

**ACCESS AND USE OF ICT TOOLS BY EXTENSION  
PERSONNEL FOR TRANSFER OF TECHNOLOGY**

By

***Mr. PATIL RITESH LAXMAN***  
**(Reg. No. 014/186)**

A Thesis submitted to the

**MAHATMA PHULE KRISHI VIDYAPEETH  
RAHURI - 413 722, DIST. AHMEDNAGAR  
MAHARASHTRA, INDIA**

in partial fulfillment of the requirements for the degree

*of*

**MASTER OF SCIENCE (AGRICULTURE)**

*in*

**AGRICULTURAL EXTENSION**

**DEPARTMENT OF EXTENSION EDUCATION  
POST GRADUATE INSTITUTE  
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2016**

## **CANDIDATE'S DECLARATION**

I hereby declare that this thesis or part thereof has not been submitted by me or any other person to any other University or Institute for a Degree or Diploma.

Place: MPKV, Rahuri

Date:     /     /2016

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## **C E R T I F I C A T E**

This is to certify that the thesis entitled, **ACCESS AND USE OF ICT TOOLS BY EXTENSION PERSONNEL FOR TRANSFER OF TECHNOLOGY**, submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra (India), in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL EXTENSION**, embodies of results of piece of bona fide research work carried out by **MR. PATIL RITESH LAXMAN**, under my guidance and supervision and that no part of the thesis has been submitted to any other University for degree or diploma.

The assistance and help received during the course of this investigation and sources of reference have been duly acknowledged.

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*(R.L.Patil)*

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## **ABBREVIATIONS USED**

ICT	: Information and Communication Technology
MSDA	: Maharashtra State Department of Agriculture
AO	: Agricultural Officer
AAO	: Assistant Agricultural Officer
<i>et al.</i>	: et alli (and other)
etc.	: etcetra
Fig.	: Figure
PGI	: Post Graduate Institute
S.D.	: Standard Deviation
<i>viz.</i>	: Vide licet (Namely)

## ABSTRACT

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### ACCESS AND USE OF ICT TOOLS BY EXTENSION PERSONNEL FOR TRANSFER OF TECHNOLOGY.

By

**Mr. Patil Ritesh Laxman**

A candidate for the degree

of

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The study was conducted in Ahmednagar district of Maharashtra state during 2015-16 on Access and Use of ICT tools by extension personnel for Transfer of Technology. Proportionate random sampling procedure was employed to select 110 extension personnel from Maharashtra State Department of Agriculture.

The results revealed that, majority (69.79%) of MSDA extension personnel belonged to middle age group (31-46yrs). About (71.81%) of MSDA extension personnel were B.Sc. (Agril) degree holders. More than half (52.72%) of MSDA extension personnel had medium level of experience in their service. More than half (63.63%) of MSDA extension personnel were using medium source of information. More than one fourth (26%) of MSDA extension personnel received training on ICT tools for (1 - 3 days) duration respectively. About cent per cent of MSDA extension personnel had accessibility to television, mobile.

It was found that, (63.63%) of MSDA extension personnel had medium level of knowledge about ICT tools. Regarding individual ICT tools, Cent per cent of MSDA extension personnel had knowledge about television, radio and equal per cent for mobile and internet (99.09%). Further, more than half (60%) of the MSDA extension personnel had medium utilization of ICT tools. For the purpose of "gaining the knowledge or for getting the information" MSDA extension personnel used internet (100%). For "transfer of technology" MSDA extension personnel used internet (90%). For "training and teaching" MSDA extension personnel used internet (71.82%). For "making/sending reports" MSDA extension personnel used computer (88.2%), e-mail (55%). For "sharing information with concerned organization including input agencies" MSDA extension personnel used computer (52.00%). For "communication with other organization" MSDA extension personnel used mobile (100%). The general problems faced by the MSDA extension personnel were 'internet connection is poor/slow' (59.09%), 'lack of proper training facility' (38.18%), lack of knowledge (30.90%), insufficient power supply' (30.00%). Physiological Problems faced by extension personnel were; 'eye pain' (36.36%), 'hand pain' (34.55%). Economical Problems faced by extension personnel like 'low income' (79.09%), 'high cost' (70.00%). Technological Problems faced by extension personnel like insufficient information to use (69.09%) and age factor (36.36%).

# 1. INTRODUCTION

## 1.1 Background Information

"Information and Communication Technology (ICT) is a tool and not an end. ICT supports the decision making system which needs a matching input and service delivery system. ICT can make things possible, but it is the people who can make a small step into a giant leap forward."

The term Information communication technology was coined by Stevenson in 1997. ICT stands for the information and communication technologies which can be broadly interpreted as technologies that facilitate communication, processing and transmission of information by electronic means. It is defined as technologies involved in collecting, processing, storing, retrieving, dissemination and implementation of data and information using microelectronics, optics, telecommunication and computers.

ICT comprises a set of technological tools and resources to create, disseminate, store and manage data and information. Traditional ICT tools e.g T.V, Radio and Telephone have already established their credibility and effectiveness in transfer of information and new technology to the farmers. The modern ICT tools such as computers, internet, wireless communication technologies along with the powerful software which can process and integrate the sound text and video into electronic media.

According to UNESCO, ICT can be broadly understood as the technologies that facilitate communication,

processing and transmission of communication by electronic means. It is one of the most important and challenging field in today's world. In recent years there is a visible shift from the old ways of delivering information to the modern ways of information delivery systems. ICT is rapidly gaining the central focal point for future world economic growth and development. While ICT is gaining prominence as an engine for economic growth. It also promises to have far reaching potential for the delivery of social services, enhancing the effectiveness of government administration. Large scale investments are being made to enhance the potential of the ICT sector in India. Such investments would prove most cost effective if the resources of the IT sector are blended with that of the agricultural sector in India there by making the two ends of the thread meet.

### **1.1.1 INFORMATION**

Information refers to the knowledge obtained from reading, investigation, study or research.

Information is knowledge and in turn helps us to fulfill our daily tasks and to predict the future. For example, forecasting the stock exchange market.

### **1.1.2 COMMUNICATION**

Communication is an act of transmitting messages. It is a process whereby information is exchanged between individuals using symbols, signs or verbal interaction.

Previously, people communicate through sign or symbols, performing drama and poetry. Communication is important in order to gain knowledge. With knowledge, we are more confident in expressing our thoughts and ideas to others.

### 1.1.3 TECHNOLOGY

Aiding communication telephone and fax machines are the devices used in extending communication spreading information

To broadcast information radio, television, satellites and the World Wide Web (WWW) are the powerful tools that can be used

- Following technologies identify as the elements of ICT

Broadcast/Audio Visual Technology: e.g. Radio, Television, Projector etc.

Computer Technology/Telecommunication: e.g. Computers, Telephone, Kiosk, Satellite etc.

Print Technology: e.g. Research bulletins, Newsletters, Journals, Leaflets etc.

### 1.1.4 Old ICT Tools

The old ICT tools like radio, television, video, films, slides, pictures, print media, telephone *etc.*, are being used to disseminate the information to the grassroots level users.

**Radio:** Radio is the oldest ICT tool and has taken re-birthed in the form of FM radio, Community Radio, Rural Radio *etc.*

**Television:** Doordarshan is the world's largest terrestrial broadcaster with over 1400 terrestrial TV transmitter located throughout the Indian geographical area. Doordarshan has increased number of channels on its DTH platform. Now-a-days apart from Doordarshan many T.V channels are increasing rapidly.

**Printed media:** Newspaper, Magazines, Journals, Bulletins, Folders, Leaflets, Farm newsletters, Feature articles on farming matters, Success stories of farmers, Pamphlets, Poster, *etc.*

**Telephone:** The Ministry of Agriculture have launched a Kisan Call Centre scheme on 21<sup>st</sup> January 2004 to provide agriculture information to the farming community through toll free telephone line. A country wide common 10 digits number 1800-180-1551 has been allocated to the Kisan Call Centre (KCC). The replies to the queries of the farming community are being given through fourteen KCCs in 21 local languages covering all the states and union territories. Calls are attended from 6.00 am to 10.00 pm on all 7 days of the week.

### **1.1.5 New ICT Tools**

The new ICT tools, includes digital devices such as computers, e-mail, internet, multimedia, video-conference, mobile phone etc, which have the potential of providing vast amount of relevant information to rural population in timely, comprehensively and cost effective manner.

Following are the most frequently used tools of information technology dissemination devices.

1. Electronic Database access and Search system
2. Common label used in practices are: Database, Teletext, Videotex
3. Feedback
4. Advisory
5. Advisory system can include: Decision Support System, Expert System and Knowledge Systems.
6. Network: The Internet, Electronic - mail, Computer Conferencing
7. Multimedia

### **1.2 Importance of the study**

Agriculture is an educational service which brings information and new technologies to farming communities to

enable them to improve their production, income and standard of living. At present the extension personnel in department of agriculture has the major responsibility of transferring technologies to the farming community from time to time. But at this juncture the extension agents face number of problems in contacting farmers and the researchers due to physical distances and lack of transportation *etc.* Hence, the application of ICT offers excellent possibilities, for strengthening TOT between research and extension system and further onward transmission to the end-users. Thus, for effective and efficient service delivery, the extension service and research organization need to be appropriately supported with the use of ICT tools.

Meera *et al.*(2004) noted that ICT can bring new information services to the rural areas where the farmers (end user) will have much control, than ever before, over the current information channels. Access to such information sources is a crucial requirement for the sustainable development of the farming systems. They also added that ICT can be of immense help by enabling extension workers into knowledge workers (KW). The emergence of such knowledge workers will result in the realization of the much talked about bottom-up, demand-driven technology generation, assessment, refinement and transfer.

The advancements in ICT can be utilized for providing accurate, timely, relevant information and services to the farmers, thereby facilitating an environment that agriculture occupation is also of remunerative. At present, ICT movement is still evolving. However, all the ICT initiatives are not uniform with disparities between regions in the level and quality of

telecommunications, information and the effort of individuals, public and private organizations, and differentiated nature of demand of the farmers in different areas. As a result, there have been many successes and failures, lessons learned and also experience gained, so far. The common problems in adoption of ICT generally are illiteracy, availability of relevant and localized contents in their own language, easy and affordable accessibility of ICT tools and other issues such as awareness and willingness for adoption of new technologies. One critical aspect in the usage of ICT's for transfer of technology, as seen in some of the ICT driven initiatives, is the involvement of human interface at the last mile indicating that there is a human dependency in transmission of information/knowledge to farmers.

Thus, there is a need to know the accessibility and use of ICT tools by extension personnel for onward transfer of technology. Moreover till now, there are few studies reported on access and use of ICT tools by the extension personnel for transfer of technology. Hence the findings of the proposed research study will be of immense utility to the extension personnel, researchers, administrators and policy makers to formulate and execute suitable strategies enhancing the use of ICT tools for transfer of technology. Particularly it will be helpful to give a detailed account of accessibility and use of ICT tools by different extension personnel, their socio-economic profile and their knowledge level about ICT tools and also about the problems encountered by them, in using these tools.

Therefore, the study on access and use of ICT tools by extension personnel for transfer technology in Maharashtra is taken up with the following objectives:

### **1.3 Specific objectives of the study**

1. To study the socio-economic profile of extension personnel using ICT tools.
2. To study the accessibility to ICT tools by the extension personnel.
3. To analyze the knowledge level of extension personnel about ICT tools.
4. To ascertain the utility pattern of ICT tools for transfer of technology (TOT) by the extension Personnel
5. To enlist constraints while using ICT tools.

### **1.4 Hypothesis**

1. The respondents might be well acquainted to handle ICT tools due to their educational qualification.
2. Their might exist relationship between knowledge level and utility pattern of ICT tools.

### **1.5 Limitations of the Study**

Due to limitation of time, money and other resources to the student researcher, the present investigation was conducted in 4 tahsils of Ahmednagar district by selecting 110 extension personnel from Maharashtra State Agriculture Department as sample for the present study.

The findings of the study are based upon the opinion expressed by the extension personnel. Hence the objectivity of data might be influenced by the extent of readiness and honesty of respondent Department of Agriculture, Government of Maharashtra. Hence, generalization made in this study, may have to be reinforced by a comprehensive study.

### **1.5 Layout of the thesis**

The report of the present research study entitled

“Assess of ICT tools by extension personnel for transfer of technology to farmers” has been presented in five chapters.

The first chapter “Introduction” comprises the information about ICT tools, its importance in human life, list of ICT tools, objectives of the study, hypotheses, scope, importance and limitations have also been presented in this chapter.

The second chapter ‘Review of Literature’ deals with relevant literature and findings of various past research studies conducted in different locations on the same or similar topics have been summarized.

The research methods, techniques, tools used and procedures followed in the present investigation have been presented in the third chapter ‘Research Methodology’. The findings of the study have been presented, interpreted and discussed in the fourth chapter ‘Results and Discussion’.

A brief summary of the investigation, conclusions, implications and suggestions for further research have been given in the fifth chapter on ‘Summary, Conclusions and Implications’. The literature cited, interview schedule and other schedules, formats and vitas are appended at the end of this thesis.

## **2. REVIEW OF LITERATURE**

In order to develop a proper understanding of research problem and to develop a conceptual framework to conduct the study, it is very essential on the part of the researcher to review the efforts made by the earlier researchers. A systematic review of the past literatures help the researcher to have a mental framework of their research, provides comprehensive information on methods, procedures and forms the basis for interpretation of findings. It guides the researcher throughout the investigation period. A very few research studies has been conducted so far on access and use of ICT tools by extension personnel for transfer of technology.

Therefore with best sincere effort the review of literature has been collected both from the national and international level and the literature viewed for the purpose of study is organized and presented under the following headings:

- 2.1 Socio-economic profile of extension personnel of using ICT tools.
- 2.2 Accessibility of ICT tools by the extension personnel.
- 2.3 Knowledge level of extension personnel about ICT tools.
- 2.4 Utility pattern of ICT tools of extension personnel.
- 2.5 Constraints while using ICT tools by extension personnel.

### **2.1. Socio-economic profile of Extension Personnel using ICT tools.**

#### **2.1.1 Age**

Kiran (2007), in his study on, perception of organizational climate by scientists of University of Agricultural

Sciences Dharwad, concluded that 58.13 per cent of the scientists belonged to middle age group followed by 21.24 per cent and 20.63 per cent belonged old and young age group respectively. Further, 64.29 per cent of the teachers, 50.00 per cent extension workers and 47.92 per cent researchers belonged to middle age group followed by 28.57 per cent of extension workers, 25.00 per cent of researchers and 18.36 per cent of teachers belonged to old age group, while 27.08 per cent, 21.43 per cent and 17.35 per cent of researchers, extension workers and teachers belonged to young age group respectively.

Agwu *et al.* (2008) reported that 42.50 per cent of extension workers were within the age range of 30-39 years, while 32.5 per cent were 40- 49 years. Only 20.0 per cent of the extension workers were upto 30 years, while 5.0 per cent of them were in the age group of 50 - 59 years.

Nagalaksmi (2008), in her study on, integrating ICT with multiple functions for agriculture development, concluded that more than half of extension personnel (52.94 %) were under old age group category, 26.47 per cent of extension personnel were under middle age and 20.59 per cent of extension personnel were under young age group category.

Isiaka and Abubakar (2008), in their study on, use of Cyber-cafes, indicated that the majority of the cyber-cafe users were students, of age in between 21-25 years.

Salau and Saingbe (2008), in their study on, access and utilization of information and communication technologies (ICT) among agricultural researchers and extension workers, revealed that mean age for the researchers and extension workers were 44.83 and 41.06 years respectively, this implies

that agricultural researchers and extension workers were in the middle ages.

Omotesho *et al.* (2012) revealed that about 70.00 per cent of the agricultural extension officers were below the mean ages of 42.50 for Extension agents and 43.00 for SMSs respectively. Still being relatively young, it can be expected that they should be able to adapt to new innovation in agricultural development brought about by ICT.

Kariuki Karanja (2014) revealed that 41.60 per cent of the respondents were in the age group 50-59 followed by 35.60 per cent in between 40-49, 17.80 per cent in between 30-39 while merge (5.00%) in between 20-29 age.

Samansiri and Wanigasundera (2014) revealed that the 48.50 per cent of the extension workers were above 45 years old while 43.6 per cent were in between 36 - 45 years and the remaining 7.9 per cent of the extension workers were 35 years and below.

Raksha (2015) in her study stated that 36.37 per cent of the respondents were old age followed by middle 33.33 per cent and young 30.00 per cent.

### **2.1.2 Education**

Rao (2000), in his study on, communication techniques used by agricultural assistants of KSDA, reported that two fifth of AA's (40.00%) were educated upto SSLC followed by 33.33 per cent educated upto PUC level, whereas 23.33 per cent of the AA's had education upto graduation level and only 3.34 per cent AA's had agricultural diploma.

Hedjazi *et al.* (2006), in their study on factors affecting the use of ICTs by Iranian Agriculture Extension

Specialists that only 3.80 per cent of the specialists had a Ph. D. degree, 34.60 per cent of them had Masters Degree and 61.50 per cent had Bachelor degree.

Frempong *et al.* (2006) revealed that more than half (50.9%) of the respondent have received education upto tertiary or university level.

Adesope *et al.* (2007) concluded that 89.6 per cent of the female researchers had M. Sc degree as the highest academic qualification.

Bahgat and Antar (2007) revealed that 56.00 per cent hold agricultural diploma. Most of them (63.00%) are extension workers or specialists at the village level.

Kiran (2007) majority (86.25%) of the scientists possessed Doctorate degree and the rest of them (13.75%) possessed Master degree. It was also inferred that 93.88 per cent of teachers possessed Doctorate, followed by 78.60 per cent of extension workers and 72.90 per cent of researchers, whereas 27.10 per cent of researchers possessed Master degree followed by 21.40 per cent and 6.12 per cent of extension workers and teachers respectively.

Agwu *et al.* (2008) reported that 37.50 per cent of the researchers had masters degree, 27.50 per cent and 22.50 per cent had Ph.D and B.Sc. degrees respectively, while the remaining 7.50 per cent and 5.00 per cent had HND and OND, respectively.

Meera *et al.* (2010), conducted study on, Critical analysis of e-learning opportunities and e-readiness in the public extension system: Empirical Evidence from Tamil Nadu,

opined that 63.00 per cent of the respondents are having Master's Degree in agriculture as the educational qualifications.

Yakubu *et al.* (2013) revealed that 35.8 per cent of the extension agents had Higher National Diploma (HND), 33.00 per cent had Ordinary National Diploma (OND), 27.60 per cent had Secondary School Certificate and 3.60 per cent had a Bachelor Degree (BSc. or B. A) as their highest educational level attained.

Raksha (2015) stated that 58.33 per cent of the respondents were doctorate followed by post-graduate (41.67%).

### **2.1.3 Experience**

Rao (2000) reported that nearly two third (65.00%) of the Agricultural Assistants had high level of experience while 25.00 per cent had low level of experience and remaining 10.00 per cent were found in medium level of experience category.

Frempong *et al.* (2006) revealed that 65.60 per cent of extension agents had experience over 10 years.

Kiran (2007) opined that 52.50 per cent of the respondents were in medium level of experience, while 25.00 per cent and 22.50 per cent of the respondents were in low and high level of experience respectively.

Salau and Saingbe (2008) revealed that more than half (55.55%) of researchers had 1-20 years working experience, while most (71.11 %) of the extension workers had 20 years of working experience, this means that extension workers had longer working experience than the researchers.

Tanko *et al.* (2013) observed that about 45.00 per cent of sampled respondents have 5 to 10 years of experience. Moreover, 56.70 per cent belonged to public extension agencies, while 43.30 per cent belonged to private organizations.

Yakubu *et al.* (2013) revealed that the more than half (52.90%) of the extension agents had a working experience of 15-20 years.

Samansiri and Wanigasundera (2014) depicted that nearly two third (65.30%) have achieved more than 20 years of work experience while 31.70 per cent have achieved 10 to 20 years of work experience and the rest 3.00 per cent has gained less than 10 years of work experience.

#### **2.1.4 Sources of Information**

Kameswari *et al.* (2011) studied that agricultural information is gain from a wide range of sources and channels. These include district and block level agriculture/ horticulture offices, Krishi Vigyan Kendras (Farm Science Centres), daily local language new papers, agri portals, television, friends and relatives, helpline, farmers' cooperatives, radio, private input agencies and dealers and mobile phones less than half (48.00%) reported getting information from government agencies (District Agriculture and Horticulture Departments). Government agencies were also ranked as highly reliable due to technical know-how and lack of personal agenda. Friends and relatives were also important and reliable sources of information, especially in remote villages. However, it was observed that only 2.00 per cent of the respondents reported using TV for seeking agricultural information despite high ownership and regular broadcast of agriculture programs.

Ezeh Ann N. (2013) revealed that most of the extension agents (98.33%) and (85.83%) owned radio and television, respectively. This was followed by 81.67 per cent who own mobile phones and 42.50 per cent who have libraries. Less

than one fourth (24.00%) owned cassette recorder/player, the least were 15.00 per cent who own internet connected computer. Further it was observed that majority (85.00%) accessed ICT facilities from cybercafé/telecentres, followed by 57.50 per cent who accessed from home. Some (35.00%) accessed from their workplace while few (18.30%) accessed ICT facilities in the public libraries.

Tanko *et al.* (2013) indicated that majority (85.71%) of the respondents have newspaper within reach. Respondents that use research bulletins are the lowest, constituting about 1.43 per cent of sample respondents.

Kariuki Karanja (2014) revealed that the mobile phones are the most popular ICT device among rural agricultural extension personnel. Majority of them had their own hand sets. Mobile phones therefore present a good source of agricultural information source among extension personnel and their clients and need to be exploited.

Samansiri and Wanigasundera (2014) observed that majority (78.2%) of the respondents used mobile phones for about 4-7 days per week, as it is convenient to get information by mobile phones. Next to mobile phones, 44.60% of the respondents have used fixed telephones to get information, about 4-7 days per week. 95.00 per cent have never used facsimile, while majority have never used the Internet (63.40%), e-mail (61.40%) and VCD/DVD/IMM-CD (57.4%) for getting information.

### **2.1.5 Training**

Nataraj (1989) found that 57.00 per cent received less training while 43.00 per cent received more training.

Lakshminarayan (1992), in his study on, extension teaching methods used by Agricultural Assistants, found that 80.00 per cent of the Agricultural Assistants had undergone refresher training and 20.00 per cent of them have not undergone any refresher training.

Patel *et al.* (1994), in their study on, performance of rural Agricultural Extension Officers, reported that majority (93.00%) of Rural Agricultural Extension Officers working under T and V system in Madhya Pradesh was professionally untrained.

Mohan (2000) found that 14.60 per cent of Assistant Agricultural Officers had received training for more than six months duration, while 17.07, 29.01, 12.41 and 12.91 per cent of them received in-service training for 4-6, 2-4, 1-2 and less than a month duration, respectively. Nearly 14.00 per cent of Assistant Agricultural Officers had not undergone any type of training at all.

Rao (2000) opined that all the AAs had received training in communication techniques during their fortnightly meeting along with subject matter areas. In addition to this 38.33 percent of AAs had received special training in rural development training centre (RDTC).

Frempong *et al.* (2006) revealed that 23.7 per cent of respondents have attended professional courses on ICT, while 29.2 per cent of the respondents have received ICT trainings on their own at business centre's such as community learning centre's.

Bahgat and Antar (2007) revealed that majority (88.00%) of them never attended any training courses on computer and only (8.00 %) Of them work for VERCON.

### **2.1.6 Mass Media Utilization**

Meenakshi (1983) reported that the personal and mass media were the most important sources of market information to the farmers, mass media such as radio, newspaper were the least preferred sources of information.

Mohan (2000) found that 73.17 percent of assistant agricultural officers had medium level of information seeking behavior, while 12.19 and 14.64 per cent of them had low and high information seeking behaviour respectively.

Apparap (2007) in his study on use of mass media by extension personal in dissemination of technology concluded that 1.87 per cent of village agricultural worker, 65.00 per cent of agricultural extension officers and 86.00 per cent of subject matter specialist did utilize mass media for dissemination of technology to the farmers.

Frempong *et al.* (2006) in their research study on challenges of infusing information and communication technologies in extension for agricultural and rural development in Ghana revealed that more than two third of the respondents utilized telephone, television, radio and video decks.

Meera *et al.* (2010) conducted study on Critical analysis of e-learning opportunities and e-readiness in the public extension system: Empirical Evidence from Tamil Nadu concluded that majority (73.00%) of the respondents (extension workers) in overall had better to be mass media exposure.

### **2.1.7 Achievement Motivation**

Reddy (1983) in his study on Role performance and job satisfaction of Village Extension Officers working with intensive Agricultural Extension Programmes (T and V). classified 50.00 per cent, 35.00 per cent and 15.00 per cent of the Village Extension Officers working under Intensive Agriculture Extension Programme in Andhra Pradesh as having high, average and low achievement motivation in that order.

Rao (1985) in his study on Task and Time Management by Assistant Agricultural Officers working under AEP in Karnataka reported that 55.45 per cent of Assistant Agricultural Officers under agriculture extension Project in Karnataka had high level of achievement motivation, while 44.55 per cent had low level of achievement motivation.

Sundaraswamy (1987) reported that 27.28 per cent of Assistant Agricultural Officers working under Training and Visit system belonged to the low level of achievement motivation category, whereas 51.24 per cent and 21.48 per cent of Assistant Agricultural Officers had medium and high level of achievement motivation.

Nataraj (1989) in his study on Job Perception and Job Performance of Assistant Directors of Agriculture under NAEP found that 59.00 per cent of Assistant Directors of Agriculture under National Agriculture Extension Project in Karnataka had low level of achievement motivation, while 41.00 per cent had high level of motivation.

Kumar (1987) in his study on achievement motivation of Assistant Agricultural Officers working under National Agriculture Extension Project in Karnataka reported that 50.57

per cent and 49.43 per cent of Assistant Agriculture Officers had low and high level achievement motivation, respectively.

Mohan (2000) reported that the AAOs having high, medium and low achievement motivation were 19.21, 69.51 and 12.19 per cent respectively.

Kiran (2007) opined that majority (80.63%) of scientists had medium level of achievement motivation whereas 11.87 per cent of them were in high achievement motivation category and the 7.50 per cent of them were in low level of achievement motivation category.

## **2.1.8 Situational factors**

### **2.1.8.1 Infrastructure and Other Resource Facilities**

Shinde (1990), in his study on communication patterns of research and extension personnel in T and V system of Karnataka, found that majority (60%) of the Agricultural Officers (SMS) belonged to the medium category of facility. About one-fourth (24.29%) appeared in low category and 15.71 per cent in high category of facilities.

Meti (1992), in his study on perception of organizational climate and job satisfaction of Agricultural Assistants in NAEP, found that majority (67%) of the Agricultural Assistants were under somewhat satisfactory category, followed by a more or less equal distribution of respondents coming under satisfactory (18%) and not satisfactory (15%) categories.

Sontakki (1995), in his study on organizational climate perception of taluka level fisheries extension personnel found that majority of respondents belonged to moderate satisfaction of availability of facilities at their work.

Halakatti and Sundaraswamy (1998), in their study job performance characteristics and constraints of Agricultural Assistants in T and V system of Karnataka reported that majority of respondents were not satisfied with availability of residential quarters and conveyance facilities.

Nagananda (2005), in his study on organizational climate perception of ADA and AOs of Karnataka State Department of Agriculture found that comparatively more number of Assistant Directors of Agriculture (68.3%) was noticed in moderate perception of facilities and resources at their work as compared to Agriculture Officers (30.0%).

#### **2.1.8.2 Means of Communication**

Brenda (1998), in his study on Computer Anxiety Levels of Virginia Cooperative Extension Field Personnel said that to be more available to the clientele, personnel training is needed to utilize distance learning via audio, video, and computer means.

Jahagirdar and Balasubramanya (2007), in their Study on Feedback Behaviour of Extension Personnel of Karnataka State Department of Agriculture revealed that majority (76 %) of the government extension personnel were found in 'medium communication behavior' category. Majority of the respondents (68 %) informed the 'agriculture problems' to 'higher officers' followed by shared in monthly meeting' (65 %). Seventy per cent of the government extension personnel informed extension programmes to higher officers and 63 per cent of the respondents shared in monthly meetings.

Anonymous (2005), studied Communication Channels and Methods Used by the Scientists for Establishing

Linkages with Extension Personnel, it was found that over one third of Assistant Professors (33.87%) used personal visits regularly as a means of communication followed by Associate Professors (30.76%), whereas more than half of the Professors (57.14%) used personal visits occasionally, followed by Associate (42.30%) and Assistant Professors (37.09%), respectively. Half of the Professors used phone calls regularly, followed by Associate Professors (46.15%) and Assistant Professors (40.32%) whereas, almost same (50.00%) number of Professors and Associate Professors used phone calls occasionally, followed by Assistant Professors (33.87%) and Cent per cent Professors, Associate Professors and Assistant Professors used written communication regularly in order to provide information to extension personnel.

## **2.2 Accessibility to ICT tools by the Extension Personnel.**

Brenda (1998) in his study on Computer Anxiety Levels of Virginia Cooperative Extension Field Personnel revealed that over 33.00 per cent of them used computer, and only 8.00 per cent had a computer in their office.

Frempong *et al.* (2006) in their research study on challenges of infusing information and communication technologies in extension for agricultural and rural development in Ghana revealed that less than one fourth (23.40%) of the of the respondents personally owned and use computer at home.

Adesope *et al.* (2007) (a) in their study on extension and research proficiency requirement in information and communication technologies in Southeastern Nigeria concluded that 82.00 per cent of the female researchers indicated that they know how to access internet on their own while 74.10 percent of

female extensionists indicated that 71.70 per cent of the female researchers indicated that they do not have adequate access to ICT , while 59.30 percent of the female extensionists indicated that they have adequate access.

Adesope *et al.* (2007) (b) in their study on effect of personal characteristics of extension managers and supervisors on information technology needs in the Niger Delta area of Nigeria reported that 62.10 per cent of the respondents indicated that they have adequate access to information Technology, while 37.90 per cent indicated that they do not have.

Wims (2007) in his study an analysis of adoption and use of ICTs among Irish farm families, found that 56.00 per cent of respondents owned a home PC while 48.00 per cent had home internet connectivity.

Isiaka and Abubakar (2008) in their study on the use of cybercafe in Ilorin, Nigeria indicated that the most of the respondents largely used e-mail, online chat, e-publications, file transfer protocol and the world wide web, all of which they desired to learn more about.

Agwu *et al.* (2008) in their study on Use of Information Communication Technologies (ICTs) among Researchers, Extension Workers and Farmers in Abia and Enugu States: reported that 65.00 per cent of the researchers, 56.00 per cent of the extension workers and 33.00 per cent of the farmers asserted that they had access to ICT facilities. Further more it was observed that majority (67.00%) of the farmers do not have access to major ICT facilities.

Salau and Saingbe (2008) in their study on access and utilization of information and communication technologies

(ICT) among agricultural researchers and extension workers revealed that researchers have 87.00 per cent access to ICT facilities while the extension worker had 66.00 per cent access.

Oladosu (2008) in his study on extension workers' information technology use characteristic and training needs of Nigeria revealed that majority (80.00%) of the extension agents had access to the internet. But only a significant proportion (7.00%) uses it regularly.

### **2.3 Knowledge level to extension personnel about ICT tools**

Chakarborty *et al.* (2000) opined about effect of some important personal and socioeconomic factors on gain of knowledge through radio. The knowledge gained by the respondents through the exposure to radio broadcast was medium to high.

Hedjazi *et al.* (2006) conducted a study on factors affecting the use of ICTs by Iranian agriculture extension specialists. The results revealed that specialist's level of knowledge and skill in producing and preparing papers was more than other ICT-related materials.

Bahgat and Antar (2007) in their study on evaluations of extension personnel in Assiut governorate of their levels of knowledge and use and the degree of importance of information communication technology revealed that 49.00 per cent of them had low or very low levels of knowledge on ICT and 32.80 per cent had medium levels of knowledge, only 18.20 % of them had high or very high levels of knowledge.

Ndag *et al.* (2008) in their study comparative analysis of information and communication technology (ICT) use by

agricultural extension workers in south-west and north-central Nigeria concluded that the 51.17 percent and 55.71 percent of the respondent in north central and south, respectively had knowledge of ICT use.

Agwuet *al.* (2008) reported that more than half 52.5 per cent of the researchers had high knowledge level and 40.00 per cent had moderate knowledge level while only 7.50 per cent had low knowledge level of ICTs. In the case of the extension workers, majority 57.50 per cent had moderate knowledge level and 32.50 per cent had high knowledge level while only 10.0 per cent had low knowledge level.

Salau and Saingbe (2008) in their study on access and utilization of information and communication technologies (ICT) among agricultural researchers and extension workers revealed that majority (87.00%) of the researchers have access to ICT facilities while 66.00 per cent of the extension worker had access. On the level of utilization of ICT agriculture communication the researchers scored as high as 85.00 per cent while extension workers scored 70.30 per cent.

## **2.4 Utility Pattern of ICT tools by Extension Personnel**

### **2.4.1 Extent of utilization of ICT tools by Extension Personnel**

Akpabio (2007) revealed that public extension officers utilized a wider range of ICT (especially the broadcast and print ICT) than their private agency counterparts. Private extension officer, however, utilized more of telecommunication/computer ICTS, which are faster, means of accessing agro-technological information.

Bahgat and Antar (2007) in their study evaluations of extension personnel in Assiut governorate of their levels of knowledge and use and the degree of importance of information communication technology revealed that Levels of use of ICT were evaluated as low or very low by over 60.00 per cent of them, medium 27.40 per cent and as high or very high by only 12.60 per cent of the respondents.

Aboh (2008) in his study Assessment of the frequency of ICT tools usage by Agricultural Extension Agents in IMO state, Nigeria revealed that only mobile phone and computer were frequently used by respondents. The overall mean of 0.89 suggests that ICT tools were not frequently used for extension services.

Ndag *et al.* (2008) in their study comparative analysis of information and communication technology (ICT) use by agricultural extension workers in South-West and North-Central Nigeria concluded that majority (51.43%) of the respondents had low level ICT use in South-West Nigeria, majority had moderate level ICT use in North-Central Nigeria.

Singh *et al.* (2009) elucidated the use of internet based e- resources at Manipur University. It was noticed that 30.7 per cent of respondents use internet to little extent, 28.8 per cent to some extents and 13.1 per cent of respondents use internet to full extent. However 27.4 per cent of respondents are non-users of internet.

#### **2.4.2 Purpose of Utilization of ICT tools by Extension Personnel**

Brenda (1998) in his study Computer Anxiety Levels of Virginia Cooperative Extension Field Personnel revealed that

73.00 per cent of the personnel needed information on the same day to answer clients' inquiries. 94.00 percent of them were used for getting information for training programs, 63.00 per cent for reports, and 56.00 per cent collected research information.

Bahgat and Antar (2007) revealed that highest proportion of the respondents was in the case of searching the internet and the lowest of was in the case of spread sheet. This may be due to that some of extension personnel are working for VERCON and may be using the internet in their work more than other skills.

Oladosu (2008) in his study on extension workers' information technology use characteristic and training needs of Nigeria revealed that majority (53.00%) claimed that they rarely seek extension information, about one third (33.00%) sometimes seek extension information while a very small proportion do seek extension information regularly.

Salau and Saingbe (2008) in their study on access and utilization of information and communication technologies (ICT) among agricultural researchers and extension workers revealed that majority of the sampled researchers used ICT items such as telephones, radio, television, video film/camera and power point for agricultural research and extension activities, while only 56.22 per cent of the extension workers use these equipment.

#### **2.4.3 Duration of utilization of ICT tools by Extension Personnel**

Brenda (1998) his study found agents used the computer on an average six hours per day. This time included

one hour per day for software experimentation and one hour a week for reading computer related materials.

Jagboro (2003) concluded that 38.24 per cent of the respondents use internet weekly, 11.76 per cent monthly, 11.76 per cent bi-monthly and 16.17 per cent quarterly. In addition, 25.00 percent spent an average time of half an hour, 39.71 per cent spent one hour, 19.12 per cent spent two hours, 7.35 per cent spent three hours, and 2.94 percent spent four hours, while 5.88 per cent spent more than four hours. He also reported that the level of internet use by the students is very low.

Adesope *et al.* (2007) in their study on extension and research proficiency requirement in information and communication technologies in Southeastern Nigeria concluded that 55.7 per cent and 70.40 per cent of the female researchers and female extensionists respectively indicated 3 to 5 times a week. As expected female extensionists recorded a higher percentage compared to male researchers.

Ommani and Chizari (2007), in their study on appropriateness of e-learning based information technology improve the productivity of crops, observed that (89.00%) of the respondent used their computer between 0-5 hours in week, and 11.00 per cent reported computer use in between 6-10 hours week.

Aboh (2008), in his study on, assessment of the frequency of ICT tools usage by Agricultural Extension agents in IMO state, Nigeria reveals that 49.10 per cent of the respondents who use ICT, spent 3 hours in ICT in a week, 21.10 per cent of the respondents spend 4-7 hours, 17.50 per cent spend 8-11 hours in a week while 12.30 per cent of the respondents spend

12-16 hours on ICT in a week. This reveals that majority of the extension agents spend 3 hours on ICT in a week while less number of the extension agents spend 12-16 hours on ICT on a week.

Meera *et al.* (2010) conducted study on Critical analysis of e-learning opportunities and e-readiness in the public extension system: Empirical Evidence from Tamil Nadu and opined that majority of the respondents (55.00%) are willing to spend thirty minutes to one hour per week for updating their knowledge.

## **2.5 Constraints while using ICT tools Extension Personnel**

Vasu (1998) in his study on extent of use of visual aid by Assistant Agricultural Officers in Karnataka revealed that most important problem faced by Assistant Agricultural Officers in use of visual aid was non - availability of sufficient budget to prepare visual aids, followed by limited facility to transport visual equipments and non - availability of artist to develop visual aid.

Rao (2000) in his study on the communication techniques used by the agricultural assistants of KSDA in Dharwad district reported that 60.00 per cent of agricultural assistants were facing the demands for free beneficiaries and subsidies by farmer followed by illiterate famers (43.00%) and inadequate kits and input supply (41.66%). 31.66 per cent expressed that farmer demand for immediate result for their advice, less encouragement and poor promotion policies, difficulty of gathering farmers for meetings (30.00%).

Salau and Saingbe (2008), revealed that lack of electricity supply was rated highest (62.22%) and (82.21%) by researchers and extension workers respectively.

Micheal and Maier (2007) conducted a study on gender, culture and ICT use in rural South India. The study revealed that obstacles to ICT use were generally structural (time, location, illiteracy) and not personal (e.g. a prohibition from a relative).

Singh *et al.* (2009) found the difficulties in browsing the internet based information resources. It was found that low speed Internet access, erratic power supply and lack of required full text journals are problems with regards to the use of Internet based e-resource.

Parida (2010) in her study Utilization of Information and Communication Technology by Staff and Students in Universities revealed that 8.69 per cent of UASD staff faced obstacle always regarding reliability of content. Majority of them found Internet connection poor or low in most of the times (28.26%). With respect to the staff of KUD inadequate computer facility always played a major problem for them (17.39%), lack of proper training as a problem (26.08%). With respect to social problem conversation with parents (8.69%) for UASD staff. Occasionally they faced the problem like spending less time in social events or gathering outside home (34.78%). Nearly three forth of them never faced the problem of visit to their relative house (73.91%). 23.91 per cent of KUD staff regularly faced the problem of meeting friends and conversation with parents. Occasionally they felt the problems like visit to relative house and spending time in social events or gathering outside home

(41.30%). Further, most of the UASD staff faced the physiological problem like eye pain regularly (10.86%). Eye pain and back ache (32.60%). Eye pain, back ache and head ache played regular problems for most of the KUD staff (17.39%). Occasionally most of them faced the problem of eye pain (23.91%).

### **3. RESEARCH METHODOLOGY**

This chapter deals with methods and techniques employed to collect and analyze the data. This chapter is divided into eight sections under following headings,

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Brief description of the study area
- 3.4 Selection of the respondents
- 3.5 Consideration of ICT tools
- 3.6 Operationalization and measurement of variables
- 3.7 Problems encountered by extension personnel
- 3.8 Development of interview schedule
- 3.9 Pre-testing of interview schedule
- 3.10 Data collection
- 3.11 Statistical tools used
- 3.12 Definition of terms and concepts

#### **3.1 Research design**

For present study an ex-post facto research design was adopted. Ex-post facto research is systematic empirical enquiry in which, the scientists not have direct control of influencing (independent) variable because their manifestations have already occurred or because they are inherently not manipulable.

#### **3.2 Locale of the study**

The study was conducted in purposively selected Ahmednagar district of Maharashtra state. Ahmednagar district was selected as it has largest area among the districts of Maharashtra state. In Ahmednagar district there are 14 tahsils.

Considering the geographical situation of Ahmednagar district it is observed that the following four tahsils are having better irrigation facilities as compared to rest of the tahsils. Hence these four tahsils namely Rahuri, Sangamner, Shrirampur and Rahata were randomly selected for present study.

### **3.3 Brief description of the study area**

Ahmednagar district is located at 18.2° and 19.9° to the north latitude and 73.9° to 75.50° to the east longitudes to the Maharashtra. The district is surrounded by seven district boundaries of Maharashtra namely Nashik and Aurangabad to North side, Solapur to South, Beed and Osmanabad towards East and Pune and Thane towards West.

### **3.4 Selection of the respondents**

The list of Agri. officers, Agri. Supervisor and Agri. Assistant working in department of agriculture was obtained of four tashils from sub divisional Agriculture officer, Ahmednagar. From the list, it was observed that following staff is working in agricultural department as mention below.

**Table1: Distribution of extension personnel in selected tahasil**

<b>Name of Tahsil</b>	<b>Agri. Officer</b>	<b>Agri. Supervisor</b>	<b>Agri. assistant</b>
Rahuri	4	8	49
Sangamner	4	8	49
Shrirampur	3	5	25
Rahata	3	5	25
<b>Total</b>	<b>14</b>	<b>26</b>	<b>148</b>
<b>Selected respondents</b>	<b>9</b>	<b>15</b>	<b>86</b>

Thus total 188 personnel were working. From these by proportionate sampling method 9 Agri. Officer, 15 Agri. Supervisor, 86 Agri. Assistant thus total 110 respondents were selected for the present study.

### **3.5 Consideration of ICT tools**

The ICT tools considered for the study were radio, television, telephone, mobile, computer, internet, e-mail, web based search engine, web based agriculture information portals, decision support system, video conferencing, Kiosks, e-newspaper, e-agricultural magazines. Total 14 ICT tools were selected for the study.

### **3.6 Operationalization and measurement of variables**

#### **3.6.1 Measurement of independent variables**

##### **3.6.1.1 Age**

The chronological age of the extension personnel is in years, measured in terms of completed years at the time of investigation. A score of 1 was assigned to each completed years. The respondents were classified into three groups as young, middle and old by using statistical tools mean  $\pm$  standard deviation.

<b>Sr. No.</b>	<b>Category</b>	<b>Age (years)</b>
1	Young	Less than 30 years
2	Middle	31 to 46 years
3	Old	More than 47 years
	Mean=38.30	S.D.=7.83

### 3.6.1.2 Education

Education refers to the number of years of formal schooling obtained by the extension personnel. It refers to the university degrees obtained by the extension personnel. According to the educational qualification, the extension personnel were grouped into three categories.

<b>Sr.No.</b>	<b>Education</b>	<b>Weightages</b>
1	Graduate	1
2	Post graduate	2
3	Doctorate	3

### 3.6.1.3 Experience

It was operationalized as the number of years of service completed in performing his job at the time of investigation. A numerical score of 1 was assigned to each completed year of service. The respondents were classified into three categories by using statistical tools mean  $\pm$  standard deviation.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 4 years
2	Medium	Between 5-19 years
3	High	20 years and above
	Mean=11.34	S.D.=7.70

### 3.6.1.4 Sources of information

Information sources use referred to the frequency of contact or exposure of the respondents to different information sources for obtaining the ICT tools information. The extent of

use of information sources was assured by taking into consideration all the possible ways available to the respondents for getting information. The scoring procedure used as follows;

<b>Sr.No.</b>	<b>Particulars</b>	<b>Score</b>
1	Once in a week	6
2	Once in a fortnight	5
3	Once in a month	4
4	Once in a season	3
5	Once in a year	2
6	Never	1

Thus total score was worked out and the respondent's categorization was done on the basis of mean  $\pm$  S.D. into following categories.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1.	Low	Less than 63
2.	Medium	Between 64-69
3.	High	70 and above
	Mean=65.51	S.D.=3.47

### **3.6.1.5 Training**

It refers to the training received by the respondents on ICT tools. Each training was given a score of one. Then based on duration of training undergone by the respondents, it was classified into five categories.

### **3.6.1.6 Mass Media Utilization**

This variable is operationalized by considering the exposure and level of participation of an individual to different mass media's such as radio, CRS, television, farm magazine,

newspaper. The respondents were asked to indicate their level of participation in terms of listening, viewing and reading behavior and also owner/subscriber.

The scoring procedure used as follows;

<b>Sr. No.</b>	<b>Subscription / Possession</b>	<b>Score</b>
1	Subscriber / Owner	1
2	Non-subscriber / Not-owned	0

<b>Sr.No.</b>	<b>Reading / Listening / Viewing behavior</b>	<b>Score</b>
1	Regular	2
2	Occasional	1
3	Never	0

The maximum score that one should get was 42 and the minimum was zero. Based on the total scores of mass media participation, the respondents were classified into three categories such as 'low', 'medium' and 'high' by considering mean  $\pm$  and standard deviation (SD).

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 19
2	Medium	Between 20-26
3	High	27 and above
	Mean=22.33	S.D.=3.65

### **3.6.1.7 Achievement Motivation**

It is operationally defined as the degree to excel regardless of social rewards. It is the desire to do well not so much for the sake of social recognition or prestige but to attain an inner feeling of personal accomplishment.

There were nine statements in the form of questions. Each question has three alternative answers. The respondent has to tick one of the alternatives to each statement. The questions, 1, 4 and 6 were positive statements and scoring was given as 2, 1 and 0. The reverse scoring was followed for other negative statements.

Based on the total score, the individuals were grouped into three categories as 'low', 'medium' and 'high' by using statistical tool mean  $\pm$  S.D.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 5
2	Medium	Between 6-8
3	High	9 and above
	Mean=6.64	S.D.=1.24

### **3.6.1.8 Situational Factors**

#### **3.6.1.8.1 Infrastructure and other Resource facilities**

This refers to the infrastructure and other resource facilities at the disposal of extension personnel required for performing their duties. For the purpose of measurement, this was defined as the degree of satisfaction of the extension personnel working at Maharashtra State Department of Agriculture towards the availability of infrastructure facilities such as building, equipments, money, staff/men, repair and maintenance which are essential in transfer of technology and successfully accomplishing their duties.

This was quantified by using the scoring procedure specially devised for this purpose in the present study. The procedure involved rating of the various infrastructure and other

resource facilities for their sufficient and adequate availability to respondents on a two continuum namely 'yes' and 'no' with a weightages of 1 and 0 respectively. Total score with respect to this variable for a respondent was the sum of the scores obtained by him on all the five items and the possible score ranged was between 0 to 5.

For quantification of this variable the procedure followed by Sontakki (1995) was followed with slight modification. Based on total score, the respondents were grouped into three categories as 'low', 'medium' and 'high' by considering the mean  $\pm$  standard deviation (SD) as measure of check.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 2
2	Medium	Between 3-4
3	High	5 and above
	Mean=3.26	S.D.=1.01

### **3.6.1.8.2 Means of Communication**

Means of Communication are operationalized as the ICT tools, agents, instruments, methods or resources used to impart or interchange thoughts, opinions or information *etc.*

Teacher made scale was employed to analyze the means of communication of Extension Personnel. There were three statements in this test provided with three alternatives to answer as *viz.*, always, sometimes and never with a weightage of 2, 1 and 0 respectively for each statement. The maximum score that one should get was 6 and the minimum was zero.

Based on the total score, the respondents were classified into three categories namely, 'low', 'medium' and 'high' using mean  $\pm$  standard deviation (SD) as measure of check.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 3
2	Medium	Between 3-5
3	High	6 and above
	Mean=4.36	S.D.=1.77

### **3.6.2 Measurement of dependent variables**

#### **3.6.2.1 Knowledge**

English and English (1958) defined knowledge as a body of understood information possessed by an individual. Knowledge level of extension personnel was operationalized as the quantum of scientific information known to the respondents about the ICT tools.

The knowledge test constituted 13 knowledge questions which were provided with 3 alternative answers including correct answer. The knowledge test was administered to the respondents and was ask to underline/tick mark to the correct answer. Quantification of knowledge item answers was made by giving one score and zero score for correct and wrong answers, respectively. The scores of all the individual items were summed to get knowledge score of the respondent. The summation of scores for a particular respondent indicated his knowledge level about ICT tools. The maximum score that one should get was 13 and the minimum was zero. This was quantified based on the procedure followed by Hinge (2009) used with certain modifications.

Based on the total score, the respondents were classified into three categories namely, 'low', 'medium' and 'high' by using mean  $\pm$  standard deviation (SD) as a measure of check.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 10
2	Medium	Between 11-12
3	High	13 and above
	Mean=11.53	S.D.=1.11

### **3.6.2.2 Utility Pattern**

#### **3.6.2.2.1 Extent of Utilization of ICT tools**

Extent of Utilization of ICT tools was operationalized by classifying under the following headings;

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Very Frequently	4
2	Frequently	3
3	Rarely	2
4	Very Rarely	1
5	No use	0

The possible obtainable scores ranged between 56 and 0 respectively. Based on the total scores, the respondents were classified into three categories namely 'low', 'medium' and 'high' by considering mean ( $\pm$ ) standard deviation (SD) as measure of check.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	Low	Less than 35
2	Medium	Between 36-46
3	High	47 and above
	Mean=40.95	S.D.=5.88

### 3.6.2.2.2 Purpose of Utilization

The purpose of utilization was classified under following categories.

The scoring procedure used as follows;

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	For knowledge/recent information	6
2	For transfer of technology	5
3	For training/teaching	4
4	For making and sending reports	3
5	For sharing with concerned organization including input agencies	2
6	For organizational communication	1

### 3.6.2.2.3 Duration of Utilization of ICT tools

On the basis of extent of utilization of ICT tools, the duration of utilization of ICT tools were calculated in hours per week. The Duration of utilization category was made using the procedure followed by Parida (2010) with certain modification.

<b>Sr. No.</b>	<b>Category</b>	<b>Score</b>
1	30 min to 1 hours per week	1
2	1 to 2 hours per week	2
3	2 to 3 hours per week	3

### 3.7 Constraints encountered in using ICT tools by Extension personnel

Respondents were asked to indicate the problems faced by them during the usage of ICT tools. The problems were classified into three categories like general problems, physiological problems and social problems.

### **3.8 Development of an interview schedule**

The interview schedule was drafted so as to collect the information in line with the objectives of the study. The schedule was developed in three parts. In the first part, questions related to selected personal, economical, situational, economical and psychological characteristics of the respondents viz., age, education, experience, source of information, training, mass media utilization, achievement motivation were included. The second part of the schedule consisted of the question related to the general information pertaining to the utility pattern of ICT tools. In the third part, questions related to knowledge of ICT tools for transfer of technology along with the information on constraints faced by the extension personnel while using various ICT tools and various suggestions for overcoming these constraints.

### **3.9 Pre-testing of interview schedule**

The interview schedule so developed was pre-tested for its accuracy, simplicity and practicability with group of extension personnel in Ahmednagar Dist. Considering the experience of pre-testing, related questions were put together to have consistency in response. Number of copies of interview schedule was then got xeroxed and used for data collection.

### **3.10 Data collection**

The final data were collected with the help of a pre-tested interview schedule incorporating all the items on which information was required. The respondents were contacted in person mostly at their officer or actual place of working. The importance and objectives of the study were clearly explained to them and they were assured that the information furnished by them would be kept confidential and would be used for the research purpose only.

### 3.11 Statistical tools used

The data collected from the respondents were scored, tabulated and analyzed using frequency, percentage, mean and standard deviation. Frequency and percentage were used for making the simple comparison and to interpret the socio - economic profile, knowledge level and utilization of the ICT tools by the respondents. They were also used for eliciting the problems faced by the respondents.

Statistical methods used in the present study are described below.

- 1. Frequency:** This measure was used to know the distribution pattern of extension personnel variable wise as well as department wise and to categorize the problems perceived by the extension personnel in order of importance.
- 2. Percentage:** This measure was used for simple comparisons and to know the extent of utilization.
- 3. Mean:** The arithmetic mean is the sum of the scores divided by their number. This measure was used to categorize the dependent and independent variables into low, medium and high categories.

The mean will be calculated by using formula,

$$\bar{X} = \frac{\sum Xi}{N}$$

Where,

$\bar{X}$  = Mean,

N = Total number of observation

Xi = Value of observation

**4. Standard Deviation:** This measure was used to categorize the dependent and independent variables into low, medium and high categories.

The mean will be calculated by using formula,

$$S.D = \sqrt{\frac{\sum(X_i - \bar{X})^2}{N}}$$

Where,

S.D. = Standard deviation,

$X_i$  = Individual score of the  $i^{\text{th}}$  respondent

$\bar{X}$  = Mean of the sample

N = Total number of respondents

### 3.12 Definition of terms and concepts

1. **Age:-** Chronological age of respondents in years at the time of interview.
2. **Education:-** It is number of school grades successfully completed by the respondents.
3. **Source of information:-** The source of information refers to the use of different sources of information communication channels used by the sugarcane - potato production technology.
4. **Training:-** The action of teaching a particular skill or type of behavior.
5. **Knowledge:-** Knowledge as a body of understood information possessed by individual.
6. **Utility:-** The state of being useful, profitable or beneficial.
7. **Achievement motivation:-** Is the affect in collection with evaluated performance in which competition with standard of excellence.

- 8. ICT:-** Which can be broadly interpreted as technologies that facilitate communication, processing and transmission of information by electronic means.
- 9. ICT Tools:-** It is diverse set of technological tools and resources used to communicate, to create, disseminate, store and manage information.

## 4. RESULTS AND DISCUSSION

This chapter enumerates the results and discussion of the investigation by keeping in view the objectives of the study under the following headings.

- 4.1 To study the socio-economic and psychological characteristics of extension personnel using ICT tools.
- 4.2 To study the accessibility to ICT tools by the extension personnel.
- 4.3 To analyze the knowledge level of extension personnel about ICT tools.
- 4.4 To ascertain the utility pattern of ICT tools for transfer of technology (TOT) by the extension personnel.
- 4.5 To enlist constraints while using ICT tools and obtain the suggestions.

### **4.1 To study the socio-economic and psychological characteristics of extension personnel using ICT tools.**

#### **4.1.1 Age**

Age denotes chronologically completed calendar year by the respondents. Age influences behavior of an individual by exposing to varied situations a number of times. Thus, it becomes an essential aspect to consider age of the respondents in this study. Considering this the information on the age of the extension personnel were collected, analyzed and findings are presented in the following Table 2 and Fig. 2.

**Table 2. Distribution of the extension personnel by their age**

<b>Sr. No.</b>	<b>Age groups in years</b>	<b>No. of respondents (N = 110)</b>	<b>Percentage</b>
1.	Young (30 years and below)	24	21.12
2.	Middle (31-46 years)	76	69.79
3.	Old (47 years and above)	10	9.09
	<b>Total</b>	<b>110</b>	<b>100</b>
		<b>Mean=38.30</b>	<b>S.D.=7.83</b>

Table 2 indicated that, 69.79 per cent of MSDA extension personnel were in middle age group (31 to 46 years) followed by 21.12 per cent in young age group (30 years and below) 9.09 per cent of the respondents were in old age group (47 years and above).

The probable reason might be that recruitment in the past years is more and hence more number of respondents belonged to more per cent of middle age group.

This finding is in line with the findings of Kiran (2007).

#### **4.1.2 Education**

Education enhances comprehensive ability and skill of an individual. It increases skill in problem solving capacity of an individual. Educated person can analyze cause and effect relationship of different phenomenon. Hence, this aspect was considered important in this study. The data in this respect were collected and analyzed. The findings are presented in Table 3 and Fig.3.

**Table 3. Distribution of extension personnel by their educational qualification**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1.	Graduate	79	71.81
2	Post graduate	31	28.19
3	Doctor Of Philosophy	-	-
	<b>Total</b>	<b>110</b>	<b>100</b>

Regarding educational status, 71.81 per cent of MSDA extension personnel were graduate followed by post graduate (28.19%).

Reason lying behind this could be that the minimum qualification for recruiting an MSDA extension personnel is agri diploma or graduation in agriculture and allied branches but degree or post graduation is required for early promotion and other benefits like additional increments. Hence, this kind of results.

This finding is in agreement with the finding of Kiran (2007).

#### **4.1.3 Experience**

It was felt that total service experience influences the skill, training needs, knowledge of extension personnel. In view of this the data regarding the total service experience of extension personnel's in education, research, extension education and management were collected and analyzed. The findings are presented in Table 4 and Fig.4.

**Table 4. Distribution of extension personnel by their total service experience**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1	Low (up to 4)	31	28.18
2	Medium( 5 to19)	58	52.73
3	High( above 20)	21	19.09
		Mean =11.34	SD = 7.70

Regarding the experience in their service 52.73 per cent of MSDA extension personnel had medium level of experience followed by low (28.18%) and high (19.09%) respectively.

This can be justified as majority of MSDA extension personnel are of middle age and having graduation qualification, so they might have joined the service little late.

This finding is in line with the finding of Kiran (2007).

#### **4.1.4 Source of information**

In this study, source of information refers to the frequency of contact over exposure of the respondent to different information sources for obtaining ICT tools information. A source of information helps the respondents to get acquainted with knowledge of ICT tools and its need. Therefore, it is very important to know that availability and use of information sources by extension personnel. The distribution of respondents according to their extent use of source of information is given in Table 5 and Fig.5.

**Table 5. Distribution of extension personnel by their use of source of information**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1	Low (up to 63)	28	24.98
2	Medium( 64 to69)	70	63.63
3	High( 70 and above)	12	11.39
		<b>Mean=65.51</b>	<b>SD = 3.47</b>

From the Table 5, it is observed that about 63.63 per cent of the respondents were using medium sources of information, whereas 24.98 per cent and 11.39 per cent of them had used low and high sources of information, respectively.

Thus, it is concluded that more than half of the extension personnel had used medium sources of information.

The results presented in Table 6 indicated that, 58.00 per cent and 50.9 per cent of MSDA extension personnel had get information from friends and neighbors respectively, followed by agril. assistant (48.18 %) once in a week.

Above one third (36.36%) of the extension personnel got information from agril. supervisor followed by 34.54 per cent from meetings, 33.63 per cent from neighbors, 32.73 per cent from friends and 8.18 per cent from relatives once in fortnight.

The 55.45 per cent extension personnel got information from taluka agril. Officers, followed by 47.27 per cent from subject matter specialist, 39.09 per cent from meetings, 35.45 per cent from agril. supervisor, and 30.00 per cent from circle agril. officers once in month.

**Table 6: Source of information of extension personnel**

Sr. No.	Name of sources of information	Frequency											
		Once in a week		Once in a fortnight		Once in a month		Once in a season		Once in a year		Never	
		F	%	F	%	F	%	F	%	F	%	F	%
<b>A</b>	<b>Personal localite</b>												
1.	Friends	64	58.2	35	32.73	11	10	00	00	00	00	00	00
2.	Neighbours	56	50.9	36	33.63	14	12.72	00	00	00	00	04	3.63
3.	Relatives	00	00	09	8.18	25	23.64	40	36.36	36	32.7	00	00
4.	Progressive farmers	00	00	04	3.63	18	16.36	34	30.90	34	30.90	20	18.18
<b>B.</b>	<b>Personal cosmopolite</b>												
<b>I.</b>	<b>Single window system</b>												
1.	Agril. Assistant	53	48.18	35	31.81	21	19.09	01	0.9	00	00	00	00
2.	Agril. Supervisor	20	18.18	40	36.36	39	35.45	06	5.45	05	4.54	00	00
3.	Circle Agril. Officer	25	22.72	52	46.36	33	30	00	00	00	00	00	00
4.	TalukaAgril. Officer	08	7.27	28	26.36	61	55.45	12	10.9	00	00	00	00
5.	SDAO	00	00	01	0.90	24	21.81	32	29.09	38	33.63	15	13.63
6.	SAO (Dist. Superintending Agril. Officer)	00	00	00	00	15	13.63	43	39.09	52	57.47	00	00
<b>II.</b>	<b>University scientists</b>												
1.	Agril. Assistant	00	00	00	00	18	16.36	42	38.18	50	45.45	00	00
2.	Subject Matter Specialist	00	00	04	03.63	20	18.18	37	33.63	49	44.54	00	00
3.	Agril. Scientist	00	00	01	0.9	17	15.45	41	37.27	51	46.36	00	00
<b>III.</b>	<b>KVK scientists</b>												
1.	Programme Assistant	00	00	00	00	13	11.81	42	38.18	55	50	00	00
2.	Subject Matter Specialist	01	0.9	07	06.36	52	47.27	27	24.54	23	20.90	00	00
3.	Programme Coordinator	03	2.72	07	06.36	29	26.36	38	34.54	33	30	00	00
<b>C.</b>	<b>Extension methods</b>												
1.	Meetings	09	8.18	38	34.5	43	39.09	20	18.18	00	00	00	00
2.	Demonstration	00	00	07	06.36	24	21.81	43	39.09	36	32.72	00	00

Further more it was observed that 39.09 per cent of the extension personnel got information equally from SAO and Demonstration followed by 38.18 per cent from both agril. Assistant and programme assistant, 36.36 per cent from

relatives, 30.90 per cent from progressive farmer respectively once in season.

Regarding once in year 57.47 per cent of the extension personnel got information from SAO followed by 46.36 per cent from agril. scientist, 45.45 per cent from agril. assistant and 44.54 per cent from subject matter specialist. Whereas negligible per cent of extension personnel never got information from anyone.

The reason for this could be the education level of extension personnel, low level of curiosity about new information, less knowledge.

This finding is in agreement with the finding Kameswari *et al.* (2011).

#### **4.1.5 Training received on ICT**

This study refers to the training received by the respondents on ICT tools based on duration of training undergone by the respondents. The distribution of respondents according to their training received is given in Table 7 and Fig.6.

**Table 7. Distribution of extension personnel according to their training received**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1	1 - 3 days	29	26.00
2	4 - 6 days	45	41.00
3	7 - 14 days	31	28.47
4	15 - 21 days	3	2.72
5	Above 21 days	2	1.81

The results depicted in Table 7 and Fig. 6 indicated that, 26.00 per cent of MSDA extension personnel received training on ICT tools for 1 to 3 days duration followed by 41.00 per cent for 4 to 6 days, 28.47 per cent for 7 to 14 days and 2.72 per cent for 15 to 21 days duration, and 1.81 per cent for more than 21 days respectively.

The reason for this could be more number of training organized to motivate MSDA extension personnel to use ICT tools as they are the best means of communication in the changing scenario. In addition to this ICT related training attended by them were based on their subject of specialization.

Whereas, the results revealed that, very low per cent of MSDA extension personnel had received training on ICT tools for 15 -21 days and > 21 days duration, while very negligible per cent undergone training on ICT tools may be because of low education status, Low knowledge about ICT, low mass media participation and less opportunity to attend such training could support the findings. Also majority of the training are conducted of short duration to refresh the extension personnel before each season.

This finding shows conformity with the findings of Lakshminarayan (1992) and Mohon (2000).

#### **4.1.6 Mass Media Utilization**

In this study, mass media utilization refers to exposure and level of participation of an individual to different mass media's such as radio, CRS, television, farm magazine, newspaper etc. The data in this respect were collected and analyzed. The findings are presented in Table 8 and fig.7.

**Table 8. Distribution of extension personnel by their Mass Media Utilization**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1	Low (up to 19)	27	24.54
2	Medium (20 to 26)	70	63.63
3	High ( 26 and above)	13	11.83
		<b>Mean = 22.33</b>	<b>SD = 3.65</b>

The results depicted in Table 8 revealed that, 63.63 per cent of the extension personnel had medium level of participation followed by low (24.54%) and high (11.83%) level of participation. This could be attributed to the awareness and importance attached for getting information by the respondents. Moreover educational qualification of respondents might have contributed to this kind of result.

These observations are in line with the observations of Mohon (2000).

None of the extension personnel possesses Community Radio Stations (CRS). All the extension personnel (100%) possessed television. Whereas, 80.00 per cent of MSDA extension personnel were subscribers of farm magazine. Regarding newspaper, cent per cent of MSDA extension personnel were subscribers of newspaper.

With respect to mass media utilization, it was observed from Table 9 that, 50.00 per cent of MSDA extension personnel listened agricultural programmes broadcasted through 'Radio' regularly followed by occasionally (31.18 %) and never (18.18%). Whereas, 46.36 per cent listened rural development programmes occasionally followed by regularly (30.90 %) and never (22.72%) respectively. while 56.36 per cent of them were in the habit of listening news regularly followed by occasionally (36.36%) and never (7.27%) respectively.

**Table 9: Mass media utilization of extension personnel**

Mass media	MSDA (N = 110)							
	Subscription/ Possession		Listening/Viewing/Reading Behaviour					
			Regular		Occasional		Never	
	Freq	%	Freq	%	Freq	%	Freq	%
<b>Radio</b>								
Agricultural Programmes	36	32.72	55	50	35	31.81	20	18.18
Rural Development Programmes			34	30.90	51	46.36	25	22.72
News			62	56.36	40	36.36	8	7.27
<b>Community radio station</b>								
Agricultural Programmes	00	00	37	33.63	47	42.72	27	24.54
Rural Development Programmes			21	19.09	46	41.81	44	40
News			55	50	43	39.09	13	11.81
<b>Television</b>								
Agricultural Programmes	110	100	56	50.90	44	40	10	9.09
Rural Development Programmes			29	26.36	54	49.09	27	24.51
News			39	35.45	54	49.09	17	15.45
<b>CD/ DVD</b>								
Agricultural Related Information	69	62.72	27	24.54	46	41.81	37	33.63
Rural Development Related Information			19	17.27	51	46.36	40	36.36
News			41	37.27	47	42.72	23	20.90
<b>Kiosk</b>								
Agricultural Related Information	36	32.72	21	19.09	52	47.27	37	33.63
Rural Development Related Information			15	13.63	43	39.09	52	47.27
News			11	10	40	36.36	59	53.63
<b>Farm Magazine</b>								
Agricultural Related Information	88	80	63	57.27	39	35.45	8	7.27
Rural Development Related Information			19	17.27	59	53.63	32	29.09
News			25	22.72	53	48.18	32	29.09
<b>Newspaper</b>								
Agricultural Related Information	110	100	58	52.72	42	38.18	10	9.09
Rural Development Related Information			22	20	48	43.63	40	36.36
News			29	26.36	54	49.09	26	23.63

Regarding the programmes broadcasted through 'Community Radio Station (CRS)', it was found that 42.72 per cent of the MSDA extension personnel were occasional listeners of agricultural programmes followed by regular listeners (33.63%) and never (24.54%) respectively. With respect to listening behavior of rural development programmes, 41.81 per cent of them listened occasionally followed by never (40.00%) and regular (19.09%) respectively. Whereas, 50.00 per cent of the respondents regular listened news followed by occasional (39.09%) and never (11.8%) respectively.

The reason may be that, the coverage area of Krishi Community Radio Station is limited only upto 25 km and hence acts as main reason for this finding. In addition to this respondent personal interest and inconvenient timing of broadcasting of programmes could also attributed to this kind of results.

It was also seen that, 50.90 per cent of MSDA extension personnel were regular viewers of agricultural programmes through 'Television' followed by occasional viewers (40.00%) and never (9.09%). Further, rural development programmes were viewed occasionally by 49.09 per cent followed by regular (26.36%) and never (24.51%) respectively. While 49.09 per cent of them were occasional viewers of news followed by regular (35.45%) and never (15.45%) respectively.

Television shows the pictures with synchronized sound which make the respondents to gain and retain more knowledge/information easily as compared to other mass media.

It was also seen that, 41.81 per cent of MSDA extension personnel were occasional viewers of agricultural

programmes through 'CD/DVD' followed by never viewers (33.63%) and regular (24.54 %). Further, rural development programmes were viewed occasionally by 46.36 per cent followed by never (36.36 %) and regular (17.27%) respectively. While 42.72 per cent of them were occasional viewers of news followed by regular (37.27%) and never (20.90%) respectively.

This revealed that, television and radio were the most effective common medium which are now being possessed by every individual and have become common media for every individual. Moreover, extension personnel would like to get refresh and rejuvenate themselves after their hectic schedule and thus they give more emphasis to television for entertainment. They also consider television and radio as a means of getting informed about the happenings and the new technologies occurring in the world.

Also it can be observed from the Table 9 that, 47.27 per cent of the MSDA extension personnel occasionally visit the 'Kiosk' followed by never visit (33.63%) and regular (19.09%) for agricultural related information. Less than half (47.27%) of the respondents never read the rural development related information followed by occasional (39.09%) and regular (13.63%). Whereas, 53.63 per cent of them never read news information followed by occasionally (36.36%) and regularly (10.00%) respectively.

Further more it can be observed from the Table 9 that, 57.27 per cent of the MSDA extension personnel regularly read the 'Farm Magazine' followed by occasional readers (35.45%) and never (7.27%). More than half (53.63%) of the respondents read the rural development related information

occasionally followed by never (29.09%) and regularly (17.27%). Whereas, 48.18 per cent of them read news information occasionally followed by never (29.09%) and regularly (22.72%) respectively.

Further, 52.72 per cent of MSDA extension personnel regularly read the agricultural related information published in 'Newspaper' followed by occasionally (38.18%) and never (9.09%). It also revealed that 43.63 per cent of them occasionally read the rural development related information, followed by never (36.36%) and regularly (20%). While news were read occasionally by 49.09 per cent followed by regularly (26.36%) and never (23.63%).

Higher education qualification as well as job nature of MSDA extension personnel may accountable for this kind of result.

These observations are in line with the observations of Apparap (2007).

#### **4.1.7 Achievement Motivation**

It is refers the degree to excel regardless of social rewards. It is the desire to do well not so much for the sake of social recognition or prestige but to attain an inner feeling of personal accomplishment.

The data of extension personnel by their achievement motivation are shown in Table 10 and Fig.8.

The results presented in Table 10 indicated that, 80.00 per cent of MSDA extension personnel exhibited medium achievement motivation followed by low (13.63%) and high (6.37%) respectively.

**Table 10. Distribution of extension personnel by their achievement motivation**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1.	Low (up to 5)	15	13.63
2.	Medium (6 to 8)	88	80
3.	High (above 8)	7	6.37
	Total	110	100
		Mean = 6.64	SD = 1.24

The medium achievement motivation among MSDA extension personnel might be due to their higher education, more exposure to mass media, more innovative in nature *etc* to become economically sound. It is assumed that achievement motivation forces the individual towards reaching the goals, which one has set for oneself. The higher education, annual income and economic motivation might have encouraged them to set the higher goals. The reason for the present finding might be low promotional opportunities and other situational factors which have put 80.00 per cent of MSDA extension personnel in medium category of achievement motivation.

This finding is supported by the finding of Mohon (2000), Kiran (2007).

The results presented in Table 11 indicated that, 80.00 per cent of MSDA extension personnel 'agree' respectively to the statement of 'One should always follow motto service before self'. This could be justified by saying that respondents were satisfied with their job, and they might be having high determination to achieve the organizational goal or to do something better than others.

**Table 11: Achievement motivation of extension personnel**

Sr. No	STATEMENTS	MSDA (N = 110)					
		A		UD		DA	
		Freq	%	Freq	%	Freq	%
1	One should always follow moto 'service before self'	88	80.00	18	16.36	04	3.64
2	It is better to be content with whatever little one has, than to be always struggling for more	24	21.81	09	08.18	77	70.00
3	I always strive to gain more knowledge and skill for facing latest problem	83	75.45	25	22.72	02	1.81
4	One should aim high to achieve highest post in job	110	100	-	-	-	-
5	The way things are now-a-days discourage one to work hard	22	20.00	13	11.81	75	68.18
6	One should succeed in service even if one has to neglect his family	57	51.81	25	22.72	28	25.45
7	One should be satisfied with what he has achieved	59	53.63	33	30	18	16.36
8	I always attend seminars to upgrade my knowledge	99	90	08	7.27	03	2.72
9	I always go for exposure tours to attached myself with farming community	101	91.81	07	6.36	02	1.81

About 70.00 per cent of MSDA extension personnel were 'disagree' respectively to the statement of 'it is better to be content with whatever little one has, than to be always struggling for more.

The probable reason for this finding could be that 80.00 per cent of MSDA extension personnel were under medium achievement motivation category and also higher goals may disappoint and affect their working capacity.

About 74.45 per cent of MSDA extension personnel 'agree' to the statement of 'I always strive to gain more knowledge and skill for facing latest problem'. This is a negative statement but can also be viewed as positive statement; it all depends upon person to person. Since MSDA extension personnel are more qualified and having more knowledge, thus more of them perceived it as positive statement and resulted in above finding.

Cent per cent of MSDA extension personnel 'agree' respectively to the statement of 'One should aim high to achieve highest post in job'. The possible reason might be that every individual wants to prove himself/herself capable of everything and want to be the highest post in job and hence majority of the respondents agree with that statement.

About 68.18 per cent of MSDA extension personnel 'disagree' to the statement of 'The way things are now-a-days discourage one to work hard' respectively. Today we are in the age of information and communication technology/IT, development of high-tech or information and communication technology has made our work easy and faster.

About 52.72 per cent MSDA extension personnel 'disagree' respectively to the statement of 'one should succeed in his occupation even if one has been neglected by his family'. The reason might be their strong interest and dedication in achieving goals.

About 53.63 per cent MSDA extension personnel 'agree' respectively to the statement of 'One should be satisfied with what he has achieved'. The reason might be lack of interest in doing innovative things so this kind of findings.

About 90 per cent MSDA extension personnel 'agree' respectively to the statement of 'I always attend seminars to upgrade my knowledge'. The possible reason might be that every individual wants to increase and upgrade the knowledge and information level.

About 53.63 per cent MSDA extension personnel 'agree' respectively to the statement of 'I always go for exposure tours to attached myself with farming community'. The reason might be that every individual have achievement motivation to attach the farming community.

#### **4.1.8 Situational Factors**

##### **4.1.8.1 Infrastructure and Other Resource Facilities**

This refers to the infrastructure and other resource facilities at the disposal of extension personnel required for performing their duties. Infrastructure and Other Resource Facilities refers the degree of satisfaction of the extension personnel working at Maharashtra State Department of Agriculture towards the availability of infrastructure facilities such as building, equipments, money, staff/men, repair and maintenance which are essential in transfer of technology and successfully accomplishing their duties. The findings are presented in Table 12 and Fig. 9.

The data in Table 12 indicated that, 67.27 per cent of MSDA extension personnel belonged to medium infrastructure and other resource facilities category followed by low (22.73 %) and high (10.00%) respectively.

**Table12. Distribution of extension personnel by their infrastructure and other resource facilities**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1.	Low (up to 2)	25	22.73
2.	Medium (3 to 4)	74	67.27
3.	High (5 and above )	11	10
	Total	110	100
		Mean = 3.26	SD =1.01

This clearly indicates that, the respondents had less facility to carry out extension activities which need to be taken care while making of budgetary provision.

Similar results were reported by Shinde (1990), Sontakki (1995) and, Nagananda (2005).

The data in Table 13 indicated that, 70.00 per cent of MSDA extension personnel said 'yes' to the statement of 'Do you have the suitable buildings for the use of ICT tools with proper ventilation, air and light etc? This is may be due to good infrastructure facilities at office.

About 72.72 per cent of MSDA extension personnel said 'yes' to the statement of 'Do you have well equipped equipments/materials for proper use of ICT? Reason for this could be that the budgetary provision to MSDA may be less and also to provide access to such ICT tools might have become costlier affair.

**Table 13: Infrastructure and other resource facilities of extension personnel**

Sr. No.	STATEMENTS	MSDA (N = 110)			
		YES		NO	
		F	%	F	%
1.	Buildings: Do you have the suitable buildings for the use of ICT tools with proper ventilation, air and light etc?	77	70	33	30
2.	Equipments: Do you have well equipped equipments/materials for proper use of ICT?	80	72.72	30	27.27
3.	Money: Do you have sufficient money/fund for use of improved ICT tools?	46	41.81	64	58.18
4.	Staff/Men: Do you have sufficient and well trained sub-staff for efficient utilization of ICT tools?	66	60	44	40
5.	Repair and maintenance: Whether the ICT equipments are regularly serviced and well maintained?	60	54.54	50	45.45

About 58.18 per cent of MSDA extension personnel said 'no' to the statement of 'Do you have sufficient money/fund for use of improved ICT tools? This may be due to the fact that, the budget provision made for ICT tools may be insufficient.

About 60.00 per cent of MSDA extension personnel said 'yes' to the statement of 'Do you have sufficient and well trained sub-staff for efficient utilization of ICT? In case of MSDA extension personnel it could be due to non availability of tools and staff, low educational qualification.

Majority 54.54 per cent of MSDA extension personnel said 'yes' to the statement of 'Whether the ICT equipments are regularly serviced and well maintained? Reason for this could be less budget allotment for maintenance of ICT tools. Whereas, in

Department of Agriculture no such qualified and well trained manpower is placed exclusively for the use of ICT tools.

#### **4.1.8.2 Means of communication**

In this study, Means of communication refers the ICT tools, agents, instruments, methods or resources used to impart or interchange thoughts, opinions or information *etc.*The findings are presented in Table 14 and Fig.10

**Table 14. Distribution of extension personnel by their means of communication**

<b>Sr. No.</b>	<b>Category</b>	<b>Frequency (N = 110)</b>	<b>Percentage</b>
1.	Low (up to 3)	37	33.63
2.	Medium (4 to 5)	26	23.63
3.	High (6 and above )	47	42.74
	Total	110	100
		Mean = 4.36	SD =1.77

A close look at Table 14 highlighted that, 42.74 per cent of MSDA extension personnel belonged to high means of communication followed by low (33.63%) and medium (20%) category. The reason behind this is might be that, MSDA extension personnel had higher accessibility and higher extent of utilization of ICT tools.

Similar results were reported by Jahagirdar and Balasubramanya (2007).

**Table 15: Means of Communication**

Sr. No.	STATEMENTS	MSDA (n = 110)					
		Always		Sometimes		Never	
		F	%	F	%	F	%
1.	Upward communication: Do you communicate with your higher-ups in the organization about the utilization of ICT tools and other agriculture related information?	54	49.09	33	33.00	23	20.90
2.	Downward communication: Do you communicate with your lower staff i.e subordinates related to ICT and other agriculture related information?	81	73.63	08	7.27	21	19.09
3.	Horizontal communication: Do you communicate with similar cadre persons or colleagues related to ICT and other agriculture related information?	54	49.09	33	30.00	23	20.90

A close perusal of Table 15 elicited that, 49.09 per cent of MSDA extension personnel said 'always' that they 'communicate with their higher-ups in the organization about the utilization of ICT tools and other agriculture related information? People often communicate with their higher- up to gain some knowledge or to increase their knowledge.

It was found that, 73.63 per cent of MSDA extension personnel 'always' that they 'communicate with their lower staff i.e. subordinates related to ICT and other agriculture related information? Since lower staff/subordinates are suppose to carry out most of office work such as, attending the allotted work, making report, manual, bulletin *etc.* thus they do communicate with lower staff in day to day work.

Majority of MSDA extension personnel 49.09 per cent said 'always' that they 'communicate with similar cadre persons or colleagues related to ICT and other agriculture related

information? It is obvious that, people would like to share with same cadre people as they can share without hesitation and they can have freedom for discussion with their colleagues like friends/same cadre people.

#### **4.2 Accessibility to ICT tools by the extension personnel**

It refers to the accessibility of ICT tools like radio, television, telephone, mobile, computer, laptop, e-mail etc. by the extension personnel. The information regarding accessibility to ICT tools by the extension personnel is presented in Table 16 and Fig. 11.

The results in Table 16 indicated that, Cent per cent of MSDA extension personnel have the accessibility of Television, Telephone and Mobile, respectively followed by Web based Search Engine Google (98.18%), e-mail (84.50%), Google chrome (81.81%), Computer (80%), e-newspaper (72.72%), Internet (63%), Web based Agril. information Portals e-sagu (60.90%), Kiosk (60.00%), Radio (50.00%), Decision Support System (48.18%) followed by e-Agril. magazines and video conference equal (11.81%).

The reason for this could be that, Television, Telephone, Mobile and computer are very common now-a-days, most of the people can afford it easily. Moreover it became a fashion to have all this things. Television can refresh and entertain people after a hectic work. Telephone is considered as user friendly, less technical, economical and can be utilized by anyone. On the other hand mobiles are preferred more due to its value added facilities *viz.*, easy to carry everywhere, low cost *etc.* While computer is the only means for storing, retrieval and processing of large quantity of data and documentation and it is regarded as key to all ICT facilities. These findings are supported by the findings of Salau and Saingbe (2008).

**Table 16: Accessibility to ICT Tools by the extension personnel**

Sr. No.	ICT tools	MSDA (N = 110)			
		Accessible		Not Accessible	
		Freq	%	Freq	%
1.	Radio	55	50	55	50
2.	Television	110	100	-	-
3.	Telephone	110	100	-	-
4.	Mobile	110	100	-	-
5.	Computer	88	80	22	20
6.	Internet	69	63	41	37
7.	Laptop	70	63.63	40	36.36
8	Tablet	45	40.90	65	59.09
9.	e- mail	93	84.5	17	15.05
10.	Web based Search Engine				
	a) Google	108	98.18	02	1.08
	b) Google chrome	90	81.81	20	18.18
	c) Mozilla firefox	24	21.81	86	78.18
	d) Yahoo	15	13.63	95	86.36
	Web based Agriculture information portals				
11.	a) e- choupal	66	60	44	40
	b) e-sagu	97	60.90	43	39.09
	c) a- aqua	64	58.18	46	41.81
12.	Decision support system	53	48.18	57	51.81
13.	Video conferencing	13	11.81	97	88.18
14.	Kiosk	66	60	44	40
15.	e- newspaper	80	72.72	30	27.27
16.	e- agriculture magazine	13	11.81	97	88.18

Whereas, not accessible ICT tools expressed by MSDA extension personnel in the order of priority were; e-mail (15.50%), Computre (20.00%), Internet (37.00%), Radio

(50.00%), Laptop (67.27%), Tablet (70.00%). The extension personnel not accessible to Web based search engine Google (1.80%), Google chrome (18.18%), Mozilla firefox (78.18%)Yahoo (86.36%). The Web based Agriculture information portals e-choupal (40.00%), e-sagu (39.09%), a-aqua (41.81%). The extension personnel not accessible to e-newspaper (27.27%), Kiosk (40.00%), Decision Support System (51.81%), Video conference and e-Agricultural magazines (88.18%) respectively. The reason may be their low education qualification, less knowledge and less number of training organized by the State Department of Agriculture.

Similar results were reported by Agwu et al. (2008),Salau and Saingbe (2008).

#### **4.3 Knowledge level of extension personnel about ICT tools**

In this study, knowledge as a body of understood information possessed by an individual.

The information regarding the knowledge about ICT tools of the extension personnel were collected, tabulated and analyzed. The results are presented in Table 17 and Fig. 12

**Table 17: Overall knowledge level of extension personnel about ICT tools**

<b>Sr. No.</b>	<b>Knowledge Categories</b>	<b>MSDA (N = 110)</b>	
		<b>Freq</b>	<b>%</b>
1.	Low (<10)	19	17.27
2.	Medium (11-12)	70	63.63
3.	High ( > 12)	21	19.10
		Mean = 11.53	SD = 1.11

Table 17 represents the overall knowledge about ICT tools, it was found that, 63.63 per cent of MSDA extension personnel had medium level of knowledge followed by high (19.10%) and low (17.27%).

Knowledge can be increased only through the education. It can be acquired and developed through lifelong learning process. Knowledge can be overwhelmed with more research, experience and training. As some of the MSDA extension personnel are more qualified and exposed towards more training and research and mass media. So it is obvious that they have more Knowledge compared to that of other extension personnel. Further, result showed that, MSDA extension personnel should be made aware about ICT tools and need to be trained on use of ICT tools.

This finding is similar with the findings of Bhagat and Antar (2007).

A perusal of Table 18 revealed the knowledge level of MSDA extension personnel about individual ICT tools in the order of priority were; cent per cent of the respondents possess knowledge about ICT tools like radio and television followed by mobile and internet (99.09%), telephone, computer and e-mail (98.18%), video conferencing (92.72%), e-newspaper (85.45%), kiosk (83.63%), e-agricultural magazine (71.81%) ICT meaning and decision support system (63.63%). The possible reason may be that, young age, educational qualification, more accessibility, more utilization of ICT tools, more innovative, higher achievement motivation, infrastructure and other resource facility to MSDA extension personnel could support the above findings.

**Table 18: Knowledge level of extension personnel about ICT tools**

Sr. No	Knowledge	MSDA (N= 110)	
		Correct answer	
		Freq	%
1	ICT stands for — Information and communication technology	70	63.63
2	Radio — An electronic audio-medium used for broadcasting the programmes	110	100
3	Television — An electronic audio-visual medium which provides pictures with synchronized sound	110	100
4	Telephone — The telephone or phone is a telecommunications device which is used to transmit and receive sound (most commonly voice and speech) across the distance	108	98.18
5	Mobile — An electronic telecommunications device, often referred to as a cellular phone or cell phone, it connect to a wireless communications network through radio wave or satellite transmissions and provide voice communications, Short Message Service (sms), Multimedia Message Service (MMS), and newer phones may also provide Internet services such as Web browsing and e-mail.	109	99.09
6	Computer — Is a programmable machine that receives input, stores and manipulates data/information, and provides output in a useful format	108	98.81
7	Internet — Is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide	109	99.09
8	E-mail — Is a method of exchanging digital messages across the Internet/computer network	108	98.18
9	Decision support system —It is a computer based information system that support business and organizational deci	70	63.63
10	Video conferencing— Is a video channel or a 2-way cable television system which provides the picture and sound of both the sender and receiver of message	102	92.72
11	Kiosks — It is a computer based terminal or display that provides information or services in public places.	92	83.63
12	e-newspaper —Is a newspaper that exists on the World Wide Web or Internet	94	85.45
13	e-agricultural magazine — Is a magazine that exists on the World Wide Web or Internet	79	71.81

#### 4.4 Utility pattern of ICT tools by extension personnel

##### 4.4.1 Extent of utilization of ICT tools by the extension personnel

It refers to, utilization of ICT tools for various purpose by the extension personnel of Maharashtra State Department of Agriculture.

The information regarding the overall extent of utilization about ICT tools by the extension personnel were collected, tabulated and analyzed. The results are presented in Table 19 and Fig. 13.

**Table 19: Overall extent of utilization of ICT tools by the extension personnel**

Sr. No.	Categories	MSDA (N = 110)	
		Freq	%
1	Low (< 35)	21	19.10
2	Medium (36-45)	66	60
3	High (> 46 )	23	20.90
		Mean = 40.95	SD = 5.88

The results presented in Table 19 revealed that, 60.00 per cent of the MSDA extension personnel belonged to medium utilization of ICT tools, followed by high (20.91%) and low (19.09%) category, respectively.

The possible reason might be lack of exposure to ICT equipments, lack of trainings, Poor infrastructure facilities, lack of knowledge, unawareness about some of the ICT tools, lack of interest as most of them are of old age group and low educational qualification could support the findings of extension personnel.

These findings are partially supported by the findings of Ndag *et al.* (2008).

**Table 20: Extent of utilization of ICT tools by the extension personnel**

Extent of utilization									
Sr. No.	ICT TOOLS	MSDA (N = 110)							
		VF		F		LF		NAA	
		Freq	%	Freq	%	Freq	%	Freq	%
1	Radio	24	21.8	41	37.27	31	28.2	14	12.7
2	Television	50	45.45	45	40.90	15	13.4	-	-
3	Telephone	51	46.36	36	32.7	23	20.91	-	-
4	Mobile	60	54.55	32	29	18	16	-	-
5	Computer	28	25.45	26	23.6	18	16	40	36
6	Internet	28	25.45	29	26.4	25	22.73	28	25.5
7	e – mail	22	20	25	22.73	8	7.3	55	50
8	Web based Search Engine								
	a. Google	50	45.45	45	40.90	15	13.63	-	-
	b. Google chrome	28	25.45	26	23.63	18	16.36	40	36.36
	c. Mozilla firefox	07	6.36	11	10	25	22.72	67	60.90
	d. Yahoo	06	5.45	12	10.90	20	18.18	72	65.45
9	Web-based Agricultural information portals								
	a) e- choupal	05	4.54	11	10	25	22.72	70	63.63
	b) e-sagu	04	3.63	12	10.90	24	21.81	70	63.63
	c) a- aqua	07	3.36	12	10.90	18	16.36	73	66.36
10	Decision support system	04	4.63	15	13.63	11	10	80	72.72
11	Video conferencing	06	5.45	09	8.18	12	10.90	83	75.45
12	Kiosk	05	4.54	12	10.90	23	20.90	70	63.63
13	e- Newspapers	04	3.63	12	10.90	24	21.81	70	63.63
14	e-agricultural Magazines	07	6.36	11	10	25	22.27	67	60.90

Table 20, Fig. 14 depicted the extent of utilization of individual ICT tools by the MSDA extension personnel. The results indicated that, extent of utilization of ICT tools in the order of priority were; mobile (54.55%) was "Very frequently" used followed by telephone (46.36%), television (45.45%), web

based search engine Google (45.45%), computer and internet (25.45%), radio (21.80%), e-mail (20.00%). The probable reason for this could be that all the mentioned ICT tools are quite common now a day's and are the needs of every man in today's world. Telephone are utilized for keeping in touch with target group *i.e* farmers, farm women *etc.*, mobile are preferred more due to its value added service such as mobile-internet, video, mp3, Bluetooth *etc.* Farmer can ask for any information through message or by calling. Computer use for sending and making reports and television refresh and give live information.

"Frequently" used tools by MSDA extension personnel were television (40.90%), web based search engine Google (40.90%), Radio (37.27%), Telephone (32.70%), Mobile (29.00%), internet (26.40%), computer (23.60%), e-mail (22.73%). MSDA extension personnel used internet for searching required information and online news. Hence most of the time they use search engines viz. Google, Google chrome. They were using computer for making reports and to store their documents and records and video camera are mostly used during some field visits and plot demonstration to take photos.

While "Less frequently" used ICT tools by MSDA extension personnel were; Radio (28.20%), Kiosk (20.90%), e-agricultural magazines (20.81%). Reason behind this could be that many better tools have come up, so people prefer new tools than the old ones because of more facilities, comfort ability, and better service.

Further, the data revealed that, some of the tools "Not at all" used by MSDA extension personnel were; video conferencing (75.45%), Decision support system (72.72%), e-

newspaper (63.63%), Kiosk (63.63%) and e-agricultural magazines (60.90%), web based agriculture information portals e-choupal and e-sagu equal (63.63%) respectively. Because of non- availability of the required tools, low accessibility to ICT tools and not having adequate training on ICT tools may result in this kind of findings.

#### **4.4.2 Purpose of utilization of ICT tools by extension personnel**

It refers to, purpose of utilization of ICT tools for various purpose by the extension personnel of Maharashtra State Department of Agriculture. The information regarding the purpose of utilization of ICT tools by the extension personnel were collected, tabulated and analyzed. The results are presented in Table 21.

The data presented in Table 21 depicts the purpose of utilization ICT tools by MSDA extension personnel. The purposes were classified into six categories such as for gaining knowledge/ recent information, transfer of technology, training/teaching, making and sending reports, information with related organization including input agencies and communication with other related organization.

The data in Table 21 indicated the purpose of utilization of ICT tools by the MSDA extension personnel in the order of priority were; "gaining the knowledge or for getting the information" the tools used by MSDA extension personnel were; Internet (100%), Television (92.72%), Mobile (84.55%), Radio (74.50%), Computer (68.18%), e-mail (52.70%), telephone (35.45%), e-newspaper (18.18%), e-agricultural magazines (10.00%).



All these tools are very useful means of getting information, for e.g. television provides picture with synchronized sound which made easier for people to learn, whereas, Web based portals are mainly for sharing information related to agriculture and its allied discipline and also to get solution by asking question especially by the farmers, to update their knowledge level as well as to get market information (viz; price).

Further, tools used by MSDA extension personnel for the purpose of "transfer of technology" were; mobile (82.72%), Computer (72.73%), Radio (56.36%), telephone (50.91%), television (40.90%), e-mail (23.2%). Telephone and mobile are most common means of communication. It is highly utilized for keeping in touch with family, friends, colleagues, other organizations. For sending report or any other document people prefer internet, e-mail than post mail, as it is much safer, quicker, cheaper.

Further, the ICT tools used by MSDA extension personnel for the purpose of "training and teaching" were; Computer (71.82%), Internet (63.60%), Mobile (40.00%), Television (37.27%), Radio (29.10%), e-mail (18.20%) and very negligible per cent of respondents used some of the tools for the above purposes. The reason could be the less accessibility, poor infrastructure facilities and lack of operation skills and knowledge.

For the purpose of "making/sending reports", the tools used by MSDA extension personnel were; computer (88.20%), Mobile (64.00%), e-mail (50.00%) and remaining tools were not used. It became much easier to prepare a report or manual by using computer tools such as Ms Word, Ms Excel, Ms Power Point *etc.*

The results also indicated that, the tools used by MSDA extension personnel for the purpose of "sharing information with concerned organization including input agencies" were; Computer (52.00%) and very negligible per cent of respondents used some of the tools for the above purposes.

Further, the tools used by MSDA extension personnel for the purpose of "communication with other organization" were; Telephone (100%), Mobile (100%), and e-mail (12.70%). These tools provide more access to unlimited information and expose to wider spectrum of ideas and concepts.

Generally the service of extension personnel is to transfer new technology to farming communities to enable them to improve their production, income and standard of living, they largely depends on information exchange between and among farmers and a broad range of other ICT tools can have significant impact. Hence, the above mentioned purposes of utilization of ICT tools aid in bringing information to farmers and transfer of technology. Thus, this could be the probable reason for using ICT tools for above purposes.

This finding is in line with the findings of Oladosu (2008).

#### **4.4.3 Duration of utilization of ICT tools by extension personnel**

It refers to, duration of utilization of ICT tools for various purpose by the extension personnel of Maharashtra State Department of Agriculture. The information regarding the duration of utilization of ICT tools by the extension personnel were collected, tabulated and analyzed. The results are presented in Table 22.

**Table 22: Duration of utilization of ICT tools by the extension personnel**

Sr. No.	ICT Tools	MSDA (N = 110)									
		Utilization of ICT tools in hours per week									
		30min		30 min- 1 hr		1 hr- 2 hr		2hr- 3 hr		Not utilizing	
		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1.	Radio	6	5.45	12	10.91	42	38.21	50	45.5	-	-
2.	Television	8	7.27	16	14.54	42	29.09	54	49.1	-	-
3.	Telephone	4	3.63	06	5.45	46	41.82	54	49.1	-	-
4.	Mobile	2	1.81	04	3.63	22	20	82	75	-	-
5.	Computer	10	9.09	12	10.91	24	21.82	62	56.4	2	1.8
6.	Internet	12	11	22	20	28	25.5	45	40.9	3	2.72
7.	e-mail	15	13.6	23	20.09	32	29.1	30	27.27	10	9.1
8.	Web based Search Engine										
	a) Google	09	8.18	19	17.27	32	29.09	50	45.45	-	-
	b) Google chrome	10	9.09	15	13.63	35	31.81	54	40	6	5.45
	c) Mozilla firefox	21	19.09	40	36.36	12	10.90	05	4.54	32	29.09
	d) Yahoo	31	28.08	21	19.09	17	15.45	-	-	41	37.27
9.	Web Based Agril. Info. Portals										
	a) e- choupal	11	10	07	6.36	-	-	-	-	92	83.63
	b) e-sagu	15	13.63	08	7.27	-	-	-	-	87	79.09
	c) a- aqua	22	20	11	10	07	6.36	-	-	70	63.63
10.	Decision Support System	07	6.36	05	4.54	-	-	-	-	98	89.09
11.	Video Conference	07	6.36	-	-	-	-	-	-	103	93.63
12.	Kiosk	08	7.27	07	6.36	-	-	-	-	95	86.36
13.	e-newspapers	14	12.72	12	10.90	10	9.09	6	5.45	68	61.81
14.	e-Agril magazine	10	9.09	07	6.36	05	4.54	-	-	88	80

The results presented in Table 22 indicated the duration of utilization of ICT tools by MSDA extension personnel revealed that, the ICT tools used by MSDA extension personnel with duration of '30 min' in the order of priority were; web based agricultural information portals a-auqa (20%), web based search engine Mozilla firefox (19.09%), e-sagu (13.63%), e-newspaper (12.72%), e-agricultural magazines (9.09%), google chrome (9.09%).

Further, the ICT tools used by MSDA extension personnel for the '30min to 1 hour' duration e-mail (20.09%), internet (20%), web based search engine yahoo (19.09%), google (17.27%), television (14.54%) and e-newspaper (10.90%).

The ICT tools used by MSDA extension personnel for '1 to 2 hrs' duration were; telephone (41.82%), radio (38.21%), web based search engine google chrome (31.81%), television (29.09%), google (29.09%), e-mail (29.10%), internet (25.5%) and e-newspaper (9.09%).

The ICT tools used by MSDA extension personnel for '2 to 3 hrs' duration were; mobile (75.00%), computer (56.4%), telephone and television (49.10%), radio (45.50%), web based search engine google (45.45%), internet (40.9%), google chrome (40%), e-mail (27.27%).

It was observed that, most of the ICT tools not utilized by the MSDA extension personnel such as, e-mail, web based search engines, web based agricultural Information portals, decision support systems, video-conferencing, kiosk and e-agricultural magazines. Reason behind this could be the poor infrastructure, non-accessibility, lack of knowledge and training.

Transfer of technology depends on communication. Telephones, mobile are considered as best means of communication. While television can give entertainment, refresh and rejuvenate after a hectic schedule of work. That is why their utilization duration was more as compare to other tools. Further, web based search engine yahoo (37.27%), e-agricultural magazines (80.00%), web based agricultural information portals e-choupal (83.63%), decision support system (89.09%) and video conferencing (93.63%) were not used by majority of extension personnel due to inaccessibility and less knowledge.

This finding is in line with the findings of Jagboro (2003), Aboh (2008).

#### **4.5 Constraints while usings ICT tools by extension personnel**

The information pertaining to the problem or constraints faced by the extension personnel in the usage of ICT tools is presented in Table 23.

Table 23 indicated that the problems faced in using ICT tools by MSDA extension personnel. The material problems faced by MSDA extension personnel were 'internet connection is poor/slow' (59.09%), 'lack of proper training facility' (38.18%), lack of knowledge (30.90%), insufficient power supply' (30.00%) and 'inadequate computer facility' (22.73%)'.

These findings are supported by the findings of Salau and Saingbe (2008).

With respect to physiological problems faced by the MSDA extension personnel in using ICT tools were; 'eye pain' (36.36%), 'hand pain' (34.55%), 'back pain' (22.13%) and 'headache' (14.55%).

**Table 23: Constraints while using ICT tools by the extension personnel**

Sr. No.	Categories	MSDA (N = 110)			
		YES		NO	
		Freq	%	Freq	%
<b>I ) Material problems</b>					
1.	Inadequate computer facility	25	22.73	85	77.27
2.	Lack of proper training facility	42	38.18	68	61.81
3.	Insufficient power supply	33	30	77	70
4.	Internet connection is poor/ slow	65	59.09	45	40.90
5.	Lack of knowledge	34	30.90	76	69.09
<b>II ) Physiological Problems</b>					
1.	Eye pain	40	36.36	70	63.63
2.	Back ache	25	22.13	85	77.27
3.	Head ache	16	14.55	94	85.45
4.	Hand pain	38	34.55	72	65.45
<b>III ) Social Problems</b>					
1.	Visit to relative house	32	29.09	78	70.91
2.	Time spent in social events or gathering outside home	43	39.09	67	60.90
3.	Time spent with children's	70	63.63	40	36.36
4.	Conversation with parents	65	59.09	45	40.90
<b>IV) Economical problem</b>					
1.	High cost	77	70	33	30.00
2.	Low income	87	79.09	23	20.90
3.	Cost of data pack	73	66.36	37	33.64
<b>V) Technological</b>					
1.	Age factor	40	36.36	70	63.63
2.	Insufficient information to use	76	69.09	34	30.90

With respect to of social problems MSDA extension personnel expressed decreased in the frequency of 'time spent with children's (63.63%), 'conversation with parents' (59.09%), 'time spent in social events or gathering outside home'(39.09%) and followed by, 'visit to relative house' (29.09%).

With respect to economical problems MSDA extension personnel faced the problems like 'low income' (79.09%), 'high cost' (70.00%) and 'cost of data pack' (66.36%).

Whereas, in case of technological problems MSDA extension personnel faced the problems like insufficient information to use (69.09%) and age factor (36.36%).

The possible reason behind this may be that like the two sides of coin, each and everything has benefits as well as constraints. Constraint is nothing but anything which tends to prevent or obstruct the achievement of an objective. It is beyond any doubt that Information and Communication Technology is the gift of science. Along with all the advantages, there are certain problems, which the user faces in his or her day to day life. As extension personnel engaged in their relevant jobs so they hardly get time to mingle with social activities and friends or relatives. Long time use of the ICT tools also creates physiological problems for them.

These findings are partially in line with the findings of Singh *et al.* (2009), Parida (2010).

## **5. SUMMARY, CONCLUSION AND IMPLICATIONS**

Information and Communication Technologies have unique features that provide opportunities to harness them in ways that are different from how the traditional media have been used for development. Once mastered in ICTs potentially it allow every user to be a sender, receiver and broadcaster; facilitate the merging of global, local knowledge and information, support, create and strengthen interactive and collaborative networks that enable information to flow to and from rural communities; facilitate dialogue between communities, intermediaries and development organizations; foster coordination of national and local development efforts; and overcome physical barriers to knowledge and information sharing.

ICTs can also enhance the capacity of grassroots organizations to make their voices heard. ICTs improve the ability to search for information and increase the quantity of information available, ultimately reducing uncertainty and enhancing market participation, answers to question such as "how do buyers and sellers find each other and what price can be achieved?" and "is it better to store the produce or sell it immediately?" can be easily achieved through the use of ICTs. Decisions on what to plant, when to plant it, how to cultivate and harvest, and where to store and sell and at what price to sell, have long depended on knowledge, communication, and information exchange.

Agricultural extension is largely depending on the information exchange between and among farmers on the one

hand, and a broad range of other actors on the other, has been identified as one area in which ICTs can have a particularly significant impact. There is growing recognition that farmers and members of rural communities have needs for information and appropriate learning methods that are not being met. In the midst of this change, extensionists are grappling with the question of how best to harness information and communication technologies (ICTs) to improve rural livelihoods. Extension personnel who are the direct link between farmers and other actors in the agricultural knowledge and information system (AKIS), are well positioned to make use of ICT to access expert knowledge or other types of information that could facilitate the accomplishment of their routine activities.

Studies related to access and use of ICT tools by extension personnel. Hence the present study was undertaken to study access and use of ICT tools by extension personnel for transfer of technology. In this context, extension personnel of Maharashtra State Department of Agriculture. The study is conceptualized with following objectives;

- 1) To study the socio-economic profile of extension personnel using ICT tools.
- 2) To study the accessibility to ICT tools by the extension personnel.
- 3) To analyze the knowledge level of extension personnel about ICT tools.
- 4) To ascertain the utility pattern of ICT tools for transfer of technology (TOT) by the extension personnel.
- 5) To enlist the constraints while using ICT tools and obtain the suggestions.

The study was conducted in Ahmednagar district of Maharashtra during 2015 - 2016. Four tahasils namely Rahuri, Sangamner, Shrirampur, Rahata were randomly selected for the study.

With regard to selection of respondents, a list of extension personnel working under Ahmednagar district (i.e. 4 tahasil's) were obtained. Then 110 extension personnel from MSDA were selected randomly to form a sample of 110 extension personnel to study the access and use of ICT tools for transfer of technology.

In the light of objectives set for study, two dependent variable were selected for the study i.e knowledge level and utility pattern. The variables age, education, experience, source of information, training received on ICT, mass media utilization, achievement motivation, and situational factors were the independent variables.

A well structured questionnaire designed for study was used for collecting the data from respondents through post/mail as well as personal interview method. The data collected from the respondents were edited, tabulated and analyzed using suitable statistical tools like frequency, percentage, mean and standard deviation.

## **5.1 Summary**

The Salient Findings of the Present Study are as follows;

- Majority (69.09%) of MSDA extension personnel belonged to middle age group (31-46yrs).
- Majority (71.81%) of MSDA extension personnel were B.Sc. (Agril) degree holders.

- More than half (52.72%) of MSDA extension personnel had medium level of experience in their service.
- More than half (63.63%) of MSDA extension personnel were using medium source of information.
- More than one fourth (26%) of MSDA extension personnel received training on ICT tools for (1 - 3 days) duration respectively.
- More than half (63.63) of MSDA extension personnel had medium level of mass media utilization.
- All MSDA extension personnel possessed television. None of the extension personnel possesses Community Radio Station (CRS). Cent per cent of the respondents subscribers of news paper. Whereas, 80.00 per cent of MSDA extension personnel subscribers of farm magazine.
- Majority (80.00%) of MSDA extension personnel belonged to medium achievement motivation category.
- About 67.27 per cent of MSDA extension personnel belonged to medium category of infrastructure and other resource facilities.
- Less than fifty per cent (42.72) of MSDA extension personnel belonged to higher of means of communication category.
- About cent per cent of MSDA extension personnel had accessibility to Television and Mobile, Telephone, web based search engine google (98.18%), computer (80.00%). Very less Per cent of them expressed that, they don't have access to some of the given ICT tools.
- More than half (63.63%) of MSDA extension personnel had medium level of knowledge about ICT.

- About cent per cent of MSDA extension personnel possessed knowledge about ICT tools like radio, telephone, followed by mobile and internet (99.09%), telephone, computer and e-mail (98.18%), and video conferencing (92.72%), e-news paper (85.45%).
- More than half (60.00%) of the MSDA extension personnel belonged to medium category of utilization of ICT tool.
- More than half (54.55%) mobile, telephone (46.36%), television (45.45%), computer and internet (25.45%) were used "Very frequently" by UASD extension personnel.
- "Frequently" used tools by MSDA extension personnel were television (40.90%), web based search engine google (40.90%), radio (37.27%), telephone (32.70%), mobile (29%).
- "Less frequently" used ICT tools by MSDA extension personnel were; radio (28.2%), kiosk (20.90%), e-agricultural magazines (20.81%).
- ICT tools "Not at all" used by MSDA extension personnel video conferencing (75.45%), Decision support system (72.72%), e-newspaper (63.63%), Kiosk (63.63%) and e-agricultural magazines (60.90%), web based agriculture information portals e-choupal and e-sagu equal (63.63%) respectively.
- For "gaining the knowledge or for getting the information" MSDA extension personnel used internet (100%), television (92.72%), mobile (84.55%), radio (74.5%), computer (68.18%), e-mail (52.7%), telephone (35.45%), e-newspaper (18.18%), e-agricultural magazines (10%).

- For the purpose "transfer of technology" MSDA extension personnel used mobile (82.72%), Computer (72.73%), Radio (56.36%), telephone (50.91%), television (40.90%), e-mail (23.2%).
- For the purpose of "training and teaching" MSDA extension personnel used computer (71.82%), internet (63.60%), mobile (40%), television (37.27%), radio (29.1%), e-mail(18.2%).
- For "making/sending reports" MSDA extension personnel used computer (88.2%), mobile (64%), e-mail (50%).
- For the purpose of "sharing information with concerned organization including input agencies" MSDA extension personnel used Computer (52%) only.
- For the purpose of "communication with other organization" MSDA extension personnel used Telephone (100%), Mobile (100%), and e-mail (12.7%).
- ICT tools used by MSDA extension personnel with duration of '30 min' in the order of priority were; web based agricultural information portals a-auqa (20%),web based search engine Mozilla firefox (19.09%),e-sagu (13.63%),e-newspaper (12.72%),e-agricultural magazines (9.09%), google chrome (9.09%) .
- ICT tools used by MSDA extension personnel with the duration of '30min to 1 hour' were e-mail (20.09%), internet (20%), web based search engine yahoo (19.09%), google (17.27%), television (14.54%) and e-newspaper (10.90%).
- ICT tools used by MSDA extension personnel with duration of '1 to 2 hour' in the order of priority were telephone

(41.82%), radio (38.21%), web based search engine google chrome (31.81%), television (29.09%), google (29.09%), e-mail (29.1%), internet (25.5%) and e-newspaper (9.09%).

- ICT tools used by MSDA extension personnel with duration of '2 to 3 hour' in the order of priority were mobile (75%), computer (56.4%), telephone and television (49.1%), radio (45.5%), web based search engine google (45.45%), internet (40.9%), google chrome (40%), e-mail (27.27%).
- ICT tools 'not at all' utilized by MSDA extension personnel in order of priority were; e-mail, web based search engines, web based agricultural Information portals, decision support systems, video-conferencing, kiosk and e-agricultural magazines.
- The general problems faced by the MSDA extension personnel were 'internet connection is poor/slow' (59.09%), 'lack of proper training facility' (38.18%), lack of knowledge (30.90%), insufficient power supply' (30.00%) and 'inadequate computer facility' (22.73%)'.
- Physiological Problems faced by the MSDA extension personnel were; 'eye pain' (36.36%), 'hand pain' (34.55%), 'back pain' (22.13%).
- Social Problems encountered by MSDA extension personnel were decrease in frequency of 'time spent with children's (63.63%), 'conversation with parents' (59.09%), 'time spent in social events or gathering outside home'(39.09%).

- Economical Problems faced by MSDA extension personnel like 'low income' (79.09%), 'high cost' (70.00%) and 'cost of data pack' (66.36%).
- Technological Problems faced by MSDA extension personnel like insufficient information to use (69.09%) and age factor (36.36%).

## **5.2 Conclusion**

From the study it was concluded that majority of the respondents were from middle age groups, majority of MSDA extension personnel were graduate B.Sc. (Agri) degree holders.

More than half of MSDA extension personnel had medium level of experience in their service.

More than half of MSDA extension personnel were using medium source of information.

More than one fourth of MSDA extension personnel received training on ICT tools for (1 - 3 days) duration respectively.

More than half of MSDA extension personnel had medium level of mass media utilization.

All MSDA extension personnel possessed television.

Majority of MSDA extension personnel belonged to medium level of achievement motivation category.

About more than half of MSDA extension personnel belonged to medium category of infrastructure and other resource facilities.

Less than fifty per cent of MSDA extension personnel belonged to higher of means of communication category.

About cent per cent of MSDA extension personnel had accessibility to Television and Mobile, Telephone.

More than half of MSDA extension personnel had medium level of knowledge about ICT.

About cent per cent of MSDA extension personnel possessed knowledge about ICT tools like radio, telephone.

More than half of the MSDA extension personnel belonged to medium category of utilization of ICT tool.

More than half of the MSDA extension personnel faced the general problems was 'internet connection is poor/slow'.

More than one fourth of the MSDA extension personnel faced physiological Problems was 'eye pain'.

More than half of the MSDA extension personnel faced the social problems 'time spent with children's .

More three fourth of the MSDA extension personnel faced the economical problems like 'low income'.

More than half of the MSDA extension personnel faced the technological problems like insufficient information to use ICT tools.

### **5.3 Implications of the Study**

#### **5.3.1 Action Implication**

1. It was surprising to observe that nearly half of the respondent does not have radio. Now a day many agriculture related programs are broadcasted by community radio station, KVKs, and some NGO's hence compulsion should be made that all the extensional personnel should had a radio set.
2. It was observed that very meager per cent of the respondents had education up to doctorate. Hence it is implies that department of agriculture should motive the

extension personnel to upgrade educational level. Facilities such as in service study leave should be availed to them for upgrading educational level.

3. Intensive training programmes need to be organized by department of agriculture for awareness about utilization of ICT tools. The extension personnel should be deputed for 21 days training programme hosted by various SAU's and institutes.
4. It was reported by the majority that network connectivity is poor. Hence efforts are needed to improve the network connectivity by contacting the line departments attached with it.
5. It was observed that the extension personnel were experiencing various constraints to a varying degree. Sustainable measures needs to be undertaken by suggestions made by extension personnel to help them in solving their constraints.

### **5.3.2 Research Implication**

1. The present study considered only selected personal and socio-economic characteristics of the working extension personnel of the MSDA. So, it needs to conduct the further studies focusing upon some more social and economic components of extension personnel.
2. The action implication are suggested on the basis of sample area hence; for generalizing these implications the studies should be carried out more frequently to monitor the functioning of extension personnel.

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**Reg. No. :** 186/2014

**Research Topic:** Access and use of ICT tools by extension personnel for transfer of technology

**Research Guide**

**Dr. S.B. Bhange**

Head,

Department of Extension Education,  
MPKV, Rahuri

**INTERVIEW SCHEDULE  
ACCESS AND USE OF ICT TOOLS BY EXTENSION PERSONNEL  
FOR TRANSFER OF TECHNOLOGY**

Date: -

Respondent No :-

(PART – I)

**I. GENERAL INFORMATION**

1. Name of the respondent : \_\_\_\_\_

Mobile no. \_\_\_\_\_

2. Designation : \_\_\_\_\_

3. Office/ Dept: \_\_\_\_\_

4. Place of work : Dist \_\_\_\_\_ Taluka \_\_\_\_\_

**II. SOCIO – ECONOMIC PROFILE OF RESPONDENT**

1. Age : \_\_\_\_\_ years

2. Education : \_\_\_\_\_

3. Experience : \_\_\_\_\_

4. Income/year : \_\_\_\_\_

5. Source of Information

From whom you have received the information of use of ICT Tools? (Pl. put ✓mark in appropriate column)

Sr. No.	Name of sources of information	Frequency					
		Once in a week	Once in a fortnight	Once in a month	Once in a season	Once in a year	Never
1	2	3	4	5	6	7	8
<b>A</b>	<b>Personal localite</b>						
1.	Friends						
2.	Neighbours						
3.	Relatives						
4.	Progressive farmers						
<b>B.</b>	<b>Personal cosmopolite</b>						
<b>I.</b>	<b>Single window system</b>						
1.	Agril. Assistant						
2.	Agril. Supervisor						
3.	Circle Agril. Officer						
4.	Taluka Agril. Officer						
5.	SDAO						
6.	SAO (Dist. Superintending Agril. Officer)						
<b>II.</b>	<b>University scientists</b>						
1.	Agril. Assistant						
2.	Subject Matter Specialist						
3.	Agril. Scientist						
<b>III.</b>	<b>KVK scientists</b>						
1.	Programme Assistant						
2.	Subject Matter Specialist						
3.	Programme Coordinator						
<b>C.</b>	<b>Extension methods</b>						
1.	Meetings						
2.	Demonstration						

6. Training : Any training received on ICT YES/NO

If yes, please mention;

Sr. No.	Name of the training programme	Organization	Duration

Have you made use of the received ICT trainings in your job?  
Yes/No

If yes, please tell how? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### 8. Mass Media Utilization

Please indicate your response by making a tick (✓) mark to the following statements;

Sr. No	Media	Subscription/possession	Type of Programmers/Information	Listening/Viewing/Reading		
				Regular	occasional	Never
1	Radio		Agricultural programmes			
			Rural development programmes			
			News			
			Any other			
	Community Radio Station		Agricultural programmes			
			Rural development programmes			
			News			
			Any other			
2	TV		Agricultural programmes			
			Rural development programmes			
			News			
			Any other			

3.	CD/ DVD		Agricultural programmes			
			Rural development programmes			
			News			
			Any other			
4.	Kiosk		Agricultural programmes			
			Rural development programmes			
			News			
			Any other			
5.	Farm Magazine		Agricultural related information			
			Rural development related information			
			News			
			Any other			
6.	Newspaper		Agricultural related information			
			Rural development related information			
			News			
			Any other			

### 9. Achievement Motivation

Please indicate your response by making a tick (✓) mark to the following statements;

Sr. No.	STATEMENTS	Agree	Undecided	Disagree
1.	One should always follow motto "service before self"			
2.	It is better to be content with whatever little one has, than to be always struggling for more			
3.	I always strive to gain more knowledge & skill for facing latest problem.			
4.	One should aim high to achieve highest post in job			
5.	The way things are going now-a-days discourage one to work hard			
6.	One should succeed in service even if one has to neglect his family			
7.	One should be satisfied with what he has achieved			
8.	I always attend seminars to upgrade my knowledge			
9.	I always go for exposure tours to attached myself with farming community			

## 10. Situational Factors

### 1. Infrastructure and Other Resource Facilities

Please indicate your response by making a tick (√) mark to the following statements;

Sr. No.	STATEMENTS	YES	NO
1.	Buildings: Do you have the suitable buildings for the use of ICT tools with proper ventilation, air and light etc?		
2.	Equipments: Do you have well equipped equipments/materials for proper use of ICT?		
3.	Grants: Do you have sufficient grants for use of improved ICT tools?		
4.	Staff/Men: Do you have sufficient and well trained sub-staff for efficient utilization of ICT?		
5.	Repair and maintenance: Whether the ICT equipments are regularly serviced and well maintained?		

### 2. Means of Communication

Please indicate your opinion by making a tick (√) mark about the use of different means of communication;

Sr. No.	STATEMENTS	Always	Sometimes	Never
1.	Upward communication: Do you communicate with your higher-ups in the organization about the utilization of ICT tools and other agriculture related information?			
2.	Downward communication: Do you communicate with your lower staff i.e subordinates related to ICT and other agriculture related information?			
3.	Horizontal communication: Do you communicate with similar cadre persons or colleagues related to ICT and other agriculture related information?			

**(PART - II)**

**A. Accessibility to ICT tools by the Extension Personnel Please indicate your accessibility to the following ICT tools by putting a tick (√) mark in the appropriate column;**

<b>Sr. No.</b>	<b>ICT TOOLS</b>	<b>Accessible</b>	<b>Not Accessible</b>
1.	Radio		
2.	Television		
3.	Telephone		
4.	Mobile		
5.	Computer		
6.	Internet		
7.	Laptop		
8.	Tablet		
9.	e – mail		
10.	Web based search engine a) Google b) Google Chrome c) Mozilla Firefox d )Yahoo if any other, please mention		
11	Web-based Agriculture information portals a) e-choupal b) e-sagu c) a-aqua if any other, please mention		
12	Decision support system		
13.	Video conferencing		
14.	Kiosk		
15.	e- Newspapers		
16.	e-agricultural Magazines		

**(PART - III)**

**B. Knowledge Level of Extension personnel about ICT tools Choose the Correct statement**

1. ICT stands for

- a) Information and communication technology
- b) Information and communication techniques
- c) Indigenous common technology

2. Radio

- a) An electronic audio-medium used for broadcasting the programmes

- b) Educated people or very little educated people can take the advantage of this medium and build up adequate knowledge and skills
- c) Non cosmopolite in approach

### 3. Television

- a) An electronic audio-visual medium which provides pictures with synchronized sound
- b) Non cosmopolite in approach
- c) None of the above

### 4. Telephone

- a) The telephone or phone is a telecommunications device which is used to transmit and receive sound (most commonly voice and speech) across the distance
- b) An electronic device used for one-way talking with other people
- c) Used for voice and other communications.

### 5. Mobile

- a) An electronic telecommunications device, often referred to as a cellular phone or cell phone, it connect to a wireless communications network through radio wave or satellite transmissions and provide voice communications, Short Message Service (SMS), Multimedia Message Service (MMS), and newer phones may also provide Internet services such as Web browsing and e-mail.
- b) Is a device communication techniques
- c) Is a telecommunications device which provide only voice communication

### 6. Computer

- a) Is a programmable machine that receives input, stores and manipulates data/information, and provides output in a useful format
- b) A computer does not need to be electric, nor even have a processor, nor RAM
- c) Computer is anything that transforms information in a purposeful way

### 7. Internet

- a) Is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide
- b) It is a network that consists of private, public, business and government networks
- c) None of the above

### 8. E-mail

- a) An e-mail message consists of only one components i.e the message header as it content
- b) Is a method of exchanging digital messages across the Internet/computer network
- c) Users can't open more than one e-mail I D for the same website

### 9. Decision support system

- a) It is a computer based information system that support business and Organizational decision- making activities
- b) It is an information decision making system
- c) None of these

10. Video conferencing
- Is a video channel or a 2-way cable television system which provides the picture and sound of both the sender and receiver of message
  - Video conferencing is different from video teleconferencing are
  - It is a one way communication
11. Kiosks
- It is an equipment that provides information related to agriculture and education
  - It is a computer based terminal or display that provides information or services in public places.
  - It is like ATM booth where information are available only in English
12. e-newspaper
- Online newspaper, web newspapers and e-newspaper are three different types of newspaper
  - Is a newspaper that exists on the World Wide Web or Internet
  - It has both soft copy and hard copy connections
13. e-agricultural magazine
- Is a magazine that exists on the World Wide Web or Internet
  - It is same as the other magazine
  - None of the above

### C. Utility Pattern of ICT tools for Transfer of Technology

C.1 Please indicate the Extent of utilization by making tick (√) mark against the following ICT tools;

Sr. No.	ICT tools	Extent of utilization			
		Very frequently	Frequently	Less frequently	Not at all
1.	Radio				
2.	Television				
3.	Telephone				
4.	Mobile(SMS)				
5.	Computer				
6.	Internet				
7.	e – mail				
8.	Web based search engine a) Google b) Google Chrome c) Mozilla Firefox d) Yahoo if any other, please mention				
9.	Web-based Agriculture information portals a) e-choupal b) e-sagu c) a-aqua if any other, please mention				
10.	Decision support system				
11.	Video conferencing				
12.	Kiosk				
13.	e- Newspapers				
14.	e-agricultural Magazines				

NOTE: VF-Very frequently (Once a day), F-Frequently (Once a week), LF-Less frequently (Once a month)

C.2 Please indicate your purpose of utilization by making tick (√) mark against the following ICT tools

Sr. No	ICT tools	Purpose of utilization					
		For knowledge/recent information	For transfer of technology	For Training/teaching	For making /Sending reports	For sharing with concerned org. including input agencies	For organizational comm.
1.	Radio						
2.	Television						
3.	Telephone						
4.	Mobile						
5.	Computer						
6.	Internet						
7.	e – mail						
8.	Web based search engine a) Google b) Google Chrome c) Mozilla Firefox d) Yahoo if any other, please mention						
9.	Web-based Agriculture information portals a) e choupal b) e-sagu c) a-aqua if any other, please mention						
10.	Decision support system						
11.	Video conferencing						
12.	Kiosk						
13.	e- Newspapers						
14.	e- agricultural Magazines						

C.3 Please indicate your duration of utilization by making tick (√) mark against the following ICT tools;

Sr. No.	ICT TOOLS	Utilization of ICT tools in hours per week				
		30 min	30 min to 1hrs	1to 2hrs	2 to 3 hrs	Not utilizing
1.	Radio					
2.	Television					
3.	Telephone					
4.	Mobile					
5.	Computer					
6.	Internet					
7.	e – mail					
8.	Web based search engine a) Google b) Google Chrome c) Mozilla Firefox d) Yahoo if any other, please mention					
9.	Web-based Agriculture information portals a) e-choupal b) e-sagu c) a-aqua if any other, please mention					
10.	Decision support system					
11.	Video conferencing					
12.	Kiosk					
13.	e- Newspapers					
14.	e-agricultural Magazines					

**(PART - IV)****D. Problems encountered in using ICT tools**

Please indicate the problems that you have encountered in using ICT tools;

Sr. No.	PROBLEMS	YES/ NO	Suggestion
<b>I. Material problems</b>			
1.	Inadequate computer facility		
2.	Lack of proper training facility		
3.	Insufficient power supply		
4.	Internet connection is poor/ slow		
5.	Lack of knowledge		
6.	If any other, please mention; a) b) c) d)		
<b>II. Physiological problems</b>			
1.	Eye pain		
2.	Back ache		
3.	Head ache		
4.	Hand pain		
5.	Arm pain		
	If any other, please mention; a) b) c)		
<b>III. Social problems</b>			
1.	Visit to relative house		
2.	Time spent in social events, gathering outside home meeting with friends		
3.	Time spent with children's		
4.	Conversation with parents		
5.	If any other, please mention; a) b) c) d)		
<b>IV. Economical problem</b>			
1.	High cost		
2.	Low income		
3.	Cost of data pack		
<b>V. Technological</b>			
1.	Age factor		
2.	Insufficient information to use		

## 8. VITA

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### MR. PATIL RITESH LAXMAN

A candidate for the degree  
of  
**MASTER OF SCIENCE (AGRICULTURE)**  
in  
**AGRICULTURAL EXTENSION**  
**2015**

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<b>Title of Thesis</b>	<input type="checkbox"/> <b>“Access and use of ICT tools by extension personnel for transfer of technology ”</b>
<b>Major field</b>	<input type="checkbox"/> Agricultural Extension.

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### **BIOGRAPHICAL INFORMATION**

- \* **Personal**
  - Born at Mehun, Tal. Muktainagar, Dist. Jalgaon on 1<sup>st</sup> July, 1992, Son of Shri. Laxman and Sou. Mandakini Patil.
  
- \* **Educational**
  - Completed S.S.C. from S. B. Choudhary High School, Changdeo in 2008 with 81.82 % marks.
  - Passed H.S.C. from Indirabai Lalwani Junior College, Jamner in 2010 with 64.00 % marks.
  - Received Bachelor of Science (Agriculture) degree in Second class from college of Agriculture, Dhule, Mahatma Phule Krishi Vidyapeeth, Rahuri in 2014 with 7.48/10.00 CGPA
  
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