOLOGY

CHAPTER III
RESEARCH METHODOLOGY

Research methodology may be understood as a science of studying how research is done scientifically. It is the methodology, which answers the "how" aspects of research. According to Kerlinger, (1983) a research design, is the strategy of investigation conceived so as to obtain answers to the research questions. This chapter deals with the brief description of the methods and procedures followed in the study. The various aspects included in this chapter are presented under the following sections.

3.1   Locale of study

3.2   Sampling procedure

3.3   Selection, operationalisation and measurement of variables

3.4   Procedure involved in data collection

3.5   Statistical tools employed

3.1   LOCALE OF THE STUDY

The objectives of the study necessitated the selection of Malappuram as one of the locale of research for the following reasons.

> ➤ The Akshaya e-literacy programme of Kerala was launched first in the district of Malappuram.
> ➤ Malappuram has been declared as the first e-literate district in Kerala

From among the thirteen districts, where Akshaya was not introduced Trichur district was randomly selected from among the 13 non-Akshaya intervened districts.

Fig. 1. Map of Kerala State showing the locale of the study

N

Kasaragod

Cannanore

Wayanad

Kozhikode

Malappuram

Palghat

Trichur

Ernakulam

Idukki

Kottayam

Allepey

Pathnamthitta

Quilon

Trivandrum

■ Malappuram District

■ Trichur District
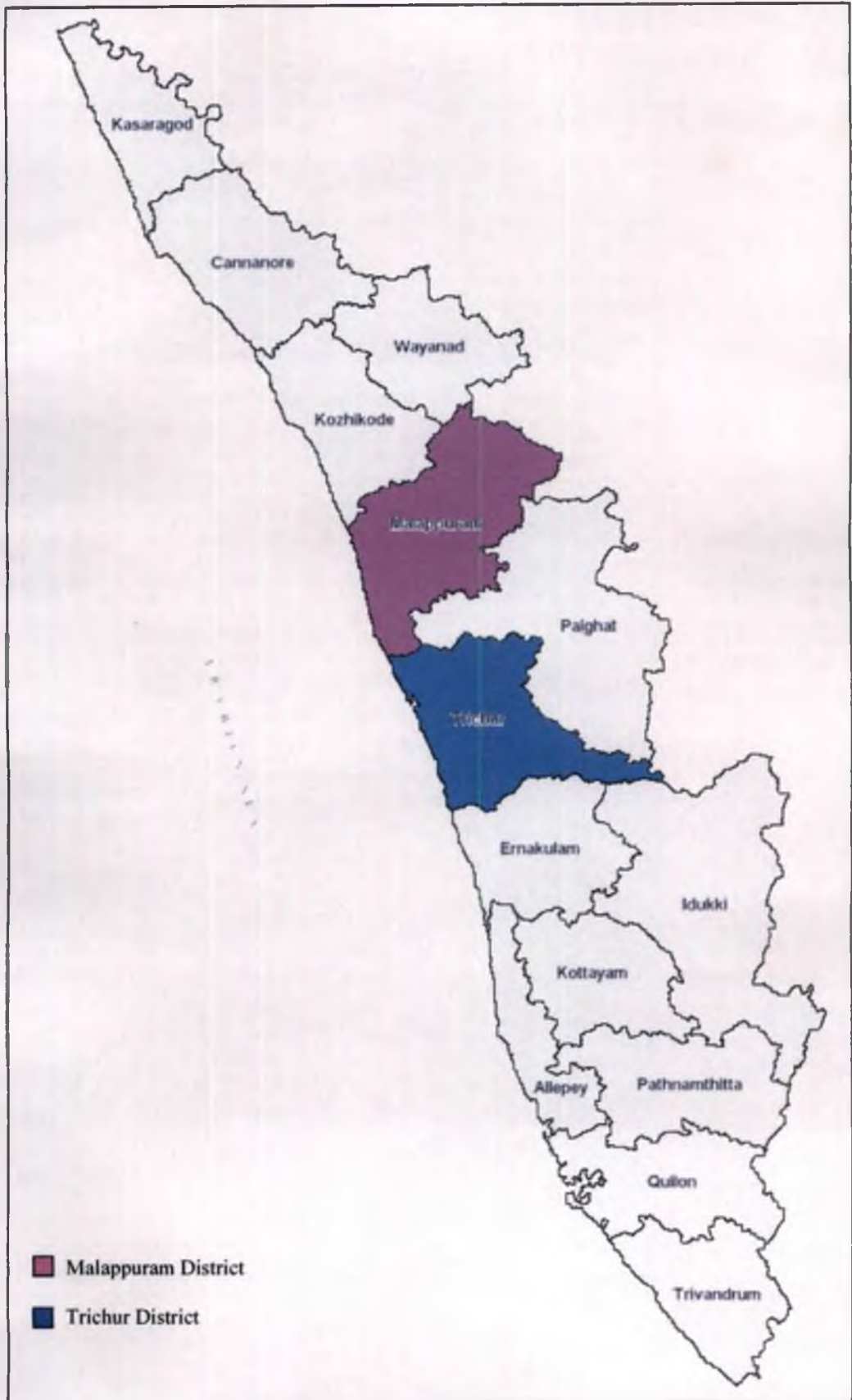
3.2 SAMPLING PROCEDURE

The unit of analysis for the present study comprised of Agricultural Officers of different Krishi Bhavans in the selected two districts. The details of all Agricultural Officers were gathered from Principal Agricultural Offices of Malappuram and Trichur districts. Only those Agricultural Officers who have exposure to computer mediated communication was prepared for each district, which served as the sampling frame. From the list so prepared, the respondents were selected following stratified random sampling with proportionate allocation so as to obtain 30 per cent representation of the population. Accordingly 46 Agricultural Officers were selected from Malappuram and 49 Agricultural Officers were selected from Trichur. Thus a sample of 95 Agricultural Officers formed the sample of the study.

The list of progressive farmers who were exposed to computer mediated communication were collected from the Agricultural Officers of the two districts and three farmers from each district were randomly selected for preparing case studies. Thus a total of six cases are presented.

3.3 SELECTION, OPERATIONALISATION AND MEASUREMENT OF VARIABLES

The importance of any research study mainly depends on the variables taken into account. Justifiable variables were selected after relevancy rating. Appropriate measurement techniques were used to quantify the variables. The procedure followed in the selection of variables, their operationalisation and measurement are stated below.

3.3.1 Selection of variables

Based on review of relevant literature and discussion with experts, an exhaustive list of socio-economic characteristics was prepared (*Appendix I*). To

know the relevancy of each of the variable, they were subjected to judges rating. Thirty extension scientists were chosen as judges and the responses were obtained on a five-point continuum viz., 'most important', 'more important', 'important', 'Less important' and 'least important'. The responses thus obtained were rated using frequency analysis to select the final variables. The selected variables with their frequencies are presented in *Appendix II*. Those independent variables that emerged as most important (those have mean value > 4.0) in the relevancy rating procedure were selected.

Similarly, a list of characteristics of computer mediated communication was prepared (*Appendix III*). The list was given to thirty extension scientists for developing critical factors that determine the characteristics of an effective computer mediated communication. A factor analysis was conducted to bring out the determinants.

3.3.1.1 Dependent variables

1. Attitude of Agricultural Officers towards computer mediated communication
2. Perception of Agricultural Officers towards computer mediated communication

3.3.1.2. Independent variables

1. Age
2. Educational status
3. Trainings undergone
4. Knowledge about computer mediated communication
5. Communication ability
6. Computer use efficiency
7. Creativity
8. Innovativeness
9. Achievement motivation
10. Information source utilization

3.3.2   Operationalisation and measurement of variables/characteristics

The selected 12 variables are operationalised and measured as follows:

3.3.2.1 *Attitude of agricultural officers towards computer mediated communication*

Attitude of the Agricultural Officers is operationally defined as the degree to which Agricultural Officer's react positively or negatively towards computer mediated communication.

An arbitrary scale developed for this purpose was used to quantify the attitude score. The scale consists of twelve statements. The range of score was from 12-48. The scoring procedure was as follows

Category	SA	A	DA	SDA
Positive statements	4	3	2	1
Negative statements	1	2	3	4

The attitude score was arrived at by summing up scores of the statements.

3.3.2.2. *Perception of agricultural officers towards computer mediated communication*

In this study perception of the Agricultural Officers is operationally defined as the meaningful interpretation of what he or she senses as computer mediated communication.

An arbitrary scale developed for this purpose was used to measure the perception score. The scale consisted of twelve statements. The range of score was from 0 to 12. The responses were collected by giving scores as below

Positive response -1
Negative response-0

Perception was arrived by summing up of the entire statements.

3.3.2.3   Age

Age of the respondent was operationally defined as the number of completed years of the respondent at the time of the study.

The scale used by Simi (2005) was followed for the study.

Agricultural Officers are categorised as given below.

Young	< 32 years
Middle aged	32-46 years
Old	>46 years

3.3.2.4 Educational status

Educational status was operationally defined as the qualification of the respondents in terms of possession of bachelor's degree, post graduation and doctorate degree.

Kumar *et al* (2003) measured educational qualification by categorizing into bachelor degree, bachelor degree with diploma or certificate or both, post graduation, post graduation with diploma or certificate or both.

In this study, educational qualification was assigned score as given below.

Educational qualification	Score
Bachelors degree	1
Post graduation	2
Doctorate degree	3.

3.3.2.5 Trainings undergone

This was operationised as the number of computer mediated communication training programmes attended by the respondents.

The scale developed by Parimala (2003) with modifications was followed for the study. The scores assigned as given below.

Trainings undergone	Score
Nil	0
Once	1

An additional score was assigned for each additional training.

3.3.2.6 Knowledge about modern technologies

This refers to the extent of understanding and proficiency in computer mediated communication possessed by an agricultural officer at the time of filling up the questionnaires, as evidenced from his/her responses to the set of questions prepared.

A teacher made knowledge test was adopted. One score was given for every correct answer and summing up scores gave the total knowledge score. The range of scores was from 0-10.

3.3.2.7 Communication ability

Communication ability is operationally defined as the ability of the respondents to transfer information, ideas or feelings effectively to the receiver.

The scale used by Pratap (1999) with modifications was followed for the study.

The scale consists of twelve statements. Communication ability score was arrived by summing up scores of the entire statements. The range of score was from 12-36. The responses were collected by assigning scores as given below

Category	Always	Sometimes	Never
Positive statements	3	2	1
Negative statements	1	2	3

3.3.2.8 Computer use efficiency

It was operationally defined as the extent of working knowledge and skill of the Agricultural Officers in operating and utilising computes.

An arbitrary scale developed for this purpose was used to quantify the computer use efficiency. The scale consisted of thirteen statements. The range of score was from 0-13. The responses were collected by giving scores as given below. Yes -1, No - 2

3.3.2.9 Creativity

Creativity of the Agricultural Officers is operationally defined as use of imagination or original ideas in order to create something productive and resourceful in the agricultural sector.

The scale used by Stevens (1999) was adopted for the study.

The scale consists of eleven statements. The range of score was from 0 –11. The responses were collected by giving scores as given below.
Yes - 1, No - 2

3.3.2.10 *Innovativeness*

Innovativeness was operationalised as the degree to which the Agricultural Officer is relatively earlier in adopting new ideas.

The scale used by Simi (2003) with slight modifications was followed for the study. The scale consists of six statements. The range of score was from 6-18. Innovativeness score was arrived by using summing up scores of entire statements.

The responses were collected by giving scores as given below.

Category	Always	Sometimes	Never
Positive statements	3	2	1
Negative statements	1	2	3

3.3.2.11 *Information source utilisation*

Information source utilisation was operationally defined as the use of various sources of information by the respondents in order to get information on agricultural technology.

The procedure adopted by Ramachandran (1992), and Manoj (1998) was followed with slight modification. The respondents were asked to indicate the frequency of use of these sources on a three-point continuum viz., 'regularly', 'occasionally' and 'never' with scores of 3, 2 and 1 respectively. For extent of information, a three point continuum viz., 'adequate', 'somewhat adequate' and 'inadequate' with scores of 3, 2 and 1 respectively were scored by the respondents.

The score given for the frequency of utilisation was multiplied with the score given for the extent of information, for all the sources and then added up to get the final score. Based on the maximum score that could be obtained on the variable, the respondents were divided into three groups on their utilisation of various information sources.

Table 12. Categorisation of respondents according to their information source utilisation

Information source utilisation	Score
Low	Below 71
Medium	71- 103
High	Above103

3.3.2.12 *Achievement motivation*

It is operationally defined as the inner driving force for attaining higher goals.

The scale used by Alexander (1996) with slight modifications was followed for the study. The scale consists of seven statements. The range of score was from 7-21. The responses were collected by giving scores as given below.

Category	Always	Sometimes	Never
Positive statements	3	2	1
Negative statements	1	2	3

Achievement motivation was arrived by summing scores of the statements.

3.4 PROCEDURE INVOLVED IN DATA COLLECTION

The data for the present study were collected using questionnaires. Part A of the questionnaire has socio-economic characteristics of the client as well

as their attitude and perception and Part B –Characteristics of Computer mediated communication.

The data were collected, coded and analysed with the help of a computer available in College of Horticulture, Vellanikkara.

A list of farmers who had awareness and knowledge in computer mediated communication were sought from the Principal Agricultural Office of the two districts. A list of 10 farmers were available from which three farmers from each district selected using simple random sampling method. They were interviewed using a semi-structured interview schedule.

3.5 STATISTICAL METHODS USED

The following non-parametric and parametric statistical tests were used in this study in accordance with the nature of data and relevant information required.

Parametric test like simple correlation was used to find out the relationship between independent variables. Comparison between two districts was made by using student's t test.

Factor analysis was used to categorise characteristics of computer mediated communication.

Besides this, other summary statistical tools like mean and standard deviation were used wherever necessary to analyse the data. Apart from this, simple percentage analysis was also done to explain the variables.

Statistical analysis was carried out using the SPSS computer software available at the College of Horticulture, Vellanikkara.

RESULTS

CHAPTER - IV
RESULTS

This chapter highlights the findings of the present investigation. They are presented under the following sections in the light of the objectives set forth.

4.1 Categorisation of respondents based on the independent variables viz. age, education, trainings undergone, communication ability, computer use efficiency, creativity, innovativeness, achievement motivation and information source utilisation

4.2 Categorisation of respondents based on the dependent variables such as attitude and perception towards computer mediated communication

4.3 Relationship between attitude and socio-psychological characteristics

4.4 Relationship between perception and socio-psychological characteristics

4.5 Relationship between computer use efficiency and socio- Psychological characteristics

4.6 Comparision of all the variables between Malappuram and Trichur districts

4.7 Characteristics of computer mediated communication

4.8 Empirical model showing the relationship between factors affecting characteristics of computer mediated communication

4.9 Suggestions of the clientele to improve computer mediated communication

4.1 Categorisation of respondents based on the independent variables viz. age, education, trainings undergone, communication ability, computer use efficiency, creativity, innovativeness, achievement motivation and information source utilization

Respondents are categorized into three groups based on mean and standard deviation (*Agricultural Officers who are above mean + standard deviation, those Officers in between mean-standard deviation and mean + standard deviation and who are below mean-standard deviation*)

Table 4.1   Mean and Standard deviation of variables is given below

Sl.No.	Variable	Mean	SD	Mean-SD	Mean+SD
1	Age	38.88	6.91	31.97	45.79
2	Education	1.42	0.53	0.88	1.95
3	Trainings undergone	0.36	0.61	0.24	0.98
4	Knowledge	4.63	2.28	2.34	6.91
5	Communication ability	31.13	3.11	28.02	34.24
6	Creativity	7.01	1.72	5.29	8.73
7	Innovativeness	13.34	1.67	11.67	15.01
8	Achievement motivation	18.18	2.15	16.03	20.34
9	Information source utilisation	86.97	16.00	70.97	102.98
10	Computer use efficiency	7.80	3.84	3.95	11.64
11	Attitude	36.22	4.46	31.75	40.68
12	Perception	7.52	2.37	5.15	9.89

It could be observed from the table that mean score for age of the respondents is 38.88 and Standard deviation is 6.91, mean score for education is 1.42 and standard deviation is 0.53, mean score for trainings undergone is 0.36 and standard deviation is 0.61, mean score for knowledge in computer mediated communication is 4.63 and standard deviation is 2.28, mean score for communication ability is 31.13 and standard deviation is 3.11, for creativity mean score is 7.01 and standard deviation is 1.72, mean score for innovativeness if 13.34 and standard deviation is 1.67.

The mean score for achievement motivation is 18.18 and standard deviation is 2.15, for information source utilisation mean score is 86.97 and standard deviation is 16.00,mean score for computer use efficiency is 7.80 and standard deviation is 3.84, mean score for attitude of respondents towards computer mediated communication. is 36.22 and standard deviation is 4.46 and mean score for perception of respondents towards computer mediated communication is 7.52 and standard deviation is 2.37.

1.Categorisation of respondents based on age

The respondents are classified into three groups based on their age.

Table 4.2 Classification of Agricultural Officers based on age.

(n=95)

Age	Frequency	Percentage
Young	18	18.95
Middle age	62	65.26
Old	15	15.79

Table (4.1) reveals that 18.95% of the respondents come under the young group. Respondents from 32 to 46 years of the age comes under the middle age group. Middle age group constitutes (65.26 %). Respondents from 47-54 years forms the next group. The old age group constitutes 15.79%

Fig. 2. Classification of Agricultural Officers based on age (n=95)
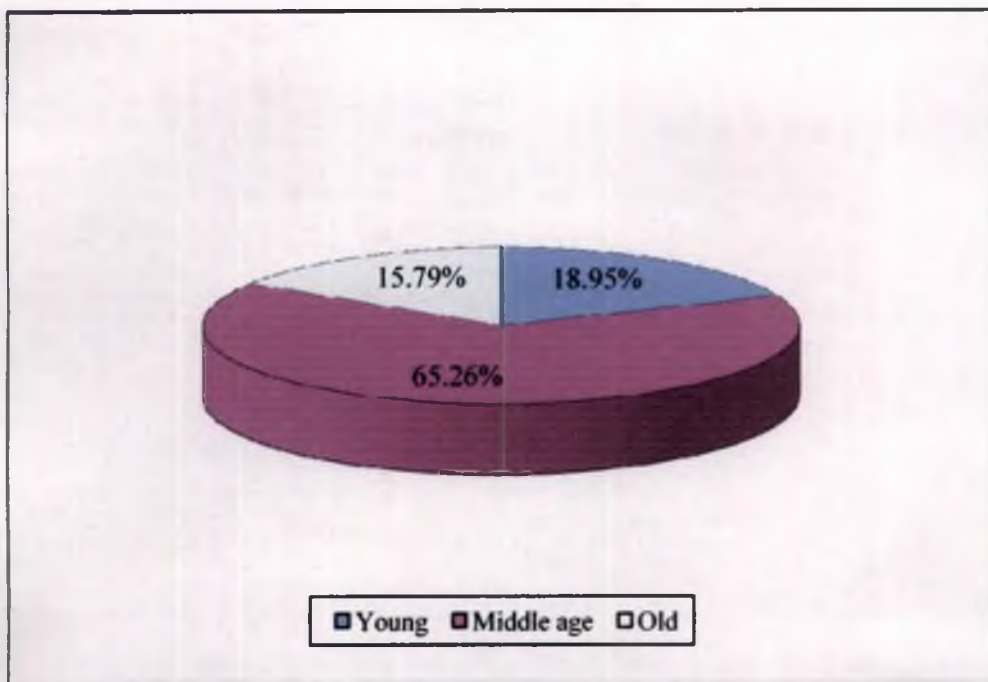
15.79% 18.95% 65.26%

☐ Young ☐ Middle age ☐ Old

Fig. 3. Classification of Agricultural Officers based on education (n=95)

2.10% 37.90% 60.00%

☐ B.Sc. (Ag.) ☐ M.Sc. (Ag.) ☐ Ph.D.
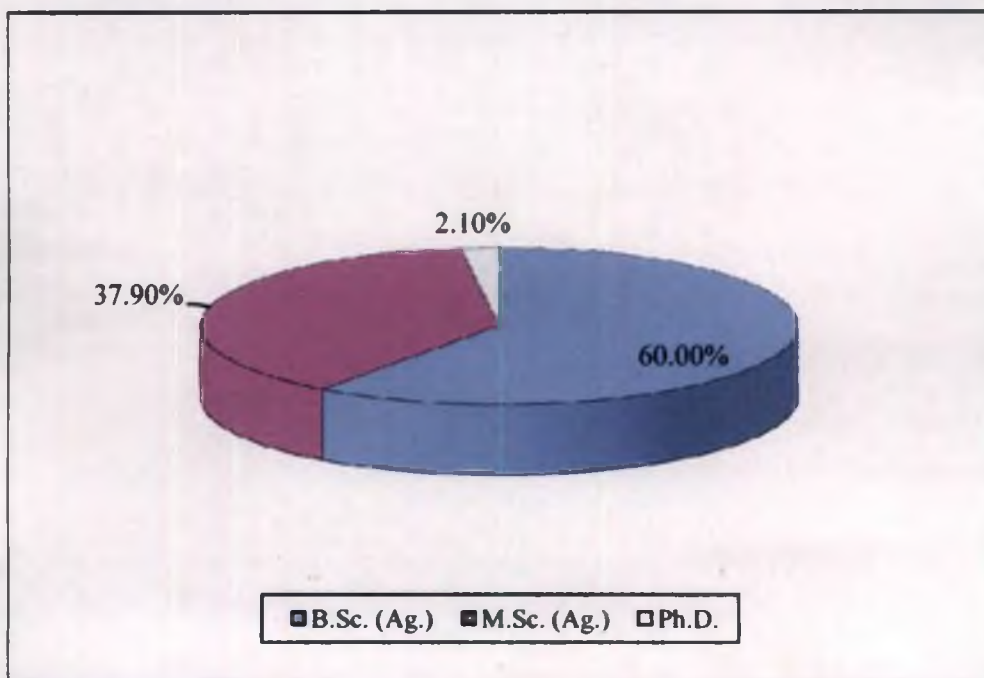
Two third of the Agricultural Officers are in their middle age.

2. Categorisation of respondents based on education

Table 4.3 Classification of Agricultural Officers based on education

(n=95)

Education (in complete degree)	Frequency	Percentage
B.Sc.(Ag.)	57	60.00
M.Sc.(Ag.)	36	37.90
Ph.D	2	2.10

It could be observed from the table that 60.00% of the Agricultural Officers are having B.Sc (Ag.) qualification without any additional degree. 37.90% are having master's degree in agricultural sciences. The percentage of Agricultural officers holding Ph.D degree are still less (2.10%).

Two third of the Agricultural Officers are with B.Sc (Ag.) qualification without any additional degree.

3. Categorisation of respondents based on trainings they have undergone in computer mediated communication

Table 4.4 Classification of Agricultural Officers based on trainings they have undergone

(n=95)

Trainings undergone	Frequency	Percentage
None	67	70.53
One	21	22.10
Two	7	7.37

It could be observed from the table that 70.53% of Agricultural Officers have not undergone any training in computer mediated communication. Only 22.10% of the Agricultural Officers are exposed to at least one training programme. The percentage of Agricultural Officers exposed to two trainings programmes are comparatively very less (7.37%).The Department of Agriculture and Kerala Agricultural University must initiate training programmes in computer mediated communication.

More than two third of respondents have not undergone any training in computer mediated communication.

4. **Categorisation of respondents based on knowledge in computer mediated communication**

Table 4.5 Classification of Agricultural Officers based on knowledge in computer mediated communication

(n=95)

Knowledge	Frequency	Percentage
Low	15	15.79
Medium	67	70.53
High	13	13.68

It could be observed from the above table that (15.79%) are in the category of low knowledge. Majority (70.53%) of Agricultural Officers are with medium level of knowledge. A small percentage (13.68%)of Agricultural Officers are highly knowledgeable.

Four fifth of the respondents are in the category of low to medium level of knowledge with respect to computer mediated communication.

Fig. 4. Classification of Agricultural Officers based on trainings undergone (n=95)
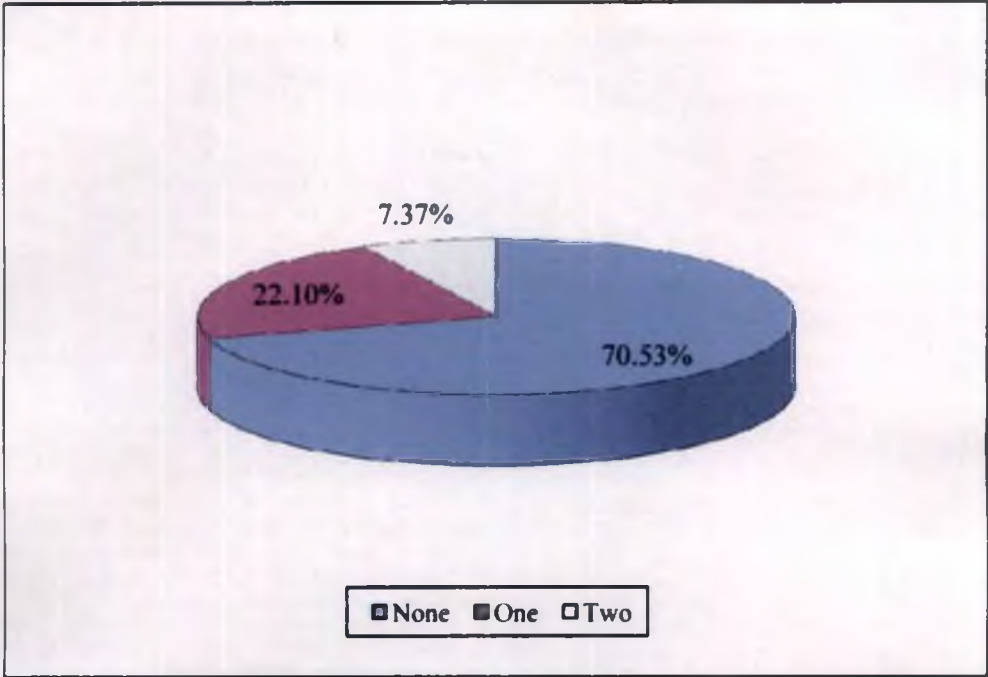
Fig. 5. Classification of Agricultural Officers based on knowledge (n=95)
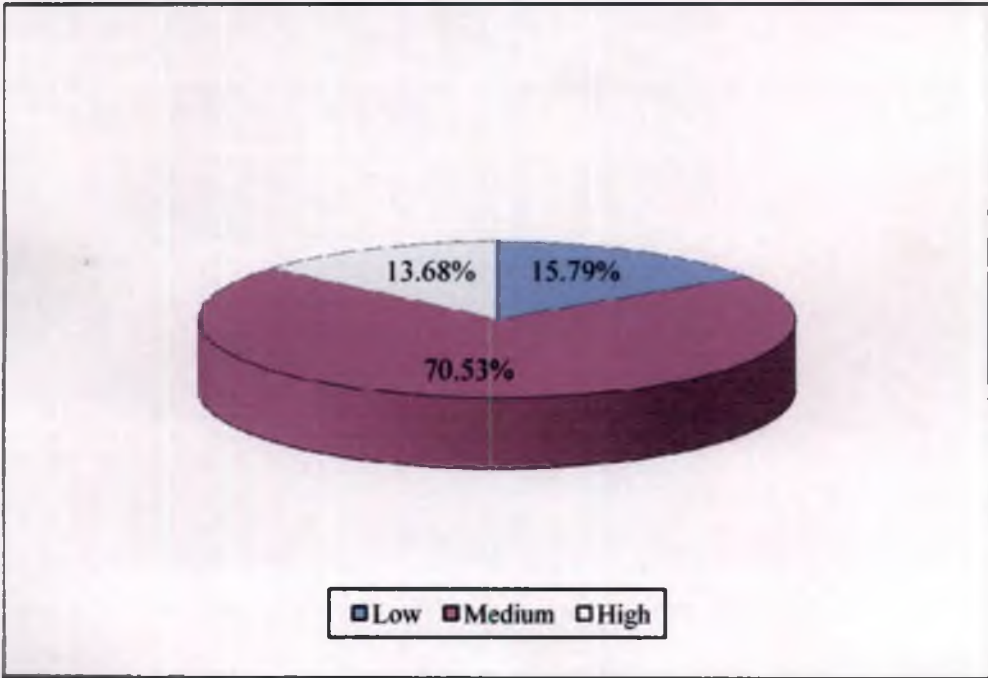
5. Categorisation of respondents based on communication ability

Table 4.6 Classification of respondents based on the communication ability

(n=95)

Communication ability	Frequency	Percentage
Low	13	13.69
Medium	62	65.26
High	20	21.05

It could be observed from the above table that majority (65.26%) of Agricultural Officers communicate well. While 21.05% feel they are highly able in their communication, those who feel they are less communicative are 13.69%

More than three fourth of the respondents have medium to high level of communication ability. Using computer mediated devices such as CD's and DVD's make them more efficient in communication.

6. Categorisation of respondents based on computer use efficiency

Table 4.7 Classification of respondents based on the computer use efficiency

(n=95)

Computer use efficiency	Frequency	Percentage
Low	17	17.90
Moderate	69	72.63
High	9	9.47

Agricultural Officers who are low in their efficiency in computers are (17.90%), and who are moderately efficient are (72.63%).Those who are highly efficient in computers are very less (9.47%).

Fig. 6. Classification of Agricultural Officers based on communication ability (n=95)

21.05% 13.69%

65.26%

□Low ☒Medium □High
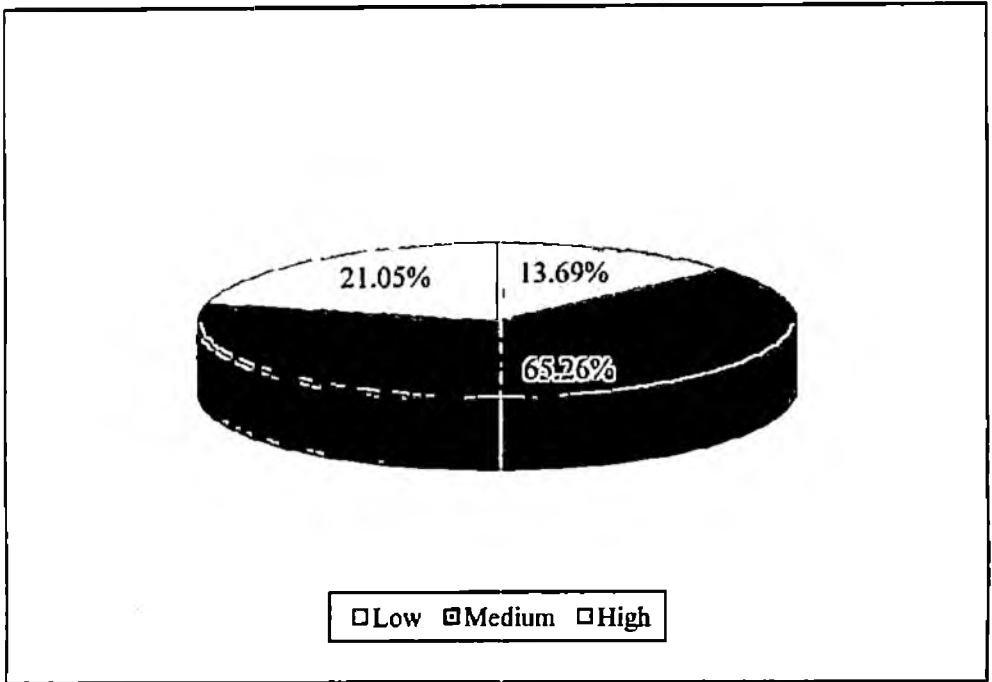
Fig. 7. Classification of Agricultural Officers based on computer use efficiency (n=95)
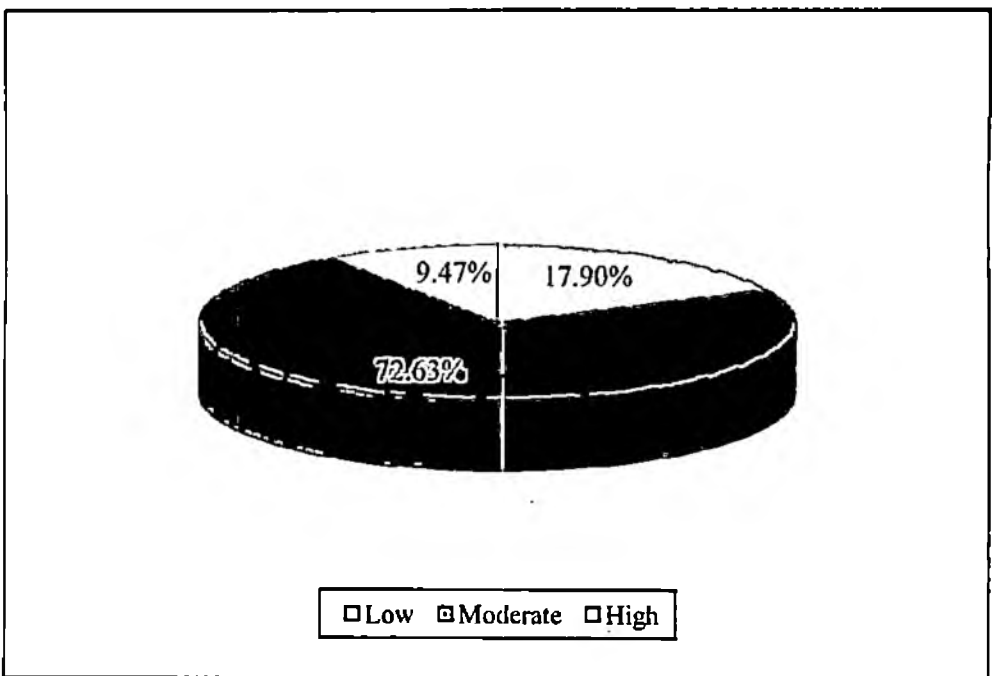
9.47% 17.90%

72.63%

□Low ☒Moderate □High

Four fifth of the respondents are with low to moderate level of efficiency in computer usage

7. Categorisation of respondents based on creativity

Table 4.8 Classification of respondents based on creativity of Agricultural Officers

(n=95)

Creativity	Frequency	Percentage
Low	6	6.32
Medium	81	85.26
High	8	8.42

Agricultural Officers who are less creative constitute only a small percentage (6.32%). Those who are creative are 85.26% and those who are highly creative are 8.42%

Four fifth of the respondents are creative.

8. Categorisation of respondents based on innovativeness

Table 4.9 Classification of respondents based on innovativeness of Agricultural Officers

(n=95)

Innovativeness	Frequency	Percentage
Low	12	12.63
Medium	76	80.00
High	7	7.37

Agricultural Officers who are innovative constitute 80.00%, those who are less innovative are only12.63% and those who are highly innovative are 7.37%

More than three fourth of the respondents are innovative.

Fig. 8. Classification of Agricultural Officers based on creativity (n=95)
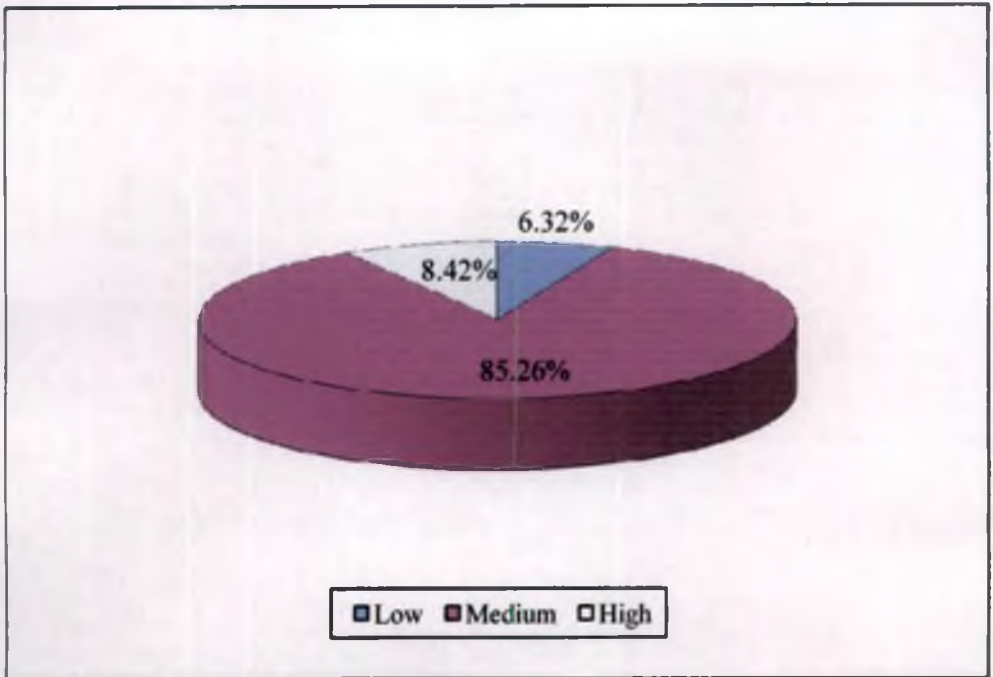
Fig. 9. Classification of Agricultural Officers based on innovativeness (n=95)
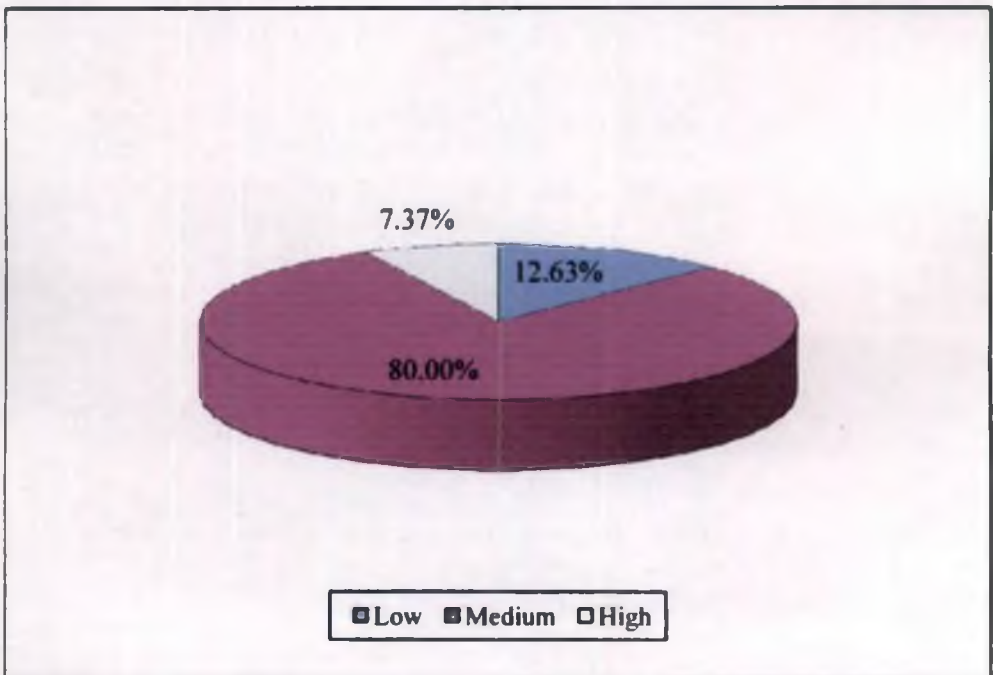
9. Categorisation of respondents based on achievement motivation

Table 4.10 Classification of respondents based on achievement motivation of
   Agricultural Officers

(n=95)

Achievement motivation	Frequency	Percentage
Low	8	8.42
Medium	76	80.00
High	11	11.58

Agricultural Officers with low Achievement motivation are 8.42%, those
with medium achievement motivation are (80.00%) and those who have high
achievement motivation are 11.58%

More than three fourth of the respondents have moderate to high
achievement motivation.

10. Categorisation of respondents based on information source utilisation

Table 4.11 Classification of respondents based on information source utilisation
of Agricultural Officers

(n=95)

Information source utilisation	Frequency	Percentage
Low	14	14.74
Moderate	64	67.37
High	17	17.89

Majority (67.37%) of Agricultural Officers use information source moderately.
The percentage of Agricultural Officers who use information source less are
14.74% and those who utilise informatioh source very much are 17.89 %

Fig. 10. Classification of Agricultural Officers based on achievement motivation (n=95)

11.58%   8.42%

80.00%

☐ Low   ☐ Medium   ☐ High
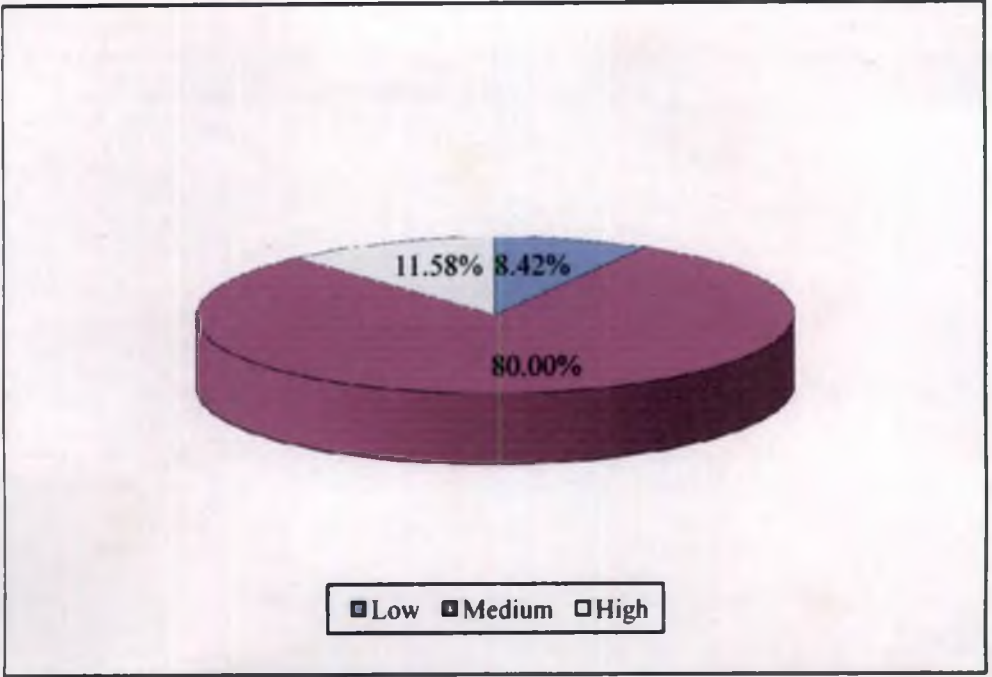
Fig. 11. Classification of Agricultural Officers based on information source utilisation (n=95)
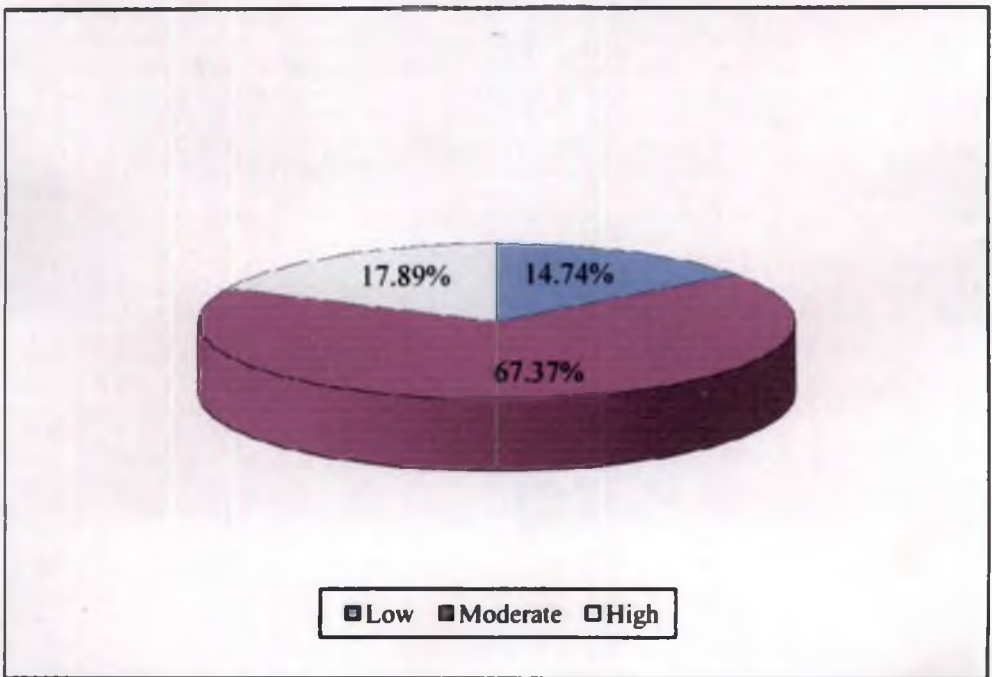
17.89%   14.74%

67.37%

☐ Low   ☐ Moderate   ☐ High

The usage of information sources for more than three fourth of the Agricultural Officers is moderate to high.

4.2 Categorisation of respondents based on the dependent variables viz. attitude & perception towards computer mediated communication.

4.2.1. Categorisation of Agricultural Officers based on their attitude towards computer mediated communication

Table 4.12 Classification of respondents based on their attitude towards computer mediated communication

(n=95)

Attitude	Frequency	Percentage
Low	14	14.74
Medium	67	70.52
High	14	14.74

Agricultural Officers who are less inclined to computer mediated communication are 14.74% .A high percentage (70.52%) of respondents seem to be favourably disposed towards computer mediated communication and those who show slight orientation towards computer mediated communication are 14.74%.

Almost three fourth of the respondents have favourable orientation towards computer mediated communication.

4.2.2 Categorisation of respondents based on their perception towards computer mediated communication

Fig. 12. Classification of Agricultural Officers based on attitude towards computer mediated communication (n=95)
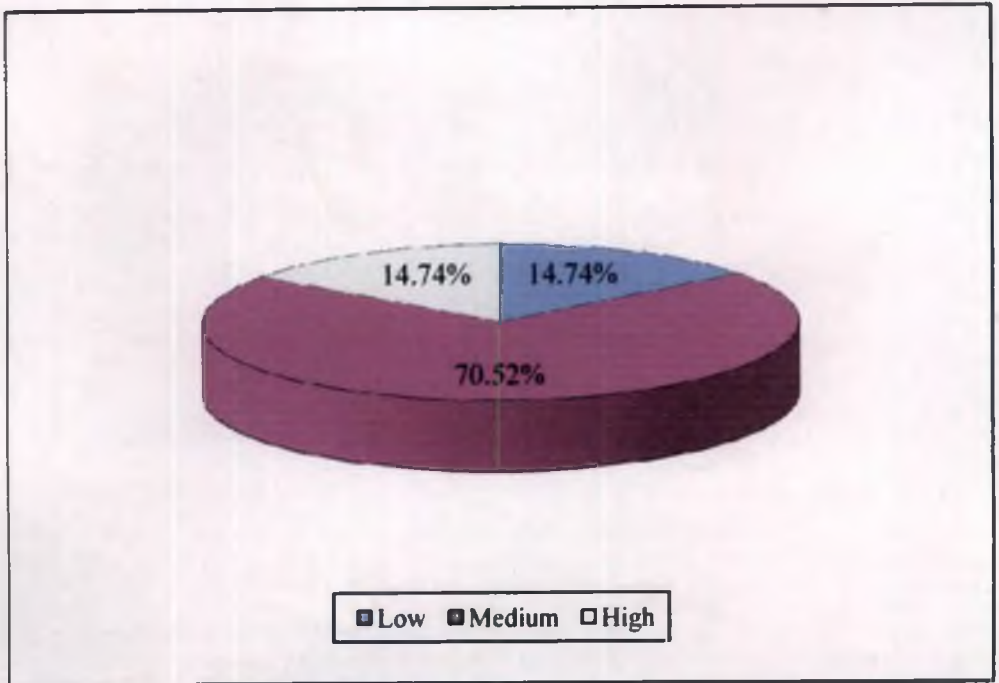
Fig. 13. Classification of Agricultural Officers based on perception towards computer mediated communication (n=95)
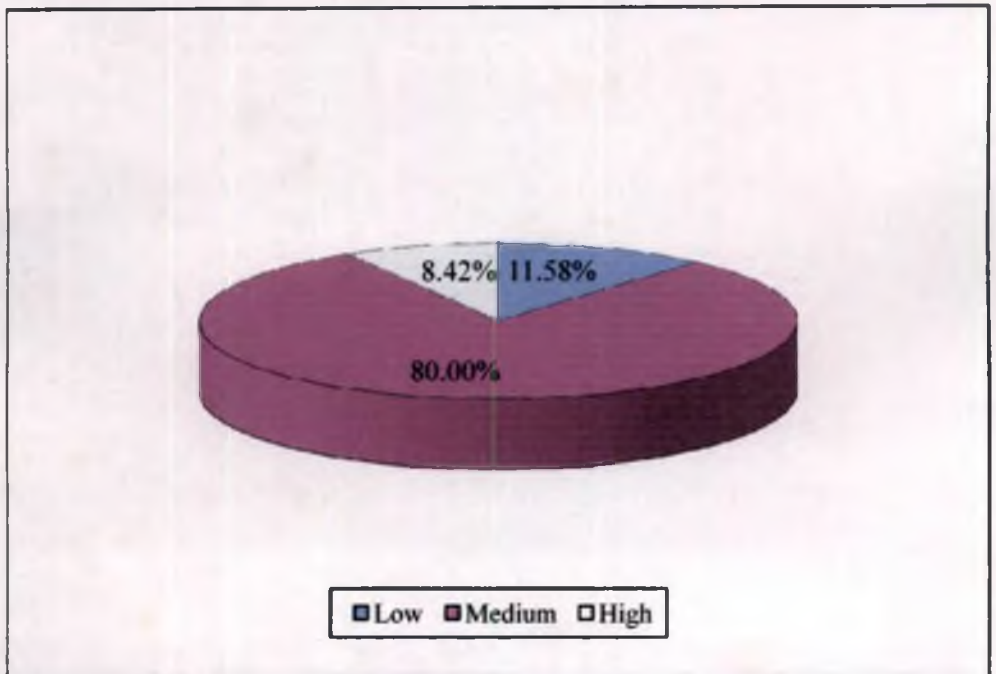
Table 4.13 Classification of respondents based on their perception towards computer mediated communication

(n=95)

Perception	Frequency	Percentage
Low	11	11.58
Medium	76	80.00
High	8	8.42

A high percentage (80.00%) of respondents perceive computer mediated communication as effective. Respondents with low perception towards computer mediated communicated are 11.58%. Very few (8.42%) appear to be showing greater orientation towards computer mediated communication.

Four fifth of the respondents have favourable perception towards computer mediated communication.

4.3 Relationship between attitude and socio-psychological characteristics

Table 4.14 Relationship between attitude and socio-psychological Characteristics

Sl. No.	Factors	Correlation coefficient
1	Age	-0.3520**
2	Education	0.2211*
3	Trainings undergone	-0.1022 NS
4	Knowledge	0.0084 NS
5	Communication ability	0.06375 NS
6	Creativity	0.0093 NS
7	Innovativeness	0.0022 NS
8	Achievement motivation	0.0569 NS
9	Information source utilization	0.00009 NS

*   Significant at 0.05 level of probability
** Significant at 0.01 level of probability
NS - Non Significant

An examination of Table 4.14 brings the relationship between attitude and independent variables.

Age had negative and significant relationship with attitude at one per cent level of probability. Education had positive and significant relationship with attitude at five per cent level of probability.

Trainings undergone, knowledge about computer mediated communication, communication ability, creativity, innovativeness, achievement motivation, information source utilisation showed non significant relationship with attitude.

4.4 Relationship between perception and selected personal and socio-psychological characteristics

Table 4.15 Relationship between perception and selected personal and socio-psychological characteristics

Sl. No.	Variables	Correlation coefficient
1	Age	-0.1838 NS
2	Education	0.0066 NS
3	Trainings undergone	0.1914 NS
4	Knowledge	0.1446 NS
5	Communication ability	0.2029*
6	Creativity	0.0014 NS
7	Innovativeness	0.0097 NS
8	Achievement motivation	0.1124 NS
9	Information source utilization	0.0041 NS

* Significant at 0.05 level of probability

NS - Non Significant

Table (4.15) brings the relationship between perception and the independent variables. Only communication ability had positive and significant relationship with perception at five percent level of probability.

Age, Education, trainings undergone, knowledge, creativity, innovativeness, achievement motivation, information source utilisation showed non significant relationship with perception.

4.5 Relationship between computer use efficiency and socio-psychological Characteristics

Table 4.16   Relationship between computer use efficiency and socio-psychological characteristics

Sl.No.	Computer use efficiency	Correlation coefficient
1	Age	-0.2352*
2	Education	0.2303**
3	Trainings undergone	0.1687 NS
4	Knowledge	0.1616 NS
5	Communication ability	0.0095 NS
6	Creativity	-0.0002 NS
7	Innovativeness	0.1073 NS
8	Achievement motivation	0.0089 NS
9	Information source utilization	0.0084 NS

*   Significant at 0.05 level of probability

** Significant at 0.01 level of probability

NS - Non Significant

An examination of Table (4.16) brings home the relationship between computer use efficiency and all independent variables.

Age had negative and significant relationship with computer use efficiency at five per cent level of probability, which means the young age group are more efficient in computer use. This is in conformity with the findings of Babu (2005). However, education had positive and significant relationship with computer use efficiency at one per cent level of probability.

Trainings undergone, knowledge, communication ability, creativity, innovativeness, achievement motivation, information source utilisation showed non significant relationship with computer use efficiency.

4.6 Comparison between the variables of two districts

Table 4.17 Comparison between the variables in Malappuram and Trichur districts

Sl. No.	Variables	Malappuram		Trichur		't' value
		Mean	SD	Mean	SD	
1	Age	36.89	6.72	40.75	6.55	2.8047**
2	Education	1.52	0.58	1.32	0.46	1.7896 NS
3	Trainings undergone	0.52	0.65	0.22	0.54	2.3943*
4	Knowledge	5.13	2.41	4.16	2.04	2.0869*
5	Communication ability	31.26	2.83	31.02	3.34	0.3728 NS
6	Creativity	6.78	1.86	7.22	1.54	1.2486 NS
7	Innovativeness	12.73	1.59	13.91	1.53	3.6325**
8	Achievement motivation	17.73	2.54	18.61	1.58	1.9953*
9	Information source utilisation	87.15	17.35	86.81	14.62	0.1011 NS
10	Attitude	36.00	4.36	36.42	4.54	0.4630 NS
11	Perception	7.89	2.42	7.18	2.26	1.4551 NS
12	Computer use efficiency	8.10	4.11	7.51	3.54	0.7522 NS

* Significant at 0.05 level of probability
**Significant at 0.01 level of probability
NS - Non Significant

There was significant difference between age, trainings undergone, knowledge about computer mediated communication, innovativeness and achievement motivation of respondents in Malappuram and Trichur districts.

The mean age of Agricultural Officers in Malappuram is 36.89 and mean age of Agricultural Officers in Trichur district is 40.75. It means the number of Agricultural Officers in young age group are more in Malappuram. While mean score trainings undergone is 0.52 in Malappuram. The mean score for trainings undergone is only 0.22 in Trichur, which is comparatively less than Malappuram. This reveals the impact of trainings by Akshaya programme. In knowledge of computer mediated communication mean score is 5.13 for Malappuram Agricultural Officers and 4.16 for Trichur Agricultural Officers and the difference is significant.

Mean score for innovativeness in Agricultural Officers in Malappuram is 12.73 and 13.91 for Agricultural Officers in Trichur district. Majority of Trichur Agricultural Officers are innovative and the difference is significant. For Agricultural Officers in Malappuram achievement motivation mean score is 17.73 and 18.61 for those in Trichur district. Agricultural Officers in and the difference is significant.

Education, communication ability, creativity, information source utilisation, computer use efficiency, attitude, perception towards computer mediated communication showed non significant difference between Agricultural Officers of Malappuram and Trichur districts.

4.7 Factor analysis of characteristics of computer mediated communication

Factor analysis using principal axis method was used to extract the nine factors for expressing the characteristics of computer mediated communication. The nine factors and the variables extracted are given below.

The first factor Credibility-*accessibility factor* has seventeen variables, the second factor *Presentation-Treatment factor* had four variables. *Experiential factor* has one variable. *Animation factor* has one variable, *intervention factor* has two variables. *Cataloguing factor* has one variable, *Imaging factor* has two variables, *audio factor* has one variable and *geographic specificity factor* has one variable.

Factor   **Factor loadings**

i. Credibility-accessibility factor

1. Quick access	0.841
2. Capability for stimulation	0.831
3. Retrievability	0.807
4. Easiness in accessing help	0.785
5. Layout and design	0.774
6. Possibilities for updating	0.769
7. Easiness in storage	0.764
8. Credibility of content	0.762
9. Portability	0.759
10. Operational felicity	0.745
11. Cost effective	0.729
12. Replicability	0.728
13. Electronic mail interactions	0.716
14. Decision support	0.708
15. Comprehensiveness of data	0.704
16. Flexibility for updating and retrievability	0.704
17. Timely access	0.699

ii. Presentation-Treatment factor

1. Simplicity of language	0.609
2. Sequential ordering of presentation	0.611
3. Style of writing	0.620
4. Appropriateness of the content	0.697

iii. Experiential learning factor

1. Presence of success and failure stories	0.586

Fig. 14. Critical Factors of Computer Mediated Communication

Credibility-Accessibility factor

Presentation-Treatment factor

Experiential learning factor

Animation factor

Intervention factor

Cataloguing factor

Imaging factor

Audio factor

Geographic specificity factor
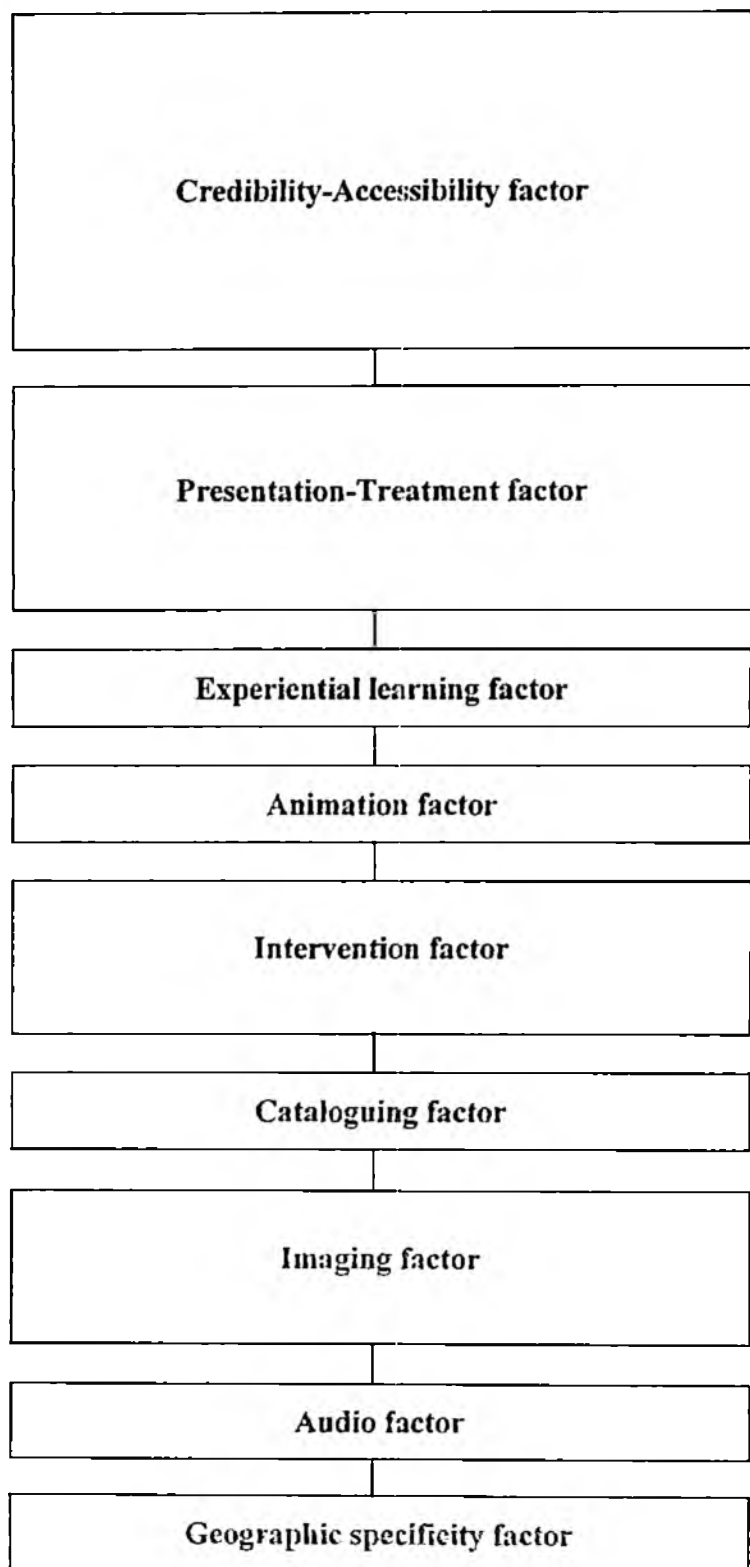
iv. Animation factor

1. Opportunities for animation   0.576

v. Intervention factor

1. Background music   0.550
2. Opportunities for intervention   0.557

vi. Cataloguing factor

1. Indexing/catalouging   0.425

vii. Imaging factor

1. Quality of photographs   0.389
2. Quality of video   0.378

viii. Audio factor

1. Clarity of narration   0.374

ix. Geographic specificity factor

1. Location specific information   0.338

The nine factors together explains 80.11% of variation. The first two factors *Credibility-accessibility factor* and *Presentation-Treatment factor* explain more than 50% of the variation.

4.8 Suggestions of the clientele to improve computer mediated communication

1. There should be full fledged computer systems in the Krish Bhavans for the effective functioning of the Agricultural Officers.
2. Computer systems must be well maintained and supported by maintenance contracts.
3. The availability of the computers with internet facility in Krishi Bhavans help to update knowledge and information.

4. Timely trainings with respect to computer mediated communication should be imparted to Agricultural Officers to improve their knowledge and skill.

5. The Department of Agriculture and Kerala Agricultural University should produce CDs and DVDs with respect to various agricultural subjects.

6. Knowledge about Geographic Information System should be made available to the Agricultural Officers.

7. Knowledge about expert systems should be made available to Agricultural Officers.

8. Trainings in computer mediated communication should be provided to progressive farmers.

CASE STUDIES

Six case studies, three from Trichur and three from Malappuram districts are furnished here. They are progressive farmers.

1. Name of the farmer: Mr.B. Venugopal

Address: Thengumpalli
             Eravimangalam(P.O)
             Trichur
             Ph.no: 2317884
e-mail: vngplb@yahoo.co.in

Crops grown: Paddy

Acreage: 1.0 acres

Other allied activities: Mushroom cultivation.

Mr.B. Venugopal is 48 years. He has completed his predegree.

The location of his farm is at Eravimangalam, 9 km from Vellanikkara. Along with paddy cultivation, he started mushroom cultivation. He is having five years experience in mushroom cultivation.

He gets spawn from Kerala Agricultural University, Vellanikkara. Technical help is also sought from KAU.

He is having computer with internet connection at his home. He is watching market demand with the help of internet. He is sending his mushroom products to the Gulf market apart from local market. In case of any doubts regarding mushroom cultivation he is gets updated information from the scientists of Kerala Agricultural University.

Venjugopal can browse the internet. His daughter is helping him in downloading interesting information from the internet. He also corresponds through e-mail to the scientists of Kerala Agricultural University.

2.Name of the farmer: Mr.Sankaran

Address: Mankuzhi
             Kanimangalam(P.O)
             Trissur district

Crops grown: Paddy, Banana and Coconut
Acreage: 1.2 acres
Other allied activities: Pisciculture

Mr. Sankaran is 42 years old and had two sons and a daughter. His educational qualification is SSC.

He is having more than 12 years of farming experience. He is maintaining six cows also. He got best farmer award from his panchayat during 2005-2006.

He is a progressive farmer. Through his son he got awareness about computers. He is interested to learn about the computers and how it would help him in agriculture.

3. Name of the farmer: Mr. P.G. Jayachandran

Address: Puthupalli veedu

      Kaniyarkode

      Tiruvilwamala

      Trichur district

Crops grown: Paddy, Banana, Coconut

Acreage: 6.0 acres acreage

Other allied activities: Nursery

            Pisciculture

          Goat rearing

Mr. P.G. Jayachandran, 52 years lives Ayyappam kavu. He has completed SSLC. He is having two daughters.

Along with paddy, banana, coconut he is maintaining a nursery. For the year 2004-2005 Jayachandran received Karshakottaman award of Kerala state government.

He browses the internet for information. However, he does not use the net for agricultural purposes.

4. Name of the farmer: Mr. Adan Shaji

Address: Theyvalaveetil

         Alissery (P.O)

         Malappuram district

Crops grown: Coconut, Pepper

Acreage: 2.0 acres

Other allied activities: Animal husbandry

Mr. Adan Shajiv is 42 years old . His educational qualification is BA.

He is having more than thirteen years of farming experience. He maintains two cows also. He is cultivating pepper and coconut.

Adan Shaji has computer at home. He is a progressive farmer. He is having computer knowledge. He has attended training programmes given by Akshaya programme. He is innovative. He is able to browse the internet. He can download information from internet.

5. Name of the farmer: Mr. Mohammed

Address: Chundam veedu

             Vettom (P.O)

             Malappuram district

Crops grown: Coconut, Spices

Acreage: 1.5 acres

Other allied activities: Animal Husbandry

Mr. Mohammed is 39 years old. He is having one son. His educational qualification is B.Com. He is having more than 10 years of farming experience. He is a progressive farmer. He is cultivating coconut, spices. He received best farmer award from his panchayat   during 2004-2005.

He knows how to correspond through e-mail. He can browse the internet. He is very much interested to learn more about the usage of computers.

6. Name of the farmer: Mr.Buson Chandy

Address: Poomankulam

             Elamkur (P.O)

Wandoor

Malappuram district

Crops grown: Coconut, Rubber, Pepper

Acreage: 3.0 acres

Other allied activities: Animal husbandry

Mr. Buson Chandy is 43 years old. He has two sons and a daughter. His educational qualification is SSLC.

He is having more than 11 years of farming experience. Along with coconut, rubber, pepper cultivation he maintains six cows.

He is a progressive farmer. Through his younger son, he got awareness about computers. He purchased computer, for his son's education. His neighbour introduced him to Akshaya centre where he learnt how to browse the internet. Mr.Chandy now regularly reads agricultural news and other agricultural related information from various sites.

DISCUSSION

CHAPTER V
DISCUSSION

This chapter includes the discussion part of the study. This is presented under the following heads.

5.1 Categorisation of respondents based on the independent variables.

5.2 Categorisation of respondents based on the dependent variables.

5.3 Relationship between attitude, perception and computer use efficiency and socio-psychological characteristics.

5.4 Comparison of the variables between Malappuram and Trichur districts

5.5 Factor analysis of characteristics of computer mediated communication

5.1 Categorisation of respondents based on independent variables.

Table 4.1 brings forth the following details. From the total ninety five Agricultural Officers mean and standard deviation have been worked out for twelve variables which include dependent and independent variables As per literature these variables are found to have relationship with effective computer mediated communication.

Table 4.2 indicates that majority of Agricultural Officers are in the age group of 32-46 years. This is in conformity with the findings of (Babu, 2005). The young are efficient in adopting new technologies like computer mediated communication.

Table 4.3 indicates that two third of the Agricultural Officers are with B.Sc(Ag.) qualification without any additional degree. In the findings of Manjula (1995) and Kumar *et al.* (2003) Education was found to have positive influence on effectiveness. It is universally accepted that education is a determinant which modifies the behavioural components of knowledge, skill and attitude of individuals; higher the education greater will be the changes that result.

Table 4.4 indicates that more than two third of respondents have not undergone any trainings in computer mediated communication. In the findings of Parimala (2004) trainings has positive influence in a successful entrepreneur. Subramaniam (1994) reported that most of the trainees were found to have gained medium to high level of knowledge about dairying due to training i.e., two third (64.50 per cent) of the trainees after undergoing the training gained medium level of knowledge and one fifth of the trainees (20.80 per cent) gained high level and the rest (14.50 per cent) gained low level of knowledge after training. Gloria (1991) observed that a general increase in awareness and knowledge gain on post harvest practices as a result of the training.

Table 4.5 indicates that four fifth of the respondents are in the category of low to medium level of knowledge with respect to computer mediated communication. There is less knowledge of computers among Agricultural Officers. Knowledge needs to be imparted through training programmes. Knowledge is the basic and prime input for any behaviour modification. It acts as a medium to absorb and assimilate different patterns of behaviour. An individual is not prone to change without knowledge and there is no substitute for true knowledge.

Table 4.6 shows that more than three fourth of the respondents are medium to high level of communication ability. Using computer mediated devices such as CD's and DVD's make them more efficient in the level of

communication. This is in conformity with the findings of Kotate and Nand (1991).

Table 4.7 indicates four fifth of the respondents are with low to moderate level of efficiency in computer usage. This is in conformity with the findings of Babu (2005). Agricultural Officers are the administrative heads of the Krishi Bhavan who have to coordinate various agricultural development activities. The work related to the Krishi Bhavan itself is voluminous. In addition to that, because of the introduction of People's Planning Programmes, people are mobilised through the local bodies, at all the stages of development planning right from the formulation of the programmes to its execution. Computers in Krishi Bhavans help to increase their efficiency. Computer use efficiency needs to be improved by providing skill training in computer use and computer accessory device use.

Table 4.8 indicates four fifth of the respondents are creative. This is in conformity with the findings of Murthy (2002) and Rajendran (2003). As the Agricultural Officers become more creative and innovative they can efficiently put to use computer mediated communication to extend agricultural technologies to the farming community. For different localities, different challenges have to be surmounted by the Agricultural Officer. Thus, he has to have high achievement motivation high innovativeness and high creativity. *"Karshaka Jalakam"* the multimedia package developed by ATIC is a first step in this direction.

Table 4.9 indicates more than three fourth of the respondents are innovative. This is in conformity with findings of Vishwas (2000) and Jyothi (2003). Innovativeness, it has been argued, has contributed to the change in the farming conditions and still continue to raise the performance level of individuals. Thus the officer who is innovative will needs to change his beliefs, attitudes and ways of acting in response to new challenges and development.

Table 4.10 indicates that more than three fourth of the respondents are with moderate to high level of Achievement motivation. This is in conformity with the findings of Porchezian (1991).

Table 4.11 indicates that majority (67.37%) of Agricultural Officers use information source moderately. The percentage of Agricultural Officers who use information source less are 14.74% and those who utilise information source very much are 17.89 %. The usage of information sources for more than three fourth of the Agricultural Officers is moderate to high. The information source is a vital component in a communication process. If proper communication packages are available, the Agricultural Officers can access information easily and utilise them effectively. The Kerala Agricultural University has a major role to play in development of agricultural information systems suitable to the farm field.

5.2 Categorisation of respondents based on the dependent variables

Table 4.12 shows that almost three fourth of the respondents have favourable orientation towards computer mediated communication. Table 4.13 indicates that four fifth of the respondents have favourable perception towards computer mediated communication.

It is important for an Agricultural Officer to have a positive disposition towards new communication technologies. While the technologies in communication are undergoing rapid changes, the Agricultural Officer has to necessarily upgrade his/her familiarity with modern communication tools. This will help the officer to document, store, retrieve, transfer and put to use requisitioned information at appropriate time periods to suit farmers' needs.

5.3 Relationship between attitude, perception, computer use efficiency and socio-psychological characteristics

Table 4.14 brings home the relationship between attitude and the independent variables. It is seen that most variables excepting age and education have no relationship to attitude of the Agricultural Officers towards computer mediated communication. This proves that though Agricultural Officers are highly creative and innovative in their fields they are not affected with the lack of agricultural information packages needed for the farmers.

Table 4.15 indicates that most of variables except communication ability have no relationship with perception. There will be however be a change in the nature and extent of relationship between the variables in course of time as communication technology is undergoing rapid changes.

Table 4.16 indicates that age had negative and significant relationship with computer use efficiency at five per cent level of probability, which means young officers are more efficient in computer use efficiency. This is in conformity with the findings of Babu (2005). It is only natural that the younger officers are more trained in computer use and potential, which is why they also show proficiency in computer use.

Education had positive and significant relationship with computer use efficiency at one per cent level of probability. It is a known and established fact, that education in the form of knowledge and skill enhances productivity.

Trainings undergone, knowledge, communication ability, creativity, innovativeness, achievement motivation, information source utilisation showed non significant relationship with computer use efficiency.

5.6 Comparison of the variables between Malappuram and Trichur districts

Table 4.17 shows that with respect to age, knowledge, trainings undergone, innovativeness, achievement motivation there is significant difference between respondents of Malalppuram and Trichur districts.

As the *Akshaya programme* was launched in Malappuram, there are significant differences in the training programmes undergone by the Agricultural Officers of Malappuram and the knowledge they have acquired is more compared to the Agricultural Officers of Trichur district. The Agricultural Officers in Malappuram district are also younger than Trichur district. Thus with the exception of dependent variables, the *Akshaya programme* do not seem to have influence on the variables like innovativeness and achievement motivation. However the innovativeness and achievement motivation of the Agricultural Officers are independent of their interest and awareness of computer mediated communication.

5.5 Factor analysis of characteristics of computer mediated communication

Any effective computer mediated communication will have a set of determinants, that will decide its utility or otherwise in a rural setting. With respect to agricultural communication a number of variables play significant roles both temporally and spatially, thus making it difficult to categorise specific factors, which will critically determine computer mediated communication characteristics.

The factor analysis brings forth the nine factors namely *Credibility-accessibility factor, Presentation-Treatment factor, Experiential factor, Animation factor, Intervention factor, Cataloguing factor, Imaging factor, geographic specificity factor* that are found to have more than eighty three percent of variation.

Any further design of computer mediated communication in agriculture needs to take care of these nine factors, to transmit beneficial effect on the user.

Credibility-accessibility factor have fourteen variables viz. Quick access, ·Capability for stimulation, Retrievability, Easiness in accessing help, Layout and design , Possibilities for updating, Easiness in storage, Credibility of content, Portability, Operational felicity, Cost effective, Replicability, Electronic mail interactions, Decision support, Comprehensiveness of data, Flexibility for updating and retrievability and Timely access.

Presentation-Treatment factor has four variables viz. Simplicity of language, Sequential ordering of presentation, Style of writing and Appropriateness of the content. *Experiential learning factor* has one variable, Presence of success and failure stories. *Animation factor* has one variable, Opportunities for animation. *Intervention factor* has two variables, Background music and Opportunities for intervention. *Cataloguing factor* has one variable, Indexing/cataloguing. *Imaging factor* has two variables, Quality of photographs and Quality of video. *Audio factor* has one variable, Clarity of narration and *Geographic specificity factor* has one variable, Location specific information.

It is seen that the *Credibility-accessibility factor and Presentation-Treatment factor* are found to explain fifty two percent variation, thereby establishing their importance in design of multimedia agricultural communication packages.

SUMMARY

CHAPTER – VI

SUMMARY

The study was undertaken as a pioneering attempt to understand the attitude and perception of the Agricultural Officers toward computer mediated communication in farming sector. The objectives of the study were:

1. To study the socio-psychological characteristics of Agricultural Officers
2. To study the attitude of Agricultural Officers towards computer mediated communication
3. To study the perception of Agricultural Officers towards computer mediated communication
4. To study the relationship between socio-psychological characteristics, perception, attitude and computer use efficiency of Agricultural Officers
5. To study the comparison between the Agricultural Officers of Akshaya introduced and non-akshaya introduced districts of Kerala
6. To identify the characteristics of an effective computer mediated communication

The study area was Malappuram and Trichur districts of Kerala. The Agricultural Officers are selected following stratified random sampling with proportionate allocation. Thus a sample of Ninety five Agricultural Officers formed the sample size of the study.

The data was collected with the help of a questionnaire. The dependent variable of the study were attitude and perception. The independent variables of the study were:

1. Age

2. Educational status

3. Trainings undergone

4. Knowledge about modern technologies

5. Communication ability

6. Computer use efficiency

7. Creativity

8. Innovativeness

9. Achievement motivation

10. Information source utilization

Statistical testes such as simple correlation, mean, standard deviation and factor analysis are used for analysis of the data.

The main findings of the study were as follows.

1.   Two third of the Agricultural Officers are in middle age group (32-46 years)

2.   Two third of the Agricultural Officers are with B.Sc(Ag.) qualification without any additional degree.

3.   More than two third of respondents have not undergone any training in computer mediated communication.

4.   Four fifth of the respondents are in the category of low to medium level of knowledge about computer mediated communication

5.   More than three fourth of the respondents have medium to high level of communication ability.

6. Four fifth of the respondents are with low to moderate level of efficiency in computer usage.

7. Four fifth of the respondents are creative in solving problems related to farming.

8. More than three fourth of the respondents are innovative.

9. More than three fourth of the respondents have moderate to high degree of achievement motivation.

10. The usage of information source utilisation for more than three fourth of the Agricultural Officers is moderate to high.

11. Almost three fourth of the respondents have favourable orientation towards computer mediated communication.

12. Four fifth of the respondents have favourable perception towards computer mediated communication.

13. Age and Education shows significant relationship with attitude towards computer mediated communication.

14. Communication ability had positive and significant relationship with perception towards computer mediated communication. There is no relationship between perception with respect to the variables age, education, trainings undergone, knowledge, creativity, innovativeness, achievement motivation and information source utilisation.

15. Age and Education shows significant relationship with computer use efficiency, which means young are more efficient.

16. There was significant difference between age, trainings undergone, knowledge about computer mediated communication, innovativeness, achievement motivation of respondents in Malappuram and Trichur districts.

17. Factor analysis shows that the credibility-accessibility factor, presentation-treatment factor, experiential factor, animation factor, intervention factor cataloguing factor, imaging factor , audio factor, geographic specificity factor together explains 80.11% of variation.

18. The first two factors *Credibility-accessibility factor* and *Presentation-Treatment factor* explain more than 50% of the variation.

REFERENCES

REFERENCES

Adhiguru, P. and Birthal, P.S. 2006. ICT in agricultural development: Issues and Straiegies. [abstract] In: *International Conference on Social Science Perspectives in Agricultural Research and Development*. February 15 – 18, 2006, IARI, New Delhi, India. 221p.

Alexander, G.1996. Work motivation a multivariate analysis among teachers of the Kerala Agricultural University. Ph.D thesis, Kerala Agricultural University, Thrissur, 65p.

Anandaraja, N. 2002. Developing farmer- friendly interactive multimedia compact disc and testing its effectiveness in transfer of farm technology. Ph.D. Thesis, Tamil Nadu Agricultural University, Coimbatore, 247p.

Anon, 1978. International Encyclopedia of the social sciences, Crowell Collier and Mhillan Inc.US.

Anon, 2001a. http://www.fao.org.

Anon, 2001b. http://www.fertindia.com

Anon, 2001c. http://www.uttamkrishi.com

Anon, 2001d .http://www.indiaagriline.com

Anon, 2003. Entrepreneurship Development and mass employment generation in IT sector in Kerala, Science and Technology Entrepreneurship Development project, Department of Science and Technology, Government of India.

Anon, 2007. Annual report of ATIC, ATIC, Kerala Agricultural University, Mannuthy, Trichur.

Arunachalam, S. 2000: *Information and knowledge in the age of electronic communication: A developing country perspective*. The Macmillian Co, New York. 170p.

Attneave, F.1962. Perception and related area. Psychology-A study of a science In: Koch, S.(ed.) Mc Graw Hill Book Co. Ltd., New York, pp 98-128.

Babu, A.A. 2005. A comparative analysis of e readiness and perception of information communication technology (IT) beneficiaries in Kerala. M.Sc(Ag) thesis. University of Agricultural Sciences, GKVK, Banaglore, 101p

Balit, S., Calvelo, M. and Masias, L. 1999.Computer for development of Latin a America. *A regional experience*. FAO. Rome.138p.

Balit, S.1998.Listening of farmers: Communication for participation and change in Latin America. *Training for agriculture and Rural development*. FAO. Rome,140p.

Belcher, D.M., 1973. *Giving Psychology away*, Harper and Row publishers, New York.159p.

Bhaskar, R. and Venkatarao, S. 1999. Experiences of Warna wired village project. *Yogana*. 21: 17-26.

Bhatia, H.R., 1965, *Elements of Social Psychology*, Oxford and IBH. Co, New Delhi.114p.

Blalock, T.C., 1963. State legislators perception of North carol in cooperative agricultural extension service. Ph.D. Thesis. University of Wisconsin, US. 150p.

Bortolussi, G.S., Coffey, J.G., Hodgkinson, J.J and Holmes, C.R.1999.Computer usage and communication preference of northern Australian beef producers. In the people and rangelands: building the future. Proceedings of the VI International Rangeland congress, Townsville, Queensland, Australia; 19-23 July

Carter, P.G., Johannsen, C.J., Biehl, L., Willoughby, G.L., Carter, B.R., Angima, S. and Robert, P.C. 2003. Training agronomic practitioners in spatial technology systems for field applications; *Proceedings of the 6th international Conference on Precision Agric. and other Precision Resources-Management*:2009-2014

Chandargi, D.M. and Channegowda, M.B.1990. Extent of reach and influence of motion picture entitled mixed farming on the knowledge of farmers-A field study. *Mysore J. Agri Sci*.14:528-535

Chengming, S., Rong, Y. and Yulong, W. 2004. Applications and advance of geographic information system in agriculture. *Acta Agriculturae*. 20:99-101.

Christopher, D. Penrose, Janet and Hollingworth, M., 1995.Collaboration hold a successful record keeping course for small business. *J. Ext*.35 :5-9.

Crow, L.D. and crow, A.1956. *Understanding our behaviour*. New York.165p.

Danda, A.K.1972.Communication Behaviour of Progressive Farmers of India. *Society and Culture* 3:1 67-69.

Das, S., Kumar, B. and Malhotra, P.K. 2002 Online pest management information system. *J. Indian Soc. Agric. Statist.*55:184-188.

David, A and Engen, T., 1975.*Introductory Psychology*. Random Home, New York. 180p.

Devaraj, R.2001. Multimedia an emerging technology for extension. *Agric. Ext. Rev.*3-8

Deveson, T. and Hunter, D. 2002. The operation of a GIS-based decision support system for Australian locust management. *Entomologia Sinica.*9:1-12.

Dwarakinath, R., Channegouda, M.R. and Jayaramaiah, K.M.1 975. Communication sources of High Yielding Variety Growers. *Mysore J. Agric. Sci.*9:70-71

Gaibhiye, T.2002. Alienation from work among entrepreneurs in agriculture. MANAGE. *Ext. Res. Rev.*3:93-100.

Ganesan, V, Geetha, P and Sameer, S. 2005. Development of an expert system software for major crops of Kerala. In: *National Seminar on role of Information Technology in High Tech Agriculture and Horticulture*, 19th National convention of Agriculture Engineers. Bangalore. pp.74-79.

Ganesan, V. 2006. DSS (Decision Support System) "Crop-9-DSS" for identified crops. In: *12th International Conference on Computer Science*, ICCS. Vienna, Austria, 29-31st Mar, 2006. pp: 263-265.

Ganesan,V. 2004. Agricultural expert system for the diagnosis of pests and diseases. In: *15th International Workshop on Artificial Intelligence in Agriculture*, Cairo, Egypt. IFAC. pp.107-110.

Gloria, P. 1991. Training of rural women in post-harvest loss In: *Paper presented in the regional workshop on training of rural women on post harvest loss prevention* Sep 2- 6, 1991. Srilanka. 120p.

Grbavac, L.2004. Evaluation and integration elements in building infosystems in agriculture. *Agronomski*.66:6-10.

Hahnwoensik, Lee-Byoungyon, Lee-Keyup and Kin-Jeounrare.1998.Devlopment of agriculture technology information network system (ATINS).RDA. *J. agrl. Sci. Farm Mangmt*.36:677-680.

Harrison, A.A.1972.*Psychology as a Social Science*, Wadsworth Publishing Co. California,190p.

Havrland, D. and Kapila, M. 2002. Use of Information Technology in Agriculture.http://www.indiainfoline.com/bisc/itin.

Hemistra, 1972, *Human behaviour: A system Approach*, Wardworth publishing co. California, 230p.

Hoe, T., Hong, N., and Fangquan, M.2002. Information system of agriculture for supporting market and trade promotion in agriculture and forest production. Proceedings of the third Asian Conference for IT, China, October .

ICAR. [Indian Council of Agricultural Research]. 2004. ICAR Annual Report. 2003–2004. [On-line]. Available: http://www.ncipm.org.in/AR03-04(1).pdf. [19.05.07]. pp:190 & 197. irrigated rice. *IRRN* 26(2): 14-15.

Issacson, R.L. and Hutt, M.L.,1971, *Psychology the science of behaviour*, Harper and Row publishers, New York.201p.

Jaleel, M.M. 1992. Factors influencing the development of Agriculture among the 'Kanikkar" Tribe of Kerala, M. Sc. Ag thesis, Kerala Agricultural University, Vellayani, 129p.

Jayalekshmi, G. 1996. Entrepreneurial behaviour of rural women in Thiruvananthapuram district. M.Sc(Ag) thesis .Kerala Agricultural University, Thrissur, 114p.

Jensen, A.L., Boll, P.S. and Thysen, S. 1997. A web based system for personalised decision support in crop management. *Computers and Electron. Agric.* 24(3):271-293

Johnson, D.M., Ferioguson, J.A. and Lester, M.L. 2000.Computer experiences, self efficacy and knowledge: a comparison of freshman and senior agriculture student.2000.ASAE Annual International Meeting Milwaukee-USA9-12-July 2000.1-10

Jyothi, P.2003.Entrepreneurial skills in relation to achievement motivation and locus of control among management students. *SEDME* 30:19-30.

Karthikeya, K. 1997. Communication role and behaviour of contact farmers under T & V System in Andhra Pradesh. M.Sc. (Ag.) Thesis. Acharya N. G.Ranga Agricultural University, Bapatla, 130p.

Kaste, F.E and Rosenweig, J.E., 1982.Organisation and Management: A system and contingency approach. Mc Graw Hill International Book Company, Mexico.245p.

Kerlinger, N.F.1983.*Foundations of behavioural research*. Surjeet Publications, New Delhi.340p.

Kokate, K.D and Nand, H.1991. Entrepreneurial behaviour of small and marginal growers of shimla hills. *J. Indian Potato Ass.*.18:155-161.

Kumar, Sandeekp, N.K. and Subramaniam, R. 2003. Training effectiveness- an analysis of Dairy trainees. *J. Ext. Edn.* 5:20-26.

Lambert, T.J.R.1992. Multimedia based computer aided learning in post graduate medical education: The LMF (Luddite Mentality Factor) as a barrier to entry. In Promaco convention (ed). Proceedings of the international interaction.

Learner, D. 1958. *The Passing of Traditional Society*: Modernising the Middle East. The Free Press. New York, 347p.

Lukuram, I., Bheenick, K.J. and Travailleur, C. 2000. Combining audio files and graphics on the web to increase accessibility to agricultural information for the non-English speaking and the non-literate farmers in Mauritius. A practical example with PETIS (Potato Extension and training information system. Paper presented to 2nd global knowledge conference, March 7-10.

Luthans, S.1981.Organisational Behaviour. (3 rd edn). Mc Graw-Hill International Book Company. New Delhi.

Mahaman, B.D., Harizanis, P. and Filis, I. 2002. A diagnostic expert system for honey bee pests. *Computers and Electronics in Agric.*.36:17-31.

Manhas, P., Bhaskar, S and Rao.,V.2005.Experiences of Warna village Project. Yogana.27:8-10.

Mani, L. 2001. The global information infrastructure: empowerment or imperialism? *Third world Quarterly*. 22: 83-86.

Manilal, R.2002. Communication for better business Management Dynamics. *Computers and Electronics in Agric*.23:95-97.

Manjula, S. 1995. Effectiveness of selected extension methods in transfer of technology on storage of food grains to rural women in Prakasam district of Andhra Pradesh. An experimental study. Ph.D. thesis, Acharya N.G.Ranga Agricultural University, Hyderabad, 175p.

Manoj, M.1998.Gaps in the adoption of plant protection practices by commercial vegetable growers of Thrissur district. M.Sc.(Ag.) thesis, Kerala Agricultural University, Thrissur, 98p.

Mathew, R. 2007. Agriculture sector turns tech-savvy. [On-line]. Available: http://www.hindu.com/2007/04/02/stories/2007040205120300.html. [30.05.07].

Meera, S.N. Jhamtani, A. and Rao, D. 2004.Information and communication technology in agricultural development: a comparative analysis of three projects from India. Network Paper. *Agric. Res. Ext*.16:15-17

Menon, S.J. 1997. Taxonomical analysis of agricultural modernity of farmers. M. Sc. Ag thesis, Kerala Agricultural University, Vellayani, 65p.

Mohan, S. and Arumugam, N. 1994. CROPS. A rule based expert system for crop selection in India: transactions-American society of agricultural engineers. *Communicator*.26:4-8

Murali, N.S. 1993. Audiotext system for monitoring and control of pests in field crops. *SEDME* .23:32-36.

Murthy, K.M.2002. Entrepreneurship: Evaluation of concept and characteristics. *SEDME*.29: 1-20

Nathaniel, D.1991.Computer technology resource its not just computer, it is technology. *Communicator*.12:3-7

Norton, C.1998.Multimedia tools for diagnosing and managing peat and disease problems, information technology, Plant pathology and biodiversity (eds P. Bridge, P. Jeffries, D.R. Morse and P.R. Scott) CAB international, London, pp151-158

Palem, K. 2002. A field experiment on farm women's cognitive domain relating to post harvest technologies. M.Sc. (Ag.) Thesis. Acharya N. G.Ranga Agricultural University, Hyderabad, 103p.

Parimala, 2003. Effectiveness of agriclinics and agribusiness training programmes in Kerala. M.Sc(Ag.) thesis, Kerala Agricultural University, Thrissur, 120p.

Patel, B.S and Patel, R.B. 1993. Farmers image regarding lab to land programme in South Gujarat, *Maharastra J. Ext. Edn*.3:111-112

Patil, M.M. 2002. Entrepreneurship of sugarcane growers and its determinants. National Seminars on entrepreneurial Development in Agriculture.3 March 2002, Marathwada Agricultural university, Parbhani, Abstract:33

Porchezian, M.R.1991. An analysis of entrepreneurial behaviour of farmers. M.Sc (Ag) thesis, Tamil Nadu Agricultural University, Coimbatore,123p.

Pratap, D.1999. Participation of farmers in credit management Groups Organised by an NGO. Unpub. M.Sc(Ag) thesis, Annamalai University, Chennai, 156p.

Pratap, D.P. 2003. Relative effectiveness of farm communication through mass media including new media: an experimental approach with rural women. M.Sc. (Ag.) Thesis. Tamil Nadu Agricultural University, Coimbatore.

Pratheepa, M., Biswas, R.S., Ballal, R.C. and Singh, P.S. 2004. Heloco-info computer database for Helicoverpa armigera.*Agric.Ext.Rev.*10:4-9p.

Rajendran, N. 2003. Problems and prospects of women entrepreneurs. *SEDME.* 30:39-42

Ramachandran, C.1992.Impact of rice minikit trials on the adoption behaviour of farmers. M.Sc (Ag.) thesis, Kerala Agricultural University. Thrissur, 145p.

Rao V.K.J., Ramachander, M.J., Gowda, C. and Achalaparipurna. 1999. Extension through expert system: new Vistas. *J. Ext. Edn.*10: (4): 2626-2627.

Rao, P. and Prasad, J. 2003. Expert systems in agriculture. MANAGE. [On-line]. Available: http://www. manageagri.com. [03. 12. 2003].

Ray, G.L. 1991. *Extension Communication and Management*, Naya Prakash, New Delhi.210p.

Richardson 1998. Communication for development report 1996-1997. Communication for development group. *Extension, education and communication service.* FAO. Rome. 138p.

Rogers E, M. 1969. Modernisation and peasants. The impact of communication. *Edn. Rural India.* 45:17-24.

Roy, H.C. 1965. Progressiveness of farmers: M.Sc (Ag) thesis, Bihar agricultural College, Sabour, Bhagalpur, 170p.

Schumann, G.L. 1998. Electronic teaching aids for students and practitioners. Information technology, plant pathology, and biodiversity. CAB international, London, pp 15-26

Sebastian, S. 2002. Effectiveness of computerised presentation vis-à-vis video presentation of sericulture technologies on the cognitive, psychomotor and effective domains of sericulturists. M.Sc. (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore.

Seshaiah, K.2003. A conceptual study of the differences among entrepreneurs, managers and leaders. *SEDME* 30:1-18.

Sethy, B., Sinha, B.P. and Bahal, R. 1984. Some Entrepreneurial characteristics in Adoption of an Improved Farm Technology, *Indian J.Ext.Edn.*20:29-37.

Sharma, G.P.K., and Arya, H.P.S. 2005. Constraints in utilization of internet communication among livestock farmers. *Indian Vet. J.* 82(5):103

Sharma, V.P.2000. Cyber extension; The extension approaches for new millennium. Extension Digest. MANAGE Publication, Hyderabad.

Shihjui, 2000.Influential factors of floriculture farmers computerization perception in Taiwan. *J. Agric. For.* 49:39-51.

Shilaja, S.1981.Influence of leaders in the Development of Rural Areas. Unpub. M.Sc.(Ag) Thesis. Kerala Agricultural University, Vellayani, Tiruvananthapuram, 160p.

Simi, G. 2005. Non-governmental sources of agricultural extension in Kerala: status and potential. M.Sc(Ag.) thesis, Kerala Agricultural University, Thrissur, 178p.

Singh, B. and Pathak, K. 1994. A Decision support system for mechanical harvesting and transportation of sugarcane in Thailand. *Computers and electronics in agric.*11:2-8.

Singh, K. 2004. Technology dissemination through digital videos for agricultural machinery. *Agric. Ext. Rev.*12:4-8.

Singh, K., Lal, B.S. and Ganeshan, S. 2003.An analytical study on entrepreneurial behaviour of cotton growers in AP, National Seminars on entrepreneurial Development in Agriculture.3 March 2002, Marathwada Agricultural university, Parbhani, Abstract:30

Sriram.N.2000.Developing standardized extension education module for sustainable cotton cultivation. Ph.D thesis, Tamil Nadu Agricultural University, Coimbatore, 100p

Stevens, M.1999. *Practical Problem solving for managers*. IBM Publishers, New Delhi, 46p.

Subramaniam, R.1994. Factors influencing adoption of poultry farming. M.Sc. (Ag.) Thesis. Tamil Nadu Agricultural University, Coimbatore, 140p.

Sunil, V.G. 2006. Design and Validation of an Information and Decision Support System for Banana Cultivation. PhD Thesis. Indian Institute of Agriculture Research, New Delhi, 118p.

Supriya, M.V and Srinath, T.J.2003. Perception of small scale entrepreneurs in Tamil Nadu regarding successful and unsuccessful qualities of entrepreneurs. *SEDME* 30:32-49.

Swaminathan, M.S. 2003.(ed.) Information technology: *Reaching the unreached:* Macmillan India, New Delhi, 102p.

Sweetmore, A.C., Scotman, B.C. and Scott. 1998. Integrated information management. A multimedia system for crop protection, Information technology, plant pathology, and biodiversity. CAB international, London, pp 117-128

Thakur, C., Singh, L. and Singh, P.R. 1972. Extension personnel's perception of package programme. *Indian J. Ext. Edn*.6:68-72

Theodorson, G.A and Theodorson, A.G.1970.*A modern dictionary of sociology*. Mentheum and Co. Ltd., London, 176p.

Tumin, M.M. and Arnold, S.F. 1961. *Social class and social change in Puero Rico*. Princeton University Press, New Jersey, 158p.

Tung, S. and Tung, S.J. 2000. Influential factors of floriculture farmer's computerisation perception in Taiwan. *J. Agric. Flor*. 49(2):p39-51

Van den Ban, A. Wilkins ,K and H.S.Hawkins,1988. *Agricultural Extension*, Longman Scientific and Technical Publishers. Calcutta, 350p.

Van den Ban, A.W and H.S.Hawkins,1988,Agricultural Extension, Longman Scientific and Technical. Calcutta-169p.

Vijayalakshmi.P, Prabakhar B, Marimuthu R. 2006. Expert system in agriculture. [abstract] Vasanthakumar, J. Ravi, K.C, Santha. G (eds) In: *National Seminar on Extension Strategies for Fostering Knowledge Centric Agricultural Growth* 2&3rd Dec, 2006. Puducherry. 200p.

Vinayagam, S.1998. Entrepreneurial behaviour of agribusiness operators in Kerala. Ph.D thesis, Kerala Agricultural University, Thrissur, 155p

Vishwas, K.2000. Prediction analysis of progressiveness of the farmers through entrepreneurship. Madhya Pradesh. *J. Ext. Edu*.243:30-33

Wensui, L.1999. Precision agriculture and modernization of shanghai agriculture. *Acta Agriculturae*.12:2-7.

Wijekoon, R., Newton, S., Zazueta, F.S. and Nong, X.J. 1998. Multimedia support for extension trainers in developing countries.*7th International Conference on Computers in Agric.Orland,Florida,USA,26-30 October,1998:612-619*

Wilkins, R. M, Garratt J. A. and Laister. A. J. 2001. PRICE: A decision support tool for the control of weeds in tropical irrigated rice. *IRRN* 26(2): 15-17.

Wilson.R.199.Multimedia:Applications in the teaching in the teaching of building technology. In Promaco conventions (Ed.) Proceedings of the International interactive multimedia symposium,167-172.Perth,Western Australia,27-31

Witt, C., Arah. J. and Pamplona. R. 2001. Nutrient Decision support System (NUDSS) for irrigated rice. IRRN 26(2): 14-15

Zaliwski, A.2000. A method of creating numerical maps of valuation of agricultural production area. *Acta Agriculturae*.18:4-7.

Zijp, W. 1994. Improving the Transfer and Use of Agricultural Information: A Guide to Information Technology. World Bank Discussion Papers, 247p.

APPENDICES

Dr. Sreevalsan J. Menon
Assistant Professor

Dear Sir/Madam

Ms.S. Grace Sarala is undertaking a study titled "Perception of Agricultural officers and selected progressive farmers on computer mediated communication: A socio-psychological analysis" with the following objectives as part of fulfillment of her PG programme under my guidance.

1. To study the socio-psychological characteristics of Agricultural Officers
2. To study the attitude of Agricultural Officers towards computer mediated communication
3. To study the perception of Agricultural Officers towards computer mediated communication
4. To study the relationship between socio-psychological characteristics, perception, attitude and computer use efficiency of Agricultural Officers
5. To study the comparison between the Agricultural Officers of Akshaya introduced and non-akshaya introduced districts of Kerala
6. To identify the characteristics of an effective computer mediated communication

In this context she has identified certain variables. Considering your rich experience and expertise, you have been identified as a judge for rating the relevancy of the given list of variables for inclusion in the final interview schedule. You may please indicate your opinion about the relevancy of each variable under the appropriate columns.

Thanking you,

Vellanikkara

Yours sincerely

(Dr.Sreevalsan J. Menon)

APPENDIX – I

PERCEPTION OF AGRICULTURAL OFFICERS AND SELECTED PROGRESSIVE FARMERS ON COMPUTER MEDIATED COMMUNICATION: A SOCIO-PSYCHOLOGICAL ANALYSIS

For Agricultural Officers

Computer mediated communication is operationally defined as all agricultural information communicated through the medium of a computer. Agricultural information, here, largely consists of agricultural sites in the Internet, agricultural DVD's and CD's, interactive CD ROMs, programmes that support decisions, presentations and analysis, expert systems etc.

Agricultural Officers who constitute the vital actors in the process of technology dissemination and feedback are to be made aware of the scope and use of computer mediated communication.

List of independent variables suggested for the study

Kindly rate your response in the following continuum based on each variable's relevancy.
(Please indicate by marking tick mark (√) in the appropriate column)

MI - Most Important   LI - Less Important
MrI- More Important   LtI - Least Important
  I - Important

Sl. No.	VARIABLE	MI	MrI	I	LI	LtI
1	Age					
2	Gender					
3	Educational status					
4	Rural urban background					
5	Computer use efficiency					
6	Job experience					
7	Job autonomy					
8	Job involvement					
9	Job satisfaction					
10	Organisational climate					
11	Innovativeness					
12	Workload					
13	Team work					
14	Extent of external influence					
15	Social participation					
16	Cosmopoliteness					
17	Information seeking behaviour					

18	Information source utilisation						
19	Clarity of task						
20	Managing problems						
21	Achievement motives						
22	Decision making ability						
23	Trainings undergone						
24	Level of aspiration						
25	Job commitment						
26	Leadership ability						
27	Creativity						
28	Knowledge about modern technologies						
29	Self interest						
30	Initiative						
31	Scientific orientation						
32	Extension orientation						
33	Span of control						
34	Rational orientation						
35	Technical orientation						
36	Resource utilisation						
37	Empathy						
38	Self confidence						
39	Communication ability						
40	Perseverance						
41	Self motivation						
42	Progressiveness-traditionalism						
	Others if any						

Signature

Name

List of socio-psychological characteristics and their mean relevancy scores
(Descending order)

Sl. No.	VARIABLES	Mean relevancy scores obtained on judges rating
1	Innovativeness	4.43
2	Knowledge about modern technologies	4.43
3	Information seeking behaviour	4.40
4	Educational status	4.30
5	Computer use efficiency	4.27
6	Information source utilization	4.27
7	Creativity	4.27
8	Initiative	4.10
9	Self interest	4.07
10	Self motivation	4.03
11	Trainings undergone	3.93
12	Communication ability	3.90
13	Organizational climate	3.87
14	Self confidence	3.80
15	Decision making ability	3.77
16	Level of aspiration	3.70
17	Age	3.67
18	Achievement motivation	3.67
19	Extension orientation	3.67
20	Job autonomy	3.63
21	Scientific orientation	3.63
22	Job commitment	3.57
23	Job involvement	3.53
24	Perseverance	3.53
25	Clarity of task	3.50
26	Managing problems	3.50
27	Technical orientation	3.50
28	Workload	3.47
29	Progressiveness-traditionalism	3.47
30	Resource utilization	3.43
31	Job satisfaction	3.37
32	Job experience	3.27
33	Extent of external influence	3.27
34	Empathy	3.27
35	Cosmopoliteness	3.23
36	Gender	3.17
37	Rural urban background	3.17
38	Leadership ability	3.17
39	Social participation	3.10
40	Rational orientation	2.87
41	Team work	2.80
42	Span of control	2.53

PERCEPTION OF AGRICULTURAL OFFICERS AND SELECTED PROGRESSIVE FARMERS ON COMPUTER MEDIATED COMMUNICATION: A SOCIO-PSYCHOLOGICAL ANALYSIS

Characteristics of an effective computer mediated communication

Computer mediated communication is operationally defined as all agricultural information communicated through the medium of a computer. Agricultural information, here, largely consists of agricultural sites in the Internet, agricultural DVD's and CD's, interactive CD ROMs, programmes that support decisions, presentations and analysis, expert systems etc. The following variables are suggested as components of an effective computer mediated communication.

List of independent variables suggested for the study

Kindly rate your response in the following continuum based on each variable's relevancy.
(Please indicate by marking tick mark (√) in the appropriate column)

MI - Most Important   LI - Less Important
MrI- More Important   LtI - Least Important
  I - Important

Sl. No.	VARIABLE	MI	MrI	I	LI	LtI
1	Font					
2	Style of writing					
3	Appropriateness of the content					
4	Sequential ordering of presentation					
5	Clarity of narration					
6	Background music					
7	Simplicity of language					
8	Appropriate titles					
9	Technical adequacy					
10	Use of illustrations					
11	Layout and design					
12	Credibility of content					
13	Electronic mail interactions					
14	Location specific information					
15	Easiness in accessing helpdesk					
16	Presence of success & failure stories					
17	Opportunity for interactivity					
18	Opportunities for animation					
19	Quick access					
20	Timely access					

21	Possibilities for updating					
22	Portability					
23	Replicability					
24	Cost effective					
25	Retrievabililty					
26	Easiness in storage					
27	Capability for simulation					
28	Forecasting					
29	Early warning					
30	Geographical information system					
31	Decision support					
32	Archival quality					
33	Flexibility					
34	Cataloguing/indexing					
35	Quality of Photographs					
36	Quality of Video					
37	Comprehensiveness of Database					
38	Presence of farmer innovations & Experiences					
39	Operational felicity					
	Others if any					

Signature

Name

KERALA AGRICULTURAL UNIVERSITY
Agricultural Technology Information Centre
Mannuthy, Thrissur-680651

Dr. Sreevalsan J. Menon
Assistant Professor, ATIC

Dear Sir/Madam

Ms. S. Grace Sarala is undertaking a study titled **"Perception of agricultural officers and selected progressive farmers on computer mediated communication"** as part of fulfillment of her PG programme under my guidance.

Considering your rich experience and expertise, you have been identified as respondent of this study. Kindly fill up the questionnaire that is given to you.

Thank you for sparing your valuable time.

Yours sincerely,

Vellanikkara

20.07.2006

(Sreevalsan J.Menon)

QUESTIONNAIRE FOR AGRICULTURAL OFFICERS

1. Name of the Agricultural Officer
2. Name of the Krishi Bhavan: District
3. Age in completed years:
4. a. Educational status:
   (please mention completed degree/additional diploma/others if any)
   b. Mention the trainings undergone with respect to Information Communication
   Technologies (ICT)

Name of the training programme	Organisation which imparted	Duration of the training programme	No. of times attended	Remarks

5. i. Do you have a computer system in your office   Yes/No

     If Yes since how many years

ii. Do you have an internet connection   Yes/No
     If yes, for what purposes do you use internet

     Personal/Official/Extension work/Others please specify

iii. Do you maintain any register for documenting the details of farmers
who use computer system from your office   Yes/No

If yes, please give details and purpose for which it was used

5. Fill up the following
a) Name two government institutions/centres that have produced agricultural
CD-ROMs in India

     1.   2.

b) Give the title of such agricultural CD-ROMs produced in India.
     1.   2.

c) Name one website that provides agricultural information

d) What do you mean by KISSAN (expansion of the abbreviation is not intended)

e)---------------- is a quicker means of computer mediated communication for sending and receiving information between two people.

f)Name the e-literacy programme of the Kerala government

g)What do you mean by LAN

h)What is the operating system of you computer?

Windows 95/Windows98/Unix/Linux/Windows 2000/Windows 2003

7.Please give your response in the following continuum.

Sl.No	Statements	Always	Some times	Never
1	I try to be friendly with people			
2	I try to participate in group activities			
3	I tend to have close personal relationships with people			
4	I try to take charge of things when I am with people			
5	I I like people to ask me to participate in their discussions			
6	I can speak about things in a convincing manner			
7	I am confident speaker			
8	People seem interested when I talk			
9	People ask me to participate in their discussion			
10	People say I am not good enough in presenting ideas			
11	People don't seem to give attention when I talk			
12	I put forth my ideas in group situations			

8. Information source utilisation(Kindly give your response under Frequency of use and Extent of use of Information)

Information source	Frequency			Extent of use information		
A.Mass media sources	Regularly	Occasionally	Never	Adequate	Somewhat adequate	Inadequate
Radio						
Television						
Newspapers and farm publication						
Rearch journals						
Internet, Educational CD-ROMs						
B.Formal personal sources						
Agricultural Officers(Peers)						
Higher Officials (JDA/ADA)						
Agricultural Assistants						
University/ICAR scientists						
C.Informal personal sources						
Progressive farmers						
Local leaders						
D.Commercial sources						
Fertilizer dealers						
Pesticide dealers						
Bank personnel						
Other non-government service providers(specify)						
Co-operative officials						
E.Other sources						
Exhibitions						
Demonstrations						
Seminar						

9a. Computer use efficiency

Sl.No.	Statements	Yes	No
a.	I type my official and personal matters in a computer		
b.	I Can copy and save a file into a floppy		
c.	I can take a print out of a page		
d.	I can open a file from a CD-ROM		
e.	I can use tables and drawings in a computer		
f.	I can prepare power point presentations		
g.	I can burn CD (make copies of CD)		
h.	I can scan pictures		
i.	I can browse the internet		
j.	I can download interesting information		
k.	I can correspond through e-mail		
l.	I can work on a laptop computer		
m.	I can work on excel/spread sheet		
n.	I can do data analysis in a computer		

o. Tick which ever is relevant

Computer usage	Office purpose	Extension purposes	Personal purposes
Frequently			
Occasionally			
Never			

p. I use computer mediated communication for clarifying for following aspects (Tick whichever is relevant)

    i. Cultivating practices ii. Plant protection iii. Processing iv. Value addition
    v. Marketing vi. Any other please specify

9b. Give exact/appropriate number of farmers under the following items

    i.   the number of farmers in your Krishi Bhavan who utilize computer mediated communication
    ii.   The number of farmers in your Krishi Bhavan who seek CDROMs
    iii.   The number of farmers who seek agricultural information for e-mail Correspondence to scientists of ICAR/SAU are

10. Creativity

Sl.No.	Statements	Yes	No
1	I understand complex situations best by trying to picture them in my mind		
2	When discussing ideas I tend to support the people who show the strongest conviction		
3	I tend to believe in ideas more when they 'feel' right		
4	I like dreaming up unusual ways to do things		
5	As soon as I come across a problem my mind races with ideas about it		
6	I think first impression often turn out to be right		
7	I often catch myself day dreaming about how I would like things to be		
8	I end to look at situations as a whole rather than breaking them down into separate		

			Yes	No
9	In meetings usually I come up with unusual ways to tackle situations			
10	I think analysis and planning take all the fun out of things and try to avoid them			
11	I often try to visualise problems			

11.Innovativeness

Sl.No.	Statements	Yes	No
1	I know I can make positive changes in farmers lives		
2	I take time for implanting new activities		
3	I search for new ideas for making a difference in my work		
4	I do only routine activities		
5	I never hesitate to implement the proven technology in my work situation		
6	I feel implementing a new work is a tiresome process		

12.Attitude

(SA-Strongly Agree, A-Agree, DA-Disagree, SDA-Strongly Disagree)

Sl.No.	Statements	Yes	No
1	Use of computer in the office is a very cumbersome process		
2	Computers are not useful to farmers		
3	Farmers can understand agricultural technologies easily through a computer		
4	Computer helps to reduce workload in the office		
5	Our extension system will be very effective by introducing computers		
6	Computer mediated communication is an effective means of communication for farmers		
7	It is not necessary to take so much of effort for computer communication in our work situation		
8	It is silly to think that one can really change the attitude of farmers through computer usage		
9	The computer in my office is highly beneficial to farmers		
10	Computers increases my efficiency as an agricultural officer		
11	Computer knowledge gives confidence to make my efforts more effective		
12	Computers plays an important role in agricultural development process		

14. Achievement motivation

Sl.No.	Statements	Yes	No
1	I try very hard to improve on my past performance at work		
2	I enjoy a difficult challenge		
3	I want to know how I am progressing as I complete tasks		
4	I direct my efforts towards achieving goal		
5	I look for opportunity to show my excellence		
6	I direct my efforts towards avoiding failure		
7	I enjoy the satisfaction of completing a difficult task		

15. Perception

Sl.No.	Statements	Yes	No
1	Decision support system helps for taking managerial decisions		
2	The Decision Support System (DSS) is not user friendly		
3	Agricultural Officers cannot depend on Geological Information System (GIS) as it is complex		
4	Information through Decision Support System is credible		
5	It is difficult to understand soil maps generated by GIS		
6	The satellite imagery generated by GIS will not give information related to my Krishi Bhavan		
7	GIS gives information about crops diversity in a location		
8	Computer based information about pest and disease is not suitable at field level		
9	Information provided by Expert System gives complete details in an area		
10	Information about pest and diseases for all crops for a panchayath may not be available in Expert System		
11	Taking managerial decisions solely based on Expert System may not be advisable		
12	By using Decision Support System farmers problems can be solved quickly		

Factor Analysis: Extraction Method - Principal Component Analysis.
9 components extracted.
Component Matrix

		1	2	3
V1	Font	0.558	0.377	-0.267
V2	Stlye of writing	0.548	0.620	-0.006
V3	Appropriaeness of the conte	0.379	0.697	0.175
V4	Sequential ordering of prese	0.520	0.611	-0.145
V5	Clarity of narration	0.599	0.296	-0.089
V6	Background music	0.320	0.425	0.299
V7	Simplicity of language	0.410	0.609	0.073
V8	Appropriate titles	0.440	0.515	0.443
V9	Technical adequacy	0.672	0.062	-0.156
V10	Use of illustrations	0.643	0.251	0.280
V11	Layout and design	0.774	0.447	0.113
V12	Credibility of content	0.762	0.060	-0.181
V13	Electronic mail interactions	0.716	0.206	-0.283
V14	Location specific information	0.509	-0.170	-0.186
V15	Easiness in accessing helpe	0.785	-0.122	-0.196
V16	Presence of success & failu	0.402	-0.028	0.586
V17	Oppportunities for interventi	0.394	-0.502	0.124
V18	Opportunities for animation	0.678	0.020	0.083
V19	Quick access	0.841	-0.276	-0.209
V20	Timely access	0.699	-0.233	-0.089
V21	Possibilities for updating	0.769	-0.332	-0.106
V22	Portability	0.759	-0.058	-0.231
V23	Replicability	0.726	-0.021	-0.315
V24	Cost effective	0.729	0.027	-0.521
V25	Retrievability	0.807	-0.150	-0.411
V26	Easiness in storage	0.764	-0.151	-0.294
V27	Capability for simulation	0.831	-0.078	0.129
V28	Forecasting	0.512	-0.442	0.293
V29	Early warning	0.536	-0.512	0.219
V30	Geographical Information sy.	0.496	-0.220	0.296
V31	*Decision support*	0.708	0.302	-0.075
V32	Archival quality	0.574	-0.121	-0.083
V33	Flexibility	0.704	-0.035	0.367
V34	Cataloguing/indexing	0.512	-0.010	0.442
V35	Quality of photographs	0.664	-0.170	0.296
V36	Quality of video	0.694	-0.193	0.237
V37	Comprehensiveness of data	0.704	-0.318	0.101
V38	Farmer innovations & exper	0.500	-0.087	0.559
V39	Operational felicity	0.745	-0.383	0.059

Extraction Sums of Squared Loadings

	1	2	3
Total	16.013	4.134	2.891
Variance	41.058	10.6	7.413
ve %	41.058	51.658	59.071

	Component					Communalities (Initial=1)	
4	5	6	7	8	9	Extraction	Rank
-0.373	-0.047	-0.266	-0.213	0.057	0.096	0.795	32
-0.045	0.123	-0.332	0.176	-0.090	-0.121	0.866	9
0.105	-0.142	0.132	-0.154	-0.314	0.092	0.839	18
0.403	-0.015	0.005	-0.048	0.086	0.092	0.846	16
0.301	0.196	0.146	-0.193	0.374	0.025	0.782	34
-0.108	0.550	-0.250	0.218	0.141	0.260	0.883	8
0.325	-0.232	-0.254	0.250	0.066	0.027	0.836	22
0.014	-0.093	0.237	-0.255	-0.149	-0.056	0.811	29
0.402	-0.171	-0.004	-0.256	-0.007	0.063	0.751	36
0.233	0.052	-0.208	0.155	0.133	-0.300	0.787	33
0.108	-0.022	0.047	0.209	-0.100	-0.128	0.897	4
0.128	-0.098	-0.002	-0.146	-0.172	-0.157	0.719	38
-0.103	0.367	0.122	-0.018	0.074	0.190	0.837	20
0.296	0.335	0.313	0.002	0.144	-0.338	0.755	35
0.028	-0.173	0.081	-0.106	-0.329	0.105	0.837	21
0.096	0.238	0.379	0.141	-0.051	0.085	0.744	37
0.268	0.557	-0.112	-0.061	-0.143	-0.060	0.846	17
-0.576	-0.005	-0.083	0.060	-0.048	-0.191	0.847	14
0.097	-0.080	0.018	-0.064	-0.049	-0.056	0.852	12
0.220	-0.015	-0.107	-0.095	-0.263	0.327	0.797	31
0.128	0.227	0.057	-0.044	0.079	0.172	0.822	26
-0.286	-0.203	0.019	0.259	0.051	-0.177	0.857	11
-0.398	0.039	0.055	0.158	-0.060	-0.117	0.832	24
0.105	-0.033	0.083	0.198	-0.007	-0.211	0.905	3
-0.217	0.152	0.038	-0.009	0.029	-0.092	0.924	1
-0.001	0.099	0.050	0.320	0.039	0.311	0.906	2
-0.076	-0.038	-0.277	0.057	0.040	0.127	0.817	27
0.276	-0.086	-0.121	0.335	-0.153	0.175	0.808	30
0.149	-0.372	0.092	0.207	-0.019	0.042	0.812	28
-0.228	0.423	-0.260	-0.121	-0.329	-0.174	0.835	23
-0.315	-0.174	0.372	0.024	0.029	0.130	0.884	7
-0.201	-0.103	0.157	-0.348	0.105	0.238	0.616	39
-0.049	-0.031	0.255	-0.053	-0.343	-0.162	0.847	15
-0.281	0.192	0.425	0.035	0.229	0.122	0.823	25
-0.047	-0.157	-0.229	-0.389	0.243	-0.030	0.849	13
-0.139	-0.019	-0.387	-0.378	0.079	0.029	0.894	5
0.253	-0.069	-0.006	-0.160	0.258	-0.307	0.861	10
-0.195	-0.366	0.031	0.137	0.272	-0.051	0.838	19
0.047	-0.266	-0.170	0.223	0.108	0.154	0.892	6
2.153	1.901	1.568	1.445	1.14	1.107		
5.52	4.875	4.021	3.704	2.923	2.838		
64.59	69.466	73.487	77.191	80.114	82.952		

PERCEPTION OF AGRICULTURAL OFFICERS AND SELECTED PROGRESSIVE FARMERS ON COMPUTER MEDIATED COMMUNICATION: A SOCIO - PSYCHOLOGICAL ANALYSIS

By
S. GRACE SARALA

ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the
requirement for the degree of

Master of Science in Agriculture

Faculty of Agriculture
Kerala Agricultural University, Thrissur

Department of Agricultural Extension
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
KERALA, INDIA
2008

ABSTRACT

The study was undertaken with the objective of finding the attitude and perception of Agricultural Officers towards computer mediated communication. The study area was Malappuram and Trichur districts of Kerala. A sample of ninety five Agricultural Officers formed the sample size of the study.

The independent variables of the study were age, educational status, trainings undergone, knowledge about modern technologies, communication ability, computer use efficiency, creativity, innovativeness, achievement motivation and information source utilisation.

Almost three fourth of the respondents have favourable orientation towards computer mediated communication and four fifth of the respondents have favourable perception towards computer mediated communication. Age and Education shows significant relationship with attitude towards computer mediated communication.

Communication ability had positive and significant relationship with perception towards computer mediated communication. There is no relationship between perception with respect to the variables such as age, education, trainings undergone, knowledge, creativity, innovativeness, achievement motivation and information source utilisation.

There was significant difference between age, trainings undergone, knowledge about computer mediated communication, innovativeness, achievement motivation between respondents in Malappuram and Trichur districts.

Factor analysis using principal axis method was used to extract the nine factors for expressing the characteristics of computer mediated communication.

Factor analysis shows that the nine factors viz. credibility-accessibility factor, presentation-treatment factor, experiential factor, animation factor, intervention factor cataloguing factor, imaging factor , audio factor, geographic specificity factor together explains 80.11% of variation.

The first two factors *Credibility-accessibility factor* and *Presentation-Treatment factor* explained more than 50% of the variation.