# A STUDY ON FARMER PARTICIPATION AND EFFECTIVENESS OF E-EXTENSION THROUGH THE WEBSITE raitamitra.kar.nic.in

**By**

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**THESIS**

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**COLLEGE OF HORTICULTURE**
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# DECLARATION

I, hereby declare that this thesis entitled "**A study on farmer participation and effectiveness of e-extension through the website raitamitra.kar.nic.in"** is bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship or fellowship to other similar title, of any other University or Society.

Vellanikara G.K.Madhusudhan

# CERTIFICATE

Certified that this thesis entitled "**A study on farmer participation and effectiveness of e-extension through the website raitamitra.kar.nic.in**:" is a record of research work done independently by **Mr.Madhusudhan.G.K** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma , associateship or fellowship to him.

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*...It's my pleasure to thank ICAR, which provided me carrier & scholarship in my Master degree Programme...*

## LIST OF ABBREVATIONS

ATI- Agriculture Training Institute

ATINS- Agriculture Technology Information Network System

ASRED- Association of Southern Region extension Directors

CES- Co-operative Extension Services

EADSI- European Association of Development Research and Training Institute

FAO- Food and Agriculture Organisation

FRIENDS - Fast, Reliable, Instant, Efficient, Network for Disbursement of Services

GIS - Geological Information System

ICAR- Indian Council of Agricultural Research

IT - Information Technology

IKM - Information Kerala Mission

ICTs - Information and Communication Technologies

KISSAN- Karshaka Information Systems Services and Networking

MCTCs- Multi Purpose Community Technology Centre

MANAGE- National Institute of Extension Education and Management

NIC- National Information Centre

NCF - National Commission on Farmers

PC - Personal Computer

PETIS- Potato Extension & Technology Information System

UNDP- United Nations Development Programs

UNECSO- United Nations Educational, Scientific and Cultural Organization

WWW - World Wide Web

# *Introduction*

# Chapter-1

## Introduction

In the context of developing countries, information technology (IT) is seen as one of the most significant forces of modernization. In the global information society, the various indicators of diffusion of IT are a characteristic of development .The world, especially the developing world is seeing a profusion of activities surrounding the Information and Communication Technologies (ICTs), recognizing them as an important tool for development. A wide range of organizations both public and private are promoting and supporting the creation of local entities that would make ICTs accessible on an afforatable basis to every one. In the 21st century, it is the digital divide which is going to separate the people in our society. This divide is between those who have the access and use of phones, computers, and the internet and those who have not. There are economic, cultural and also spatial dimensions to this divide .Knowledge and information are essential for people to successfully respond to the opportunities and challenges of social, economic and technological changes. More than 850 million people in developing countries are excluded from wide range of information and knowledge, with the rural people in particular remaining isolated from both traditional media and new information and communication technologies which would improve their livelihoods. Realizing this, lot of money is being pumped by national and international agencies in to this sector for reducing this digital divide.

The interest for e-extension began with two experts namely David King and Michael Boehlje, who wrote an article titled *e-Extension/USA: Building a Business Model*.

According to Department of Primary Industries and Fisheries DPIF (2007) e-extension can be defined simply as the use of electronic technologies (especially Information and Communication Technologies or ICT) to enhance face-to-face (f2f) and paper-based interactions. These technologies can be as simple as teleconferences or as complex as

wikis and blogs. It includes e-learning, e- trading, e-farming, wikis, web conferencing, podcasting etc.

According to Christopher *et al* (2003) e-extension is a national web based information and educational network for current and new extension clientele. They also said it is easy and

seamless access to unbiased, localized and research based information and education, responsiveness to clients' need, local and benefits to agents, specialists and the public

According to UNESCO (2004) e-extension can be broadly understood as the technology that facilitates communication, processing and transmission of communication by electronic means. In recent years, there is a visible shift from old ways of delivering information to the modern ways of information delivery system.

**Integrating e-extension (ICT) with agriculture**

Agriculture is vital to India. It contributes 23% percent of GDP, feeds over a billion people, and employs 66 percent of the workforces. Because of the green revolution, India's agricultural productivity has improved to the point that it is both self-sufficient and a net exporter of a variety of food grains. Yet most Indian farmers have remained quite poor. In the era of globalization and knowledge intensive precision farming, our farmers must be globally competitive in agricultural production. In recent years agriculture production has become a complex business requiring the accumulation and integration of knowledge and information from many diverse sources. Towards a knowledge revolution in rural India, there is need for greater stress on harnessing the power of information and communication technologies for enhancing our agricultural competitiveness. The information provided should be demand driven and relevant to the day-to-day life of the rural mass. (Swaminathan, 2003).

Given the range of agro-ecological setting and producers, Indian agriculture is faced with a great diversity of needs, opportunities and prospects. The Indian agriculture is on the threshold of a second revolution. It is becoming increasingly clear that the next leap will come from information and the knowledge intensity transfer to the agriculture sector, together with the other traditional inputs and interventions .The real challenge before the policy makers is to overcome the information asymmetry between farmer and farmer, village and village, region and region and the country as a whole versus other countries (Anonymous 2005a).

If it is to respond successfully to these challenges ,greater attention will have to be paid to information based technologies .Both technology generation and transfer will have to focus more strongly than ever before on the themes of optimization in the management of their available resources by producers ,sustainability ,coping with diversity by adapting technology more specifically to agro-ecological or social circumstances and raising the economic efficiency of agriculture .To make information transfer more effective ,greater use of modern information technology and communication among researchers ,extension workers and farmers are needed.

The e-extension support during past few years was mainly conventional. This approach has not been able to reach majority of the farmers who are spread across the whole country. This gap remains a challenge for the extension system even toady. To reach over 110 million farmers, spread over 500 districts and over 6000 blocks is an up hill task and this has been identified as an important area where in e-extension can have a significant impact. To innovate and prosper in agriculture, the farmer has to depend upon numerous specialists and advisors to get information for decision making. But situation in India is that the information provided by research system is not timely, not location specific and not demand driven. Under these circumstances, use of e-extension gains immense importance in our country.

E-extension will help in providing need based, timely, accurate and quality information at a faster rate. The past few years have brought a sea of change in

technology dissemination among farmers. Earlier farmers neither had the means nor the awareness to know about the advancements in agricultural technology and other related information like hybrid seeds, weather conditions, price movements, pesticides, fertilisers etc, except through extension services offered by universities and research institutions. But today, e-extension has made it possible that information is delivered to these farmers at their doorsteps and that too in a language they understand. Such is the power of e-extension that if used freely and fairly, it has the potential to change the social equations forever and can empower farmers and enhance the whole agriculture sector. In this information and communication technology propelled era, integrating information technology with agriculture offers many opportunities in enhancing a country's overall economy by making our farmers and extension system globally more competitive. In the context of developing countries e-extension form the technological basis of globalization, opening up new markets and facilitating trading of services and products on a global scale.

**Areas of E-extension integration**

Application of e-extension in support of agricultural and rural development fall into five main areas, as outlined by Anononymous (FAO, 1998).These are:

- economic development of agricultural producers
- Community development
- Research and education
- Small and medium enterprises development and
- Media networks

Some of the main areas of agricultural development where the e-extension can be collaborated in a country like India are:

- Providing online technical, market and weather related information
- Expert systems (Decision support systems)
- E procurement and e commerce
- Question answer services
- Creation of databases and rural networking
- Tele -education

In addition to this following agricultural development services also can be provided using e-extension:

- Provide up-to-date and quality information on subjects like package of practices, market information, weather forecasting, input supplies, credit availability etc.
- Online services for information, education and training, monitoring and consultation, diagnosis and monitoring and transaction and processing.
- E-commerce to provide direct linkage between producers and traders
- Question answer services ,where experts respond to queries on specialized subjects
- Creation of databases with details of the resources of local villages and villagers ,site specific information systems ,expert systems etc
- Provide information regarding pest or diseases attack, rural development programmmes,crop insurance and post harvest technology
- Education of farmers through audio and video conference

**Potential of ICT for rural development**

The new ICT (web) are becoming more accessible, and users can obtain information from various sources, and one computer could meet the needs of a large rural community. Electronic mail (E-mail) is the most commonly used new ICT and has caused a cultural revolution in the way individuals and organizations interact in terms of

time, cost and distance. The second most significant use of new ICT is the World Wide Web, which enables people to access information on millions of other computers. Although the internet is not a panacea for food security and rural development problems, it can open up new communication channels that bring new knowledge and information resources to rural communities (Bie 1996). Traditional communication channels have been used successfully but these have been monologic and have not allowed much interaction with users. The modern ICT takes into account this problem priding interaction with users.

**Decision making process**- Sound decision making is dependent upon availability of comprehensive, timely and up-to-date information. Food security problems faced by developing countries demonstrate the need for informed researchers, planners, policy, makers, development workers and farmers. Information is also needed to facilitate the development and implementation of food security policies .E-mail and internet can be used for transmitting information to and from rural inaccessible areas.

**Market outlook**- "We farmers daily enter the prices of vegetables in our market into our website WWW.oddanchatrammarket.com and the result is that last year, we earned 140,000 dollars by exporting drumsticks to Kuwait alone "said H Bagadoor, a farmer who has become a key figure in one of the information technology projects in Dindigul district of Tamilnadu.It is cheaper and faster to trade online than on paper-based medium, telephone or fax. Electronic –commerce could, therefore, enable entrepreneurs to access global market information and open up new regional and global markets that fetch better prices and increase farmers earning.

**Empowering rural communities** –ICT can empower rural communities and give them a "a voice" that permits them to contribute to the development process with new ICT ,rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogues with others at top level where they make decision for their own development ( Balit., 1998).

**Creating employment-** Through the establishment of rural information centres, ICT can create employment opportunities in rural areas by engaging telecentre managers, subject matter specialists, information managers, translators and information technology technicians. Such centres help bridge the gap between urban and rural communities and reduce the rural – urban migration problem. The centres can also provide training and those trained may become small scale entrepreneurs.

**ICT initiatives in India**

A silent revolution is taking place in the communication systems in rural India. The farmers and farm-families are browsing the net and getting general, technical and marketing information from the information kiosks set up by a number of pioneers across the country .There are lot of government and Non governmental organizations offering ICT based extension services in almost all States of India. The total coverage under such initiatives may be very small (around ten thousand villages out of over six lakh villages in the country) ,but the potential of this "BRIDGING" of so called "DIGITAl DIVIDE" is being hotly debated within and outside the country. If the rural India can be connected and the "masses" are empowered with "information", the Indian economy will take a leap forwards into the digital Millennium with great speed. The government of India has already put a "IT policy" in place in 2000. Almost all states have developed "IT strategy and have put these up on their websites. The focus on "e-governance" and "IT for Masses" is also emerging as front runner in all these State vision documents. The industry is also looking at rural applications as the potential "Business Domain". Technologies specifically suitable for rural areas are being developed and deployed. Portals on rural markets and agricultural services are being hosted, information are being established at block / Mandal and village levels and the technical need-based information is being collected ,digitized on the internet .

Initiatives of the government and the private sector to adopt standards develop interconnection and accounting systems and to deploy infrastructures, due to liberalization policies, have seen the growth of satellite systems and regional WANs

(Wide Area Networks) in India. Emergence of IT on the national agenda and announcement of IT policies by several state governments has strengthened India's position in the software-driven IT sector in the world. For example States of Andhra Pradesh, Delhi, Goa, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamilnadu, Uttar Pradesh, West Bengal, Pondicherry etc. announced several IT policies in the state .(Vijayanand and Sagar (2003)

There are mainly four types of ICT initiatives in the area of agriculture and rural development in India. They are

- ⇒ Projects implemented by central and state governmental organizations.
- ⇒ Projects started by Non governmental organizations
- ⇒ Projects initiated by cooperatives and
- ⇒ Projects by private agencies

**KARNATAKA –An Outline**

As we know Karnataka is a state of "information technology". Karnataka has a total land area of 1,91,791 km² and accounts for 5.83% of the total area of the country (measured at 3,288,000 km²). This puts it in eighth place in terms of size. With a population of 52,700,000, it occupies ninth place in terms of population. The population density which stands at 275 persons per km² is considerably lower than the all-India average of 324. As per the 2001 census, Karnataka had a literacy rate of 67.04%, with 76.29% of males and 57.45% of females in the state being literates. Since the 1980s, Karnataka has emerged as the pan-Indian leader in the field of IT (information technology). As of 2007, there were nearly 2,000 firms operating in Karnataka. Many of them, including two of India's biggest software firms, Infosys and Wipro have headquarters in the State.· Exports from these firms exceeded Rs. 50,000 crores ($12.5

billion) in 2006-07, accounting for nearly 38% of all IT exports from India. All this has earned the state capital, Bangalore, the sobriquet *Silicon Valley of India*. Karnataka has all the intrinsic advantages that can foster the growth of IT for social and economic development .Karnataka has advanced levels of education, healthcare, an excellent telecommunications network reaching all towns and villages, educated women and availability of world class IT professionals.

Karnataka is galloping towards a revolution in information technology, to become the WORLD'S E STATE, which envisages a massive change in all spheres of life. The introduction of e-governance would make administration better, speedier and more transparent. For this the government of Karnataka is of the firm belief that information technology should be utilized to usher in an era of electronic-Governance aimed at demystifying the rate of government by simplifying procedures, bringing in transparency, making need based good quality and timely information available to all citizens and providing all services in an efficient and cost effective way .

**E-Extension projects in Karnataka**

Many e-extension projects for transferring new farm technologies to farmers are operating successful in Karnataka. The important e-extension projects of the state are described below

**Samanya Mahiti**

Samanya Mahiti is a general information system on the basic amenities available in the villages of Karnataka and it is owned by Department of Rural Development and Panchayat Raj.
http://www.kar.nic.in/samanaya.

**e-Granthalaya**

This is available for Client-server and stand alone systems It has the facility to store and retrieve data in various languages and search facility to locate books, members, journals, serials and other materials .
http://egranthalaya.kar.nic.in

**e BHOOMI**

BHOOMI, the land records management systems is the first e-Governance project successfully implemented for the benefits of the common man, jointly by the Government of Karnataka and NIC, Karnataka. It has been providing service to more than 70 lakh farmers of Karnataka since the last 4 years E- BHOOMI has become the model for replication in many other States. It has received wide spread recognition by public and also won international award. It is owned by revenue department

**KRISHI MARATA VAHINI**

This is a Web based Online Agricultural Commodities Price Information System. Farmers, Traders and Public will get access to marketwise price information by 4 PM daily. Farmers get competitive price for their agricultural products and it is owned by department of agricultural marketing.
http://maratavahini.kar.nic.in

**Raitamitra: The Farmer's Website**

The website, designed by the National Informatics Centre, provides information on seasonal climatic conditions, area, production and productivity, stock position of inputs such as fertilisers and seeds, market information, tips to farmers, best practices and information regarding related websites.

According to NIC (2002**) Farm counseling centres** called **Raita Mitras** are being set up at hobli levels. The government would provide computers to these centres and provide them with internet connection. The farmers can get information from the technical staff at these centres. Karnataka is the first state to form the agriculture commission and start the revolutionary concept of farm counselling centres. There was an urgent need to provide proper information to farmers on agricultural issues and it was with this in mind that the counselling centres were established. These centres would rationalise the farming sector scientifically and help in solving the problems of farmers. '.RAITA MITRA' portal provides tips, information and bulletins on a daily basis to farmers for better cultivation. Access to information is provided free of cost through the 745 RAITA MITRA centres across the State.

***www.raitamitra.kar.nic.in***

Amoung various e-extension projects operating in Karnataka state, raitamitra is most related to agriculture and rural development .Hence the present study under taken with the following objectives.

1. Extent of participation of farmers in the e-extension programme
2. Socio-economic, technological and psychological factors associated with high levels of participation
3. System factors associated with high levels of participation
4. Information needs of farmer participants in the e-extension programme.
5. Effectiveness of the website in terms of gain in knowledge by the farmers.
6. Preferences of farmers towards selected formats of presentation through the website.
7. Problems confronted by the farmers in accessing information from the website.

**Scope of the study**

This is the era of information technology. Millions of money is being pumped in to the field of e governance and ICT enabled agricultural extension services by national and international agencies to reduce the gap between information haves and information have nots**.** Till now much studies have not been conducted to asses the effectiveness of E-extension programmes for rural people in India and to asses their extent of participation in e-project. Research studies for understanding the information needs and problems faced by farmers in accessing information from website are also lacking. In this line, the present study is a unique attempt to find out answers to these questions. The study would help in bringing out suggestions to improve the performance of farmers by effectively utilizing e-extension project.

**Limitation of study**

This study was conducted in a systematic way following the procedure and approach of social science research. However since the project was undertaken as a part of the requirements of masters degree project of the researcher the concept could not be studied in greater depth due to constraints of time and resources. Since the study being pioneer and unique one there were also limitations in pointing out references of old studies which might have affected the study even though all possible care was taken to avoid them.

# *Review of Literature*

# Chapter 2
# Review of literature

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

**1. e-extension**
**2. e-extension Characteristics and Importance**
**3. Dimensions of E-extension**
**3.1 e literacy**
**3.2 e governance**
**3.3 e commerce**
**3.4 e procurement**
**3.5 Expert system**
**4. e-extension initiatives in India**
**4.1 Jamsetji Tata National Virtual Academy for Rural Prosperity**
**4.2 Virtual Academy for the Semi-Arid Tropics (VASAT)**
**4.3 Virtual University for Agricultural Trade - Kerala**
**4.4 Virtual University for Agrarian Prosperity– Maharastra**
**4.5 ITC e Choupal**
**4.6 FRIENDS, Information Kerala Mission, Akshaya and e-Krishi**
**4.7 KISSAN System of Kerala Government**
**4.8 National Alliance for Mission 2007: Every Village a Knowledge Centre**
**4.9 One World South Asia – Bridging Digital Divide**
**4.10 N – Logue**
**4.11 Community Information Centres**
**4.12 TARA kendra www.TARAhaat.com**
**4.13 ISRO Village Resource Centres**
**4.14 TATA Kisan Kendra (TKK)**
**4.15 Mahindra Krishivihar**

**5. Extent of farmer participation in e-extension program**
**6. Socioeconomic factors influencing farmers' participation in e-extension**
**7. Preference of farmers towards different formats of content presentation**
**8. Information needs of farmers using e-extension programmes**
**9. Problems in using the e-extension programme**

## 1. E-extension

CES (2003) has defined e-extension as an online information and education network that provides public access to Land Grant University expertise. The vision of e-Extension will supplement the existing Extension network and address its current shortcomings.

According to Wendi Williams (2003) E-extension is expected to deliver the results of current research in multimedia formats such as publications, graphics, photos, audio and video clips/streaming, learning modules, evaluation instruments and other resources. In addition, end users will be able to interact with subject matter experts, enjoy learning from a comfortable environment such as home, provide direct feedback to extension by helping to identify emerging consumer needs and possibly use the extension resources in new and non-traditional ways.

ASRED (2002) define E-extension as a concept based on WWW and other electronic educational services that provide access to land grant university expertise for an audience that is larger and more diverse than currently served.

According to Rhonda Conlon (2004) E-extension is a national web-based information and education network for current and new Extension clientele that will support just-in-time learning by providing coordinated access to Land-Grant University expertise. It will help most people at some point in their lives. It provides aggregated, peer qualified, selected information and minimizes duplication.

Anonymous (2007) defined E-extension as an Internet-based collaborative environment where Land Grant University content providers exchange objective, research-based knowledge to solve real challenges in real time.

E-extension is unlike any other search engine or information-based website. It's a space where university content providers can gather and produce new educational and information resources on wide-ranging topics. Because it's available to students, researchers, clinicians, professors, as well as the general public, at any time from any internet connection, extension helps solve real-life problems in real time.

Bapan (2007) reported that e-Choupal is a Hindi word which means – "Village meeting place". e-Choupal is a virtual market place where farmers can transact directly with a processor and can realize better price for their produce.

Simone Cecchini and Monica Raina (2007) Mentioned in their study that web based Warana "Wired Village" project is not only to increase the efficiency and productivity of the sugar cane cooperative, but also to provide a wide range of information and services to 70 villages around Warana. The project aims at giving villagers access to information, in their local language, about crops and agricultural market prices, employment schemes from the government of Maharashtra, and educational opportunities

According to Agriculture Training Institute (2008) E-extension is a Program for Agriculture and Fisheries which aims to provide, integrate and harmonize the delivery of electronic extension services in collaboration with the various organizational units of the Department of Agriculture and other agencies like the Department of Science and Technology's Philippine Council on Agriculture, Forestry and Natural Resources Research and Development (PCARRD-DOST), among others.

This ICT approach to extension complements the traditional technology sharing approaches currently adopted in agricultural training and extension. This becomes part of ATI's regular program to fast track knowledge sharing and extension services of the Philippine Government.

## 2. E-extension –characteristics and importance

CES (2003) endorsed the character of e-extension stating that it will provide all customers with educational information based on the solid foundation of scholarship and research and will be driven by customer needs, such as the need for information in multiple languages

They opined that e-extension will also provide the ability to interact with the content, content experts, and other learners in "communities of place" and "communities of interest" through virtual collaboration media such as discussion forums.

Further unlike many Internet sites, e-Extension will provide customers with content that has been assembled with in-depth understanding of customer needs and interests.
Content will be current and location specific and will be delivered in a variety of formats. Customers will see the most relevant information for their needs and will not have to review massive amounts of content to find an answer, although they will not be limited in accessing more in-depth information.

According to CES (2003), some of the characteristics of e-extension are

| **e-Extension Characteristics** | **Description** |
|---|---|
| e-Extension will be customer-driven. | A customer-driven process addressing needs of potential communities of interest beyond current audiences. |
| E-Extension will be accessible. | A single access source for information, educational opportunities, and learning modules developed from LGU expertise. |
| E-Extension will be evolutionary. | An evolutionary process involving numerous simultaneous experiments. |
| E-Extension will be flexible. | Quickly compiling expert response teams flexible enough to move rapidly in addressing customer needs. |
| E-Extension will be easy to navigate. | A customer-driven, Web-based navigation system that provides easy, seamless access to useful information. |
| E-Extension will be expansive. | Based on openness, allowing multiple points of view in development, and informed by a diverse group representing current and potential communities of interest. |
| E-Extension will be competitive. | An outward-looking competitive program in an information marketplace defined by effective response to customer needs. |

| | |
|---|---|
| E-Extension will be integrated. | Multiple access points for customers with effective communication about individual customer needs between all points. |
| E-Extension will be objective and comprehensive. | A product/service that has the comparative advantage of being both objective and comprehensive in an increasingly competitive information marketplace. |
| E-Extension will create new communities. | Emphasis and resources spent on identifying specific needs and motivations of new communities of interest. |
| E-Extension will produce new funding. | Based on revenue generation and political capital in a balance requiring funds from traditional sources, new partners, and customer fee revenue. |
| E-Extension will be standards-based. | Based on meta-data standards agreed on by the provider community to ensure cooperation among information sources and educational opportunities. |

**Importance of e-extension**

Jones (1997) explained that e-extension would save money, time, effort and scientists will prepare electronic version of messages themselves. These versions don't have to be printed and posted .electronic messages will be updated online and that saves time too. E-extension can provide more in depth analysis and can also provide detailed on-farm research reports to farmers.

Johnson (1999) said that world wide websites were used for few educational programs with most of the websites dealing with technology transfer. He also explained the growing importance of agricultural websites in the developed countries.

According to overview of CES (2003), e-extension has,

- Quick access to trustworthy university-based research information that is organized and aggregated for making informed, educated decisions in any setting
- Local contacts available for follow-up, application, and more in-depth Learning.
- A full spectrum of information and learning opportunities that have been

organized and reviewed to enhance speed and ease of use

- Increased availability of high-quality, non-duplicated information along with a vast information network

Indira (2002) reported that e-extension can be used as a compliment in conjuction with existing extension and rural development mechanism. The e-extension naturally, cannot and will not eliminate all the programs of the existing programmes and schemes. And in most case, e-extension will not even replace the traditional extension.

E-extension will generate financial value in three ways: 1) increase the efficiency and effectiveness of extension educators and state specialists, 2) eliminate redundancy within existing and future Internet technology systems and 3) increase revenue from customer fees (CES, 2003).

It stated that e-extension is also capable of achieving the stated goals of e-extension for sharing and reusability of extension knowledge. It has new tools for capturing knowledge that focus on collaboration among individuals and groups of individuals, automatic generation of presentations from content and search engines that have a far higher level of precision and recall. It makes use of Decision Support Systems that reason over the knowledge provided by Extension to provide precise advice and recommendations to extension clients.

Training modules in e-extension are tailored to the needs and learning styles of individual students. It provides more interactive and engaging educational experiences that go beyond the classic textbook.

**3. Dimensions of E-extension**

Long and Long (1992) opined that the potential of ICTs to enable articulation, sharing and storage of local knowledge within and between groups and to facilitate improved mutual understanding between development practitioners and beneficiaries at the ‘project interface’ is considerable.

The development of precision farming in countries of the north emphasizes knowledge-intensity; hence the agricultural paradigm in the developing world will

have to be recast to take advantage of knowledge availability to achieve multiple goals of income, food, jobs, etc. As suggested by Swaminathan, (2003) ICT has a significant role to perform in evolving such a paradigm, as was evident from the interdisciplinary Dialogue on IT: Reaching the Unreached.

The continuing rapid development of the communication and computer based information technologies is probably a biggest for change in extension and Zijp, (1994) explained that there are many possibilities for the potential application of the technology in agricultural extension.

Zijp (1994) reported that ICT has many potential applications in agricultural extension. It can bring new information services to rural areas where farmers, as users, will have much greater control than before over current information channels.

Zijp (1994) and FAO (1998) pointed out that ICTs have the potential to support the improvement of currently inadequate extension and education services, and ensure the farmers have access to reliable information about agricultural technologies and markets.

ICTs are regarded as being able to improve and enhance two-way information flows and 'there is substantial evidence that without two-way information flows development efforts fail, Zijp (1994). This perspective is centred on the concept that development should be more participatory, allowing for the voices of the poor to be heard. The assumption being that information delivery from development agencies to rural communities represents an outdated mode of top-down development that was historically one-way. 'Twoway' has, therefore come to mean 'participatory' in the context of the debate surrounding the role of ICTs. However the role and potential of ICTs in support of rural development goes far beyond facilitating two-way flows of information between decision-makers and beneficiaries in a development project.

Some important roles played by ICT as stated by Roling,(1995) include two-way information flows to provide users with ongoing support, improving feedback mechanisms between users and designers of the technology, avoidance of top-down and prescriptive approaches to technology transfer and the importance of local and contextual facilitation.

Jones, (1997) opined that Agricultural Extension, in the current scenario of a rapidly changing world, has been recognized as an essential mechanism for delivering knowledge (information) and advice as an input for modern farming.

So how could the new technologies could be harnessed for rural development goals? According to the World Bank (1998) 'recent development thinking has been based on the assumption that markets work well enough to ensure development and alleviate poverty. Our growing understanding of information constraints suggests that markets alone are often inadequate; societies also require policies and institutions to facilitate the acquisition, adaptation, and dissemination of knowledge, and to mitigate information failures, especially as they affect the poor'.

According to Ramirez (1998) 'communication for development is about aiding different types of actors interested in understanding needs and assessing opportunities jointly; it is about providing them with the methods and media to reach common meaning, and about enabling them to negotiate with other actors with contrasting perceptions and interests'. The focus on the user that is prevalent in communication for development provides a useful basis for broadening the perception of the role of ICTs beyond improving the efficiency of information systems to deliver information from centralized sources and collecting better quality data for centralized analysis.

FAO (1998) states that improved systems for the management and communication of agricultural information can help poor farmers make informed choices about the opportunities and constraints associated with agricultural development strategies. The use of ICTs is seen by FAO (1998) as a pragmatic solution to the task in hand e.g. VERCON and FarmNet.

Blench (1998) opined that, perhaps nowhere has information been used to greater catalytic effect than in the field of agricultural development, such as the rapid spread of some new varieties in West Africa, but also nowhere more than agricultural extension has the importance of context specific information been more underestimated.

According to FAO (1998) with agriculture in the 21st century moving rapidly away from an artisanal, labour extensive, traditional activity towards a sophisticated, information intensive sector of the global economy, access to information and modern communication technologies has become a necessity for the world's farmers, especially in developing countries.

The power of knowledge for development was highlighted in the 1998 World Development Report (World Bank, 1998) which states that 'recognition of the importance of knowledge has gained momentum, and there is a renewed impetus to integrate knowledge into countries' development strategies'.

ICTs have been recognized as having a role to play in broad-based, cross-sectoral poverty reduction strategies and universal access policies are being promoted to improve rural access to ICTs (Kenny et.al, 2000).

Batnagar (2000) categorized information and communication technology applications in rural development into the following types: decision support to public administrators, improving services to citizens, and empowering citizens to access information and knowledge.

The report of the 'Task Force on India as Knowledge Superpower' (GOI, 2001) emphasized the necessity of developing the capacity to generate, absorb, disseminate and protect knowledge and exploit it as a powerful tool to derive societal transformation. Information and Communication technology (ICT) is seen as an important means of achieving such a transformation.

UNDP (2001) viewed that the use of ICTs is integral in realizing the potential of collective knowledge as the technologies themselves represent tools for achieving development and not merely the rewards of it.

UNDP'S Human Development Report (2001) focused on the issue of technological transformation and its impact on development and further emphases that, 'no individual, organisation, business or government can ignore the changes. The new terrain requires shifts in public policy- national and global-to harness today's technological transformations as tools for human development'.

Skuse (2001) stated that the strategic use of ICTs for poverty reduction will depend on developing the appropriate infrastructure to enable economic development and appropriate information content for the necessary social and human development to occur.

Tripp (2001) assessment of future agricultural technology policies for rural development emphasizes that most of the new technologies that will become available to farmers will be 'information-intensive', i.e. requiring increased levels of knowledge for appropriate management. In addition to basic technical knowledge, the rural poor need to be able to operate in increasingly sophisticated input and output markets.

Technology transfer has been a longstanding issue in rural development. The key concerns relate to efficiency and effectiveness, how to translate the technology developed in one context into usable solutions in another. The process of technology transfer falters not at the micro-level pilot study or test plot but at the point when the technology is expected to be adopted and used both efficiently and effectively on a larger scale. According to UNDP (2001) many of the current ICT examples are just the beginning. Tapping the potential of these new technologies will depend on adaptations to the conditions in developing countries, especially for poor users.

Rivera, (2001) says that the focus of attention on failing extension services in developing countries is occurring at a time when there is a recognition that globalization and trade liberalization is coinciding with the ICT revolution to create a peculiar climate of increased risks and opportunities for many developing countries. 'Knowledge and capital are at the centre of success within this new economic system. But some countries are yet to consider the value of making knowledge available through revived extension services'.

World Bank (2001) revealed that one area where ICTs offer great potential is in increasing the flow of public good type information. Information can be defined as a public good when it is difficult to restrict, having low excludability and when it keeps its value to individuals regardless of whether others also acquire it, because it has 'low extractability'. In the context of agricultural extension public good type information includes weather forecasts, basic information on soils and cropping

techniques, market prices and food safety etc., all of which ought to be available without restrictions or restrictive institutional controls.

Schmitz (2001) states that the Web is the largest and richest "agricultural information system" in the world. Its massive holdings, covering all aspects of world agricultural, natural resource and food systems enable farmers to locate needed information to improve yields, plan for weather contingencies, access research, calculate treatments and runoff, simulate the growing season, visualize, precision data, manage finances, buy inputs and sell outputs, and monitor prices in local as well as world markets. Of course, much remains to be done to insure that farmers worldwide can access and locate reliable web resources.

Bhatnagar and Vyas (2001) were of the opinion that introducing ICT in poor rural areas can be a catalyst for change. However, some pre-requisites are needed to make this introduction cost-effective and sustainable such as stable electric power supply, good connectivity and human capacity to mange hardware and software. If these essential factors are not present, it may be better to search for appropriate and low-tech solutions.

Meera (2002) opined that the overall development of rural areas is expanding in new directions and old ways of delivering information services are being challenged and traditional societies are being transformed to knowledge societies all over the world.

Meera (2002) also envisaged the need for developing among the farmers, both a satisfactory level of faith in the intentions of the ICT staff and a firm commitment to the goals of the proposed project before ICT in all endeavours related to agricultural development are initiated. The organizations and departments concerned with agricultural development need to realize the potential of ICT for the speedy dissemination of information to farmers. She also emphasized the need for developing strong interfaces at village level so that the problem of computer illiteracy among farmers may be resolved. She also suggested that user-friendly software, graphic interfaces and pictorial information would encourage more IT use.

At present, the priority for extension is to use ICTs to serve agricultural development goals but with increasing recognition of the importance of the rural non

farm economy and the potential for livelihood diversification, it is clear that even in this role ICTs could be used for broader rural development goals as foresighted by Start (2001)

Jafri (2002) studied about Gyandoot and noticed that the Gyandoot information service brings the local district government into greater contact with the rural community and the popularity of the complaints service is one example of how the demand for information encourages greater participation from individuals. Gyandoot could generate greater demand for information services as more people are made aware of the services and then decide for themselves whether or not Gyandoot provides a facility through which they feel they will be able to demand information that is relevant to their local context.

It can be rightly stated that though IT in agriculture is in budding stage in the Indian context and has just started to spread it shoots, but with its immense potential to standardize and regulate the agricultural processes and solve the problems it is sure to be one of the most important areas to shine in the near future. Ghatak (2002)

Sharma and Lakshmimurthy (2003) made a foresight that if the rural India can be connected and the masses are empowered with information, the Indian economy will take a leap forward in to the digital millennium with great speed. He also noticed that the process has already been started in India.

Bheenick and Brizomohan (2003) lauded that information communication technology offers the advantage of providing up-to-date information required by extension officers rapidly, increasing the efficiency of extension services.

Until early 2002, the main focus of ICT was on building or strengthening the digital readiness of developing nations to help people get connected. For example the principal response to the “digital divide” has been to make available computers, telecommunications links, and Internet Service Providers where these facilities were thinly spread or absent completely. Now we are beginning to see increasing attention to the content and services that ICTs can deliver-digital communication (email), portals for health and development, and services identified as e-commerce, governance, e-Banking, e-Agriculture, e-Health, eLearning and so on as reported by Roman and Colle (2003).

Maru (2003) revealed that India dominates Asia in the number of ICT/Internet technologies enabled rural development programs. The projects can be classified as: infrastructure, rural services including e-governance, agriculture related which can be further classified as: marketing, community mobilization, development and agricultural extension.

In the poor and drought-prone rural district of Dhar in Madhya Pradesh, India, Gyandoot have tried since January 2000 to make government services more accessible to villagers though information and communication technology (ICT).From the two recent surveys of this e -government project, Cecchini, and Raina (2003) found that service satisfaction is quite high, usage is low, and that poorest people are using Gyandoot and they concluded that most of the potential benefits of e-government are not realized.

Chapman et al., (2006) reported that there is an extensive economic literature on the market value of information in decision making and improving the quality and quantity of information available to the poor can significantly affect the sustainability, productivity and profitability of livelihood decisions.

## 3. Dimensions of E-extension

### 3.1 e Literacy

Kerala government launched an ambitious e literacy programme AKSHAYA in Malappuram district on November 2002. Anonymous (2003b) stated that as part of Akshaya project one person from each family in Malappuram district having no computer trained members will be selected and provided with specially designed training for e-literacy. About 6 lakh persons will be trained accordingly, though the Multi purpose Community Technology Centers (MCTC) established at their walkable reach. A specially designed 5-day package will be used for training. The trainee will be selected by the families itself though the authorities of concerned LSGB. The age limit preferred is 20-30 years. The e-literacy training fee for the MCTC will be Rs.120 per head. An average number of 1000 persons are to be trained by the MCTC within a span of 100 days.

Anonymous (2004a) reviewed E-Literacy (eLit) as the whole range of skills and intellectual abilities needed to appropriately use the new technologies underpinning learning and life in the modern world. It includes computer literacy, information literacy, media literacy, thinking skills and learning skills.

Anonymous (2004b) found that even in areas where access to technological infrastructure is nearly ubiquitous, there are still marginalized groups who are unable to make use of information and communication technologies because they are not e-literate.' E-governance programs will have to take special steps to include people who are not e-literate.

The E-literacy recommendations according to E-governance are,

* Ensure that content is in local languages and that interfaces are easy to use.

* Develop applications that use speech or pictures in addition to, or instead of, written text.

* Include an educational component in e-governance projects.

* Provide aids at access points who can train citizen in basic computer skills.

* Create programs that include traditional media, like radio programs or newspaper columns, where citizen can learn about e-governance.

* Special attention should be given to groups that are difficult to integrate (women, elderly, immigrants)

**3.2 E-governance**

Traunmuller and Lenk (1996) state that IT is often identified as the key to the re-invention of the Government. It is believed that development in IT such as electronic document management, EDI, internet and intranet can lead to innovative administrative information system which can enhance policy formulation, promote participation,

improve service quality, make planning more effective and become a mean of empowering citizen.

Heeks (2003) stated that the murkiness is due in part to the relative novelty of the projects and the lack of studies that offer an analytical understanding of low ICTs can be deployed to help tackle the problem of development. For instance, a recent study of e-governance project in several nations rated the project as either' successful', 'partial failure', or failures'.

Bhatnagar (2004) pointed out that e-governance is an important aspect of ICT for development projects that are meant to help transform the government's functioning and its relationship to society. E-governance is used to understand "….the process of enabling transactions between concerned groups and the government though multiple channels by linking all transaction points, decision points, enforcing/implementation points and repositories of data using information and communication technologies, to improve the efficiency, transparency, accountability and effectiveness of a government."

GOI (2004) Information Technology 2003-04 annual report linked to use of information communication technologies to enhance access and delivery of government services to the various stakeholders, primarily citizens.

Anonymous (2004b) revealed that Drishtee's e-governance project in Sirsa district, Haryana, was launched in October 2000 and received an enthusiastic response from the district administration and from the local people. Initial success encouraged Drishtee to expand the number of kiosks and its service offering. However, being a private company, it was unable to get the sustained support of the government for long and, by late 2002, most of its kiosks were floundering. The lack of connectivity in government departments and accompanying government process reorganization, forced most of its services like driving license and loan applications to remain manual. By mid-2002, Drishtee shifted attention away from e-governance in Sirsa to ensuring the viability of its kiosks by introducing private services.

The findings of a case study of MSSRF's Information village research project Pondicherry indicate that the e-governance service has not led to any significant restructuring of government functioning, but has resulted in more citizens having

access to information previously controlled by traditionally powerful groups in the villages. Evidence suggests that changes in social relations occur not only along the axes of class or caste but are refracted though a range of interpersonal and socio-cultural relationships, including those of caste and community, and gender and generation. (Anonymous ,2004b)

A case study was conducted about rural E-seva, an administrative initiative in West Godavari district.(Anonymous,2004b) The study suggests that the enthusiasm and support of government officials is vital for the success of e-governance and some degree of reorganization, along with the digitization of the system, is helpful in sustaining e governance. The development and financial sustainability of the kiosk reflects the socio-economic conditions of the beneficiaries and the services being offered in the kiosk. Offering more services demanded by citizens (mostly payments),
along with other e-governance services, can bring the citizens to the kiosk on a regular basis.

Anonymous (2005a) reported that the government of India (GOI) has drawn up a national e-governance plan (NEGP) to improve service delivery to citizens and businesses, to be implemented over the next three to four years, by expanding, for instance, the number of IT kiosks in the country from the current 8000 to 100,000.

Anonymous (2005b) reported that the World Bank has offered 500 million US dollar assistance for the first phase of the National e-governance plan.

### 3.3 e commerce

According to Bloch, et al., (1996) it is "the buying and selling of information, products, and services via computer networks".

Goldman Sachs, (1999) says that in 2004, agriculture is projected to be the fifth largest industry sector (following chemicals, computing, industry equipment, and energy), accounting for 8 percent of total B2B online economy.

Stair *et al* (2001) says that e-commerce involves business transactions carried out electronically between a company and other companies (B2B), companies and consumers (B2C), and the public sector and consumers.

Henderson (2001) views e-commerce as the purchase of goods and services over a computer-based network.

Farlane (2003) points out that important issues in the adoption of internet and usage of e-commerce lie within (1) the logistics function: how is the firm going to distribute its product and manage its inventory; (2) the transaction function: is it convenient for the farmer to buy products over the Internet and how secure and private are the transactions making farmers willing to purchase their products online; (3) the negotiation function: can they develop personal relationships with the farmers over the Internet and can the firms trust them; (4) the finance or economic function: will e-commerce make the company economically viable and sustainable as well as promote economic development in rural Alabama; (5) scope of the firm: is the firm located nationally, regionally or internationally.

### 3.4 e procurement

Ramanathan (2004) defines e-procurement as the use electronic medium for exchanging trade related documents between buyers and suppliers. The private sector has actively used the Internet medium for doing e procurement since late 90's. Several governments worldwide are in the process of implementing e-procurement in the last couple of years.

Further he also states that e-procurement enhances public sector efficiency in three areas viz reducing administrative costs, obtaining high quality data on purchasing activities and enhancing transparency and accountability in the purchasing process.

### 3.5 Expert System

As Comeau and Goit (1988) point out "agricultural problems are often multi disciplinary and very complex in nature". ES in agriculture, therefore, is off great promise.

Mockler and Dologite (1992) opined that ES are a spin –off of Al and can be thought of as the more practical and successful implementation of AI technology and experience. These "mini AI applications are more successful because they operate in

very narrowly defined subject areas or knowledge domains. By keeping the subject area narrow, adequate levels of knowledge can be encoded into the knowledge base".

Robinson (1996) states that, in simple terms, ES are computer programs that attempt to emulate human expertise as a method of solving specific problems. They vary in their complexity and can range from simple job aids, which are no more than training systems, to very serious applications which, once in place, become a required tool in order to perform the task at the same level of consistency and performance.

According to Robinson (1996) Expert systems can be mainly used in the following areas of Agriculture.
1) Crop Management Advisors, 2) Livestock Management Advisors, 3) Planning Systems, 4) Pest and disease Management Systems, 5) Marketing Advisory Systems and 6) Process control systems.

According to Ghatak (2002) an "Expert system" is an intelligent computer program that uses knowledge and inference procedures to solve problems that are difficult enough to require significant human expertise for their solution. These software programs typically fit into the category of decision support tools. Decision support programs imitate an expert by involving a client in a problem-solving situation, often providing a recommendation in response to a client's request for help in making a decision.

## 4. E-extension initiatives in India

A number of initiatives E-extension programmes have already been initiated in the country by governmental and on-governmental agencies. Some of the exclusive agricultural portals are Krishiworld.net, Agriwatch.com, Plantersnet.com and Haritgyan.com . Some of the Virtual University experiments for e-extension initiatives in India are Virtual Academy for Semi-arid Tropics (VASAT) of ICRISAT, Virtual University on Agricultural Trade (VUAT) of Kerala Agricultural University, Virtual University for Agrarian Prosperity of Maharastra State and the MSSRF-Jamsetji Tata National Virtual Academy.

### 4.1 Jamsetji Tata National Virtual Academy for Rural Prosperity

Based on the experience gained by the scientists of MSSRF in the Information Village Project in Pondicherry from 1998 onwards, the application of ICT to meet the social and economic needs of the rural families was intensified through the launching of National Virtual Academy for Food Security and Rural Prosperity on August, 23, 2003. The programme has generous support of Sir Dorabji Tata Social Welfare Trust. It aims at bringing together experts and grass root level people in a two-way communication. The Academy enables the farmer's organisations and village women to easily access scientific and technical knowledge they needed to solve local problems and enhance the quality of their lives as well as to communicate their own insights and feed back to the scientists (MSSRF, 2004). The Virtual Academy lays particular emphasis on fostering sustainable livelihood options both in the farm and non-farm sectors.

The NVA aims to provide information and knowledge related to drought, climate management, augmentation of water, maximizing crop yield (more crop per drop) and markets and build skills and capacities of the rural poor, with a view of enhancing livelihood opportunities and empowering vulnerable people to make better choices and have better control of their own lives. NVA has taken key steps of training grass root workers to use ICTs for agriculture and rural development. The NVA aims to convey such knowledge directly to villages thereby empowering rural and tribal families to build skills and capacities relevant to enhancing sustainable livelihoods. These trained persons will constitute the core competence of rural India and serve as agent of change in rural India.

The NVA fellows represent a wide range of competency and expertise – agriculture, education, microfinance, environment, health, marketing, disaster management, and numerous other fields. The target of National Virtual Academy is to enroll one million Fellows (about one woman and one man for every village) by the year 2010 who will become the torch bearers of **Rural Knowledge Revolution** (NCF, 2006).

### 4.2 Virtual Academy for the Semi-Arid Tropics (VASAT) www.vasat.org.

The Virtual Academy for the Semi-Arid Tropics is a strategic coalition hosted by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for information, communication and capacity building operating in South Asia and West and Central Africa to enhance the power of partnership and contemporary information technology to enhance food and livelihood security in the semi arid tropics of India and other developing countries. The major objectives of this project are to educate, train and communicate improved dry land farm technologies to the farmers as well as to establish a virtual network of policy makers, researchers and farming communities towards improved agriculture. Timely and relevant information related to farm technologies, weather, marketing, health, etc. will be communicated to the farmers (ICRISAT, 2003). VASAT links and mobilizes stakeholders for drought mitigation in semi-arid tropics.

VASAT emphasizes creating demand driven content that can be easily accessed, understood and applied by rural stakeholders. The anchors of this project are ICRISAT, ILRI (International Livestock Research Institute), International Water Management Institute (IWMI) and is supported by ICT-KM programme of the Consultative Groups on International Agricultural Research (CGIAR), Desert Margins Programme (DMP) in West and Central Africa (WCA) and Commonwealth of Learning. The South Asian partners are ICAR, CRIDA, B.R. Ambedkar Open University, IGNOU, Maharastra Knowledge Corporation Limited (MKCL), MSSRF, MANAGE, IIT Mumbai, Yashwantrao Chavan Maharastra Open University, Mission 2007, India and National Institute of Hydrology (ICRISAT, 2006).

VASAT has developed a number of modules for the rural learner who has not had much of classroom exposure. These modules are designed using standard principles of open, non-formal learning with emphasis on re-usability of content at various levels (Balaji, 2006). In India VASAT has established a pilot information hub with low cost connectivity to the Internet in Addakal mandal, Andhra Pradesh in partnership with the Andarsha Welfare Society. A 4500-member federation of micro credit societies of rural women uses the hub for their information needs.

**4.3 Virtual University for Agricultural Trade – Kerala. www.vuat.org.**

Virtual University for Agricultural Trade, Kerala is a project of the department of agriculture, Kerala State, coordinated by the Kerala Agricultural University and Indian Institute of Information Technology and Management – Kerala (IITM-K). VUAT Kerala was established on the basis of the report of the commission under the chairmanship of Dr. M.S. Swaminathan appointed by the Government of Kerala for examining various WTO concerns in agriculture. The commission in its final report in 2002 recommended the establishment of a Virtual University on Agricultural Trade as a 21st century institution drawing strength from the ongoing ICT revolution in Kerala. The suggestion was to establish a Virtual University on a hub and spokes model with the hub at the Kerala Agricultural University headquarters and the spokes being located in every district. The hub and spokes can be linked to Television channels and community radio so that the relevant information reaches every farm household in the state.

The main objective of the Virtual University on Agricultural Trade is to enable farmers achieve higher income and prosperity through productivity improvement, quality enhancement, value addition and farmer friendly marketing of produce (Mohandas and Madhavan, 2004). It also aims at building up a sustainable agricultural trade security system and generation of data base management systems on trade in agriculture. It will also function as a decision support system to the Government, trade and farmers. Short term courses on specific aspects of trade and IPR in agriculture under the WTO regime within the framework of a virtual college will also be offered from this Virtual University for Agricultural Trade.

The network resources employed for the VUAT include the Virtual Academy for the Semi-Arid Tropics (VASAT), ICRISAT, Hyderabad, MSSRF -Tata National Virtual Academy for Food Security and Rural Prosperity, Mission, 2007: National Alliance for Every Village a Knowledge Centre, KISSAN Network System of Government of Kerala, Agri-Data Centre of IIITM-K, Commodity Boards and ICAR Network System. Farm advisory service for the farmers is performed by the nodal centre at the KAU headquarters making use of the expertise of the scientists in various fields of agriculture with the data dissemination facility being provided by the IIITM-K.

### 4.4 Virtual University for Agrarian Prosperity– Maharastra http://agri.mah.nic.in.

Virtual University for Agrarian Prosperity in Maharastra was established on the basis of the recommendations of an expert committee under the Chairmanship of Dr. M.S. Swaminathan. This project on a pilot basis was initiated in the villages of Baramati and Khed tahsils of Pune district in 2003. WiLL technology was used to provide the connectivity. Farmer group of 50 in each village is engaged in gaining the agriculture related information from the KIOSKS. Multi-media based training CDs are being used to train the farmers on various aspects of agriculture. Krishi Vigyan Kendra, Baramati and NRC Onion, Rajgurunagar are working as online consultants and reply farmer queries by E-mail or Net-meeting. From the experiences gained from the pilot project, later it was decided to expand the project to the entire state of Maharastra. The project report was prepared by the Maharastra Knowledge Corporation, Pune and Maharastra Council of Agricultural Research and Education, Pune is working as the central hub. Establishment of village/market information centres and farmers' literacy in IT are some of the additional schemes which are initiated to enhance the impact of this virtual University.

### 4.5 ITC e Choupal www.echoupal.com.

Indian Tobacco Company's (ITC) 'e-Choupal' initiative is the largest transformational model of ICT based intervention by a corporate entity in rural India. The Company won the prestigious Development Gateway Award (previously known as Petersberg prize) 2005 for this path breaking experiment. The programme empowers 3.5 million farmers in 3,3000 villages across 7 states through 5500 e-Choupal installations. The objective of the e-Choupal initiative is to transform the Indian farmer in to a progressive knowledge seeking netizen. e-Choupal delivers real time information and customized knowledge to improve farmers decision making ability thereby better aligning farm output to market demands, securing better quality, productivity and improved price discovery. The model builds aggregate demand in the nature of a virtual producers' cooperative, in the process facilitating access to higher quality farm inputs at lower costs for the farmer. The e-Choupal model eliminates middlemen and multiple handling, thereby reducing marketing costs. From the present

33,000 villages, the initiative plans to cover 100000 villages or 1/6$^{th}$ of rural India in the next one decade creating more than one crore e-farmers.

Indian Tobacco Company's e-extension revolution began with the Soya growers in the villages of Madhya Pradesh. Farmers through internet kiosks in the village can log on to e-Choupal website and order best quality inputs and access information on latest farming practices and market prices for their crops at home and abroad. In the first season of e-Choupal operations, the farmers sold 50000 tonnes of their produce through internet which has been doubled since then. The e-Choupal has linked wheat farmers to remunerative markets by helping them to grade their produce and customize their produce to the right consumer segments. The e-Choupal initiative empowered the aqua farmers in tackling various risks associated with aqua farming. It also equipped the coffee planters in India with appropriate knowledge base and risk management tools. The latest coffee prices posted on commodity exchanges like CSCE in New York and LIFE in London are available in e-choupal.com. The NCF (2006) in its final report has recommended the Union Government to replicate the e-Choupal model of ITC by establishing Gyan Choupals in every village in the country.

### 4.6 FRIENDS, Information Kerala Mission, Akshaya and e-Krishi

FRIENDS and IKM projects implemented in Kerala represent two unorthodox approaches to ICT application that promise radical change in the experience of governance for rural people (Aruna Sundararajan, 2005). FRIENDS (Fast, Reliable, Instant, Efficient, Network for Disbursement of Services) Centres are single window IT enabled front end facilities where citizen can remit payments to Government and public utilities and access basic public services at one point. FRIENDS centres provide the convenience of interacting with a single agency instead of multiple departments even on holidays and outside office hours. The IKM (Information Kerala Mission) was implemented for re-engineering of all key processes in local self government institutions followed by comprehensive automation of finance, personnel, planning, welfare and developmental functions. The first pilot project of IKM was implemented in Vellanad Panchayath in Thiruvananthapuram district of Kerala State.

Akshaya, Kerala's pioneering ICT dissemination initiative was launched in the northern district of Malappuram and later extended to the whole of the state aimed at universalizing ICT access and skill development in the state. The project has proposed

the establishment of an extensive network of public ICT Kiosks across Kerala as self employment ventures to address the issue of access, a mass e-literacy campaign to address the issue of skill development and a major content creation initiative to provide relevant content. One centre in every two to three kilometers will be established to cover 1500-2000 families on an average. The e-literacy programme would cover at least one member from each family. Each Akshaya Kiosk would have 5-10 computers with Internet access and atleast one trained person to manage the Kiosk.

e-Krishi is a Web based pilot project in Malappuram district of Kerala state with the participation of the existing Akshaya e-Kendra entrepreneurs.

The facilities and resources of Akshaya e-Kendras in terms of computers, printers, scanners, camera, etc. and intranet/internet connectivity, already established throughout Malappuram District (about 550 e-Kendras) will be leveraged to reach the masses of farming community and other stakeholders in agricultural sector. Web based platforms will be used in creating a virtual services gateway for all the participating members. The vision of the project is to establish a connected farmers community throughout Kerala who have access to information on market demand, prices, good agricultural practices, quality agricultural inputs supported by a technology enabled robust transaction platform that support all their off line activities. The Akshaya e-Krishi programme is supported by UNDP, ICTD, NISG (National Institute for Smart Government), NSEAP (National Spot Exchange for Agricultural Produce) and MCX (Multi-Commodity Exchange).

### 4.7 KISSAN System of Kerala Government

Karshaka Information Systems Services and Networking (KISSAN) is an innovative web based project of the department of agriculture, Government of Kerala aiming at deploying and commissioning information systems and networking that helps empowering all the stakeholders in agriculture through the five fundamental rights of knowledge management in the agricultural domain: Right Information to the Right Person(s) at the Right Time in the Right Place(s) and in the Right Context. The objective of the project is to provide an effective knowledge management and smart information dissemination system that provide linkage among farmers, public research institutions, administrative and private entrepreneurs to share the information and

knowledge. Kissan is developed and maintained by a team of experts from information technology, agriculture, research scientists and visual media. The IT support is provided by the Indian Institute of Technology and Management – Kerala (IIITM-K).

### 4.8 National Alliance for Mission 2007: Every Village a Knowledge Centre

The Information Village Project of MSSRF has evolved in to a National Alliance for Mission 2007: Every Village a Knowledge Centre. MSSRF conducted a Policy Makers Workshop on October 8 and 9, 2003. The need for developing a master plan as well as a business plan for extending the benefits of ICT to all the 600000 villages in India by 2007, which marks the both anniversary of independence emerged strongly at the workshop. Based on the decision MSSRF, One World South Asia and NASSCOM Foundation initiated a National Alliance for Mission 2007 with an initial alliance of 80 partners which was later expanded to more than 150 members. The basic objective of the Alliance was to spread the rural knowledge centre movement. The Alliance has a Chairperson, Secretary General, Secretaries and four task forces for connectivity, content, management of knowledge centres and resources. In the Union budget for 2005-2006, the Finance Minister supported the Mission and provided Rs.100 crore to be disbursed by NABARD for VKCs.

A cadre of rural knowledge workers from across the country are trained to create a stake in local ownership and management. Starting with a set of Master Trainers, the network was later widened to cover a large group in an expanding scale to create large number of knowledge managers in rural areas. This grass root level workers are elected as fellows of the Jamsetji Tata National Virtual Academy for Rural Prosperity. The aim is to select one million fellows by August 2010.

### 4.9 One World South Asia – Bridging Digital Divide

The aim of One World South Asia is to bridge the digital divide with the help of ICT. It has a number of initiatives like the Open Knowledge Network and pro-poor ICT advocacy. OKN represents an attempt to join the dots, in order to increase capacity and impact. It is visualized as a flexible frame work to link information initiatives among marginalized communities through shared standards and values for

local content, local people and local languages. It helps to share local knowledge in local languages on important subjects such as health, agriculture and education.

OKN is an initiative of the DOT Force, the Digital Opportunity Task Force set up by the G8 heads of States to make a decisive contribution to bridge the digital divide. OKN has been adopted by the UN ICT Task Force. One World South Asia forges strategic alliances with like minded organisations so that the potential of ICT can be utilized for bridging digital divide and benefiting those who are marginalized in the society.
**http://southasia.oneworld.net.**

### 4.10 N – Logue www.n-logue.co.in.

N-Logue was initiated in 2001 to fulfill the need for Internet and Voice Services in every under served small town and village in India. It was launched by the Telecommunications and Computer Networks (TeNeT) Group of IIT Madras. It is employing a low cost technology suited to rural India. N-Logue has developed a three tiered business model. Where the fibre backbone ends, n-Logue identifies partners with a Local Service Provider (LSP) who assists in setting up the infrastructure that provides wireless connectivity to the surrounding villages. These LSPs find subscribers, provide services and collect payments.N-Logue with its LSPs recruits and trains local entrepreneurs who set up information kiosks at village level. The Kiosks offer a variety of services like agriculture, health, education, e-mail, photo studio and entertainment.

### 4.11 Community Information Centres www.cic.nic.in.

Community Information Centres (CIC) project is jointly sponsored by the Department of Information Technology (DIT) under the Ministry of Communications and Information Technology (MCIT), National Informatics Centre (NIC) and the State Governments of the North Eastern States. Under the project, Community Information Centres with the state of the art computer communication infrastructure have been set up in the blocks of North Eastern States of Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. Each CIC has two CIC operators for
managing the centres and providing services to the public. Basic services provided by CICs include IT education and training, Internet access, e-mail, information dissemination, entertainment and news.

### 4.12 TARA kendra www.TARAhaat.com

TARAhaat is a social enterprise dedicated to bridging the digital divide that exists between rural communities and the mainstream economy. Its purpose is to provide villagers, particularly the youth, with access to information and livelihood opportunities comparable to those available in urban areas. The project is operated by maintaining a rich portal with information carefully tailored to meet local needs and managing a network of franchised telecentres (TARA kendras). The initial TARA kendras are located in the rural areas of Punjab, Haryana, MP and UP. The network of TARA Kendras is being expanded systematically through these states and in to other parts of the country.

### 4.13 ISRO Village Resource Centres

The vision of the ISRO Village Resource Centre is to 'create and implement a sustainable, scalable, space technology supported community infrastructure towards catalyzing the transformation of rural India. Village Resource Centres provide geo-spatial information and services like non-formal education and health care to the women and men of the rural areas. Spatial information connects every citizen with his/her 'geographical' identities and national resources – their native ecosystem, and brings in the principles of associations and co-existence in their original forms.

Through the use of broad band system, telephone, fax and Internet, the Village Resource Centre operates on the concept of single window delivery of citizen centric services. They concentrate on the localization and contextualisation of services. The service provided by the Village Resource Centres include health, education, weather, knowledge, commerce, e-Governance, entitlements, spatial information and disaster management support.

### 4.14 TATA Kisan Kendra (TKK)

This is a private initiative of Tata Chemicals Limited. The project has been successfully replicated in the States of Uttar Pradesh, Haryana and Punjab. The objective of the project is to provide the farmers with infrastructure support,

operational supports, co-ordination and control of farming activities and strategic support. The project promotes the concept of precision farming. TKK's extension services are remote-sensing technology to analyze soil, inform about crop health, pest attacks and coverage of various crops predicting the final output. The information network of TKK helps farmers to adapt quickly to changing situations. The TKK network runs crop clinics where agronomists use computers to access information from geographic information system (GIS) and advice farmers on what to grow, where and when to grow it and how much nutrient to apply.

### 4.15 Mahindra Krishivihar (www.krishivihar.com)

Mahindra Shubhlabh Service Limited (MSSL), a fully owned subsidiary of Mahindra and Mahindra has developed the concept of OSS (one-stop-shop). It has been named Krishi Vihar in AP. The project is being implemented in AP, Rajasthan, Tamilnadu and rice growing tracts of Karnataka. The project has three components viz., agri-input sale (fertilizer, pesticide and seed), equipment hiring (combine harvester) and farm consultancy. Apart from this they are giving internet facilities to the farmers through the website www.krishivihar.com. They are also providing door-step service to the farmers in these states.

## 5. Extent of farmer participation in e-extension programmes

According to Paul (1980) participation refers to an active process whereby beneficiaries influence the direction & execution of development projects rather than merely receive a share of project benefits.

Yadav (1980) defined people's participation as involvement of the people in the development process voluntarily and willingly and such participation cannot be compelled

Jose (1986) Defined participation as a social experience shared by individuals and groups who live in definite economic and social relations to each other in a society.

According to Nair and White (1987) participation is a process of enabling / empowering rural people to manage their own development .Further ,they reported that people must be able to educate themselves through developing thinking ,acting and

problem solving abilities .Participation will give individuals a sense of power which will increase their control over the environment and enable them to shape their own destiny. Participation in its most developed form is self management.

Mishra (1993) defined participation as a process in which individuals and families assume responsibility for their own development .Because they better know their own situations and were motivated to solve their common problems.

Jose (1994) Defined participation as process of taking part, having a self / being able to influence the design, implementation or the outcome of a development project

According to Vidya (1997), participation is a mechanism where people express themselves and act with mutual responsibility to promote a mutual set of interest.

**Types of participation**

Warner (1965) stated that participation can take place in many forms like affiliation, attendance at the meetings, taking part in the programmes and activities of the meeting, performing special jobs or assignments for the group, contributing financially, exercising leadership responsibilities and working on projects.

Mary (1983) identified six levels of responsibility in participation viz.,Participation in response to an order or to force, voluntary participation stimulated by reward, voluntary participation prompted by awareness, participation by giving suggestions and making criticism aimed at the improvement of an activity, participation by taking participation by creativity .

**Farmer participation in e-extension programmes**

Robert (1987) focused on the factors that associated with participation of young farmers in agricultural extension education activities in lowa. He found that young farm operators were not active in educational programs that were primarily designed to hold them in making farm management design

According to Benninger (1991) Farmer participation may be described as taking part in the events taking place in a community or a larger area. Farmer participation can

take both active and passive forms such as :being present as an observe, taking part in discussion and contributing information as well as asking questions, sharing knowledge and skill, transferring knowledge and skill, contributing labour, assisting in the work, contributing financially and contributing assets such as land, water, bullock and other things

Farmer Participation is the active participation and partnership of farmers and other key stake holders in the process of design, planning, implementing, monitoring and evaluating research. Okali et al (1994).

Narayan (1995) Opined that farmer participation can be brought in several ways –directly through participation in decision making, indirectly through leader or through representative of committees or boards.

Srivastava and et al (1998) discussed the drainage works in the Chambal Command Area, India, the experiences of farmer involvement in the development of the drainage works and the need for farmers to participate in drainage management and the development of proper legislation requirements. The objective was to involve farmers in micro-level drainage works through the On Farm Development Programme, especially land shaping, realignment of water-courses and farm boundaries, and construction of surface drains. Farmers participated in the installation of subsurface drainage (SSD) systems for the Rajasthan Agriculture Research and Development project. This involved: awareness campaigns; village level meetings; demonstration days; and visits to research sites.

A study by Chandran et al (2001) on farmers' participation through Water Users' Association under Command Area Development Programme (CADA) in Malampuzha Irrigation Project, Kerala. It has shown that only about 30 percent of participatory activities envisaged for WUAs are being undertaken by farmers and hence participation is low. Most of the activities undertaken are related to irrigation water management. Activities such as consolidation of landholdings, group farming, adoption of suitable cropping pattern etc, are not carried out by most of the WUAs.

Freeman (2001) stated that farmer participation can help to improve the effectiveness of technology development, raise adoption rates and increase the pay off to agricultural research. In the study he found differences between the various

approaches in diagnostics activities, planning of experiments, assessment of results and strengthening of farmers capacity to conduct their own experiments

Vilas Boas and Goldey (2001) described the nature of participation in farmer's organizations and they attempted to explain why farmers prefer to carry out production and marketing activities by themselves. They also examined the implications of the findings for rural extension and related services. The major implication of the findings as to putting more emphasis on providing knowledge to local people in the technical aspects of managing collective business.

Meera (2002) pointed out that generating awareness among young and middle aged farmers about the availability of e-extension services is the first step to be considered to increase farmers' participation in ICT initiatives

Nagabhushanam (2003) found that farmer's participation in a watershed programme had the highest contribution towards sustainability. For marginal farmers, age and extension participation were the major determinants of sustainability. Likewise, participation in a watershed programme, extension participation and risk orientation were the major determinants of sustainability among small farmers.

Savitha and Reddy (2003) studied the extent of farmers' participation, and their motives for participating, in rythu bazaars (farmers' markets) in Ranga Reddy district, Andhra Pradesh. The findings revealed that farmers' participation in the bazaars was high due to the elimination of the middlemen, the remunerative selling price, and the immediate cash after sale.

Chandra and Checkicherry (2004) Reported that farmer participation is critical to improve on farm water management and crop productivity under the command area development program.

**6. Socio economic factors influencing farmer's participation in e-extension programme**
**Age**

Khandekar and Mathur (1975) reported that age was negatively related to perceived effectiveness of the magazine which was assessed using the criteria such as suitability of the content, length, usefulness, reading ease and timeliness.

Siddharamaiah et al (1976) in their study conducted in the villages of Karnataka found that 58.33 percent of newspaper subscribers wee below the age of 30 years, which indicated that most of the newspaper subscribers belonged to younger age group.

Deepali (1979) found that there was significant relationship between age and participation of rural farmers in agriculture.

Jayaram (1980) in his study on the evaluation of 'Krishivignana', a quarterly farm journal in Kannada language revealed that younger members of the community have benefited more by reading 'Krishivignana'. Nehru (1980) reported that age was not significantly related to the communication behaviour of listeners of farm broadcasts.

Miah and Halim (1994) found out that one fourth (25.20 per cent) of the farmer readers were young (age up to 35 years), 35.20 per cent middle aged and the rest being old age (51 years and above).

Babu (2005) in his study Comparative analysis of e readiness and perception of ICT beneficiaries found that majority(77.5 percent) of akshaya beneficiaries are young and rest 22.5 percent are middle aged, none are from old.

Sarala (2008) found that there was negative significant relationship between age and computer use efficiency. Which mean young age groups are more effective in computer use.

**Educational status**

As quoted by Bhaskaran (1979), better response of knowledge gain was seen among farmers with high level of education.

Deepali (1979) found that illiterate group were in high participation score range in contrast to other group. She also observed that low family education profile group of respondents were in high participation score range.

Jayaram (1980) reported that the educated farmers have benefited more by reading 'Krishivignana', a quarterly farm journal in Kannada.

Joshi and Bhatt (1992) observed that educational status of the reader farmers had positive and significant relationship with their reading habits.

Singh and Tyagi (1993) found that education was positively and significantly correlated with the communication behaviour of farmers.

Similarly Selavaraj (1997) and Vishwanathan (1997) reported positive relationship between education and knowledge gain of farmer viewing video programs on farm information.

Sarala (2008) in her study conducted in Malapuram District of Kerala found that perception and computer use efficiency had non significant and significant relationship respectively with respect to education status of agriculture officers. She also mentioned that computer use efficiency has influenced by quality of education.

**Income**

Lionberger (1971) found that the level of income of farmers in Counties of Missouri had some influence in using newspaper and farm journals as the most important source of information by them.

Oliver (1971) observed that the farm income of the respondents had not significantly influenced the reading of agricultural news articles published in newspaper 'Dinamani'. But farmers' income was found to have significant influence on the learning of package of practices of new varieties of paddy through agricultural news articles.

Balachandranath (1998) found that 35.83 per cent of farmer readers of agricultural column of newspapers were having annual income from main occupation and they belonged to the Rs.1000–2000 income category. The farmer readers who belonged to the category of Rs.5001-10000 were 13.83 per cent and those who had income above

Rs.10000 were only 7.50 per cent. He also found that annual income had no relationship with the reading behaviour of the farmers.

Babu (2005) observed that high income groups had more perception and extent of participation in the case of Kissan Kerala Programme. At the same time in the case of akshaya beneficiaries there was no much relationship for income with perception and extent of participation.

**Computer use efficiency**

Sarala (2008) found that four fifth of agriculture officers are with low to moderate level of efficiency in computer usage because their work related to the Krishibhavan is voluminous.

**Training undergone**

Anoop (2003) mentioned in his study that most of the pig farmers were untrained. This might be due to fact that training for pig farmers is not so common in training centre as compared to training in other sector.

Sarala (2008) found that two third of respondents have not undergone any training in computer mediated communication.

**Cosmopoliteness**

Murthy and Singh (1972) observed a positive and significant correlation between cosmopoliteness and communication behaviour of farmers. Murthy and Singh (1972) reported that the more cosmopolite an individual, the more was the communication behaviour.

Ambastha and Singh (1975) found a positive and significant correlation between cosmopoliteness and information input and output indices of farmers.

Vijayaraghavan and Subramanian (1981) found that farmer's cosmopoliteness had significant and positive correlation with information input and output and it had significant association with information processing by farmers.

Subramanian (1986) identified a positive association of cosmopoliteness of farmer respondents with their communication behaviour.

Balachandranath (1998) observed that majority of the farmer respondents were visiting the nearest city once in a week. He found that Cosmopoliteness had no significant relationship with reading behaviour of the farmers.

Babu (2005) found that in case of farmers e readiness decreased but perception and extent of participation increased along with Cosmopoliteness.

**Media exposure**

Thamban *et al.* (1996) observed that the mass media exposure of the farmers was positively and significantly associated with the knowledge of improved cultivation practices of coconut.

Rahman *et al.* (1997) in a cross cultural study on the communication behaviour of farmers in Japan and Bangladesh found that Japanese farmers had much higher exposure to newspapers and television compared to the Bangladeshi farmers.

Balachandranath (1998) reported that 99.17 per cent of farmer readers were reading newspapers daily. Those who respond to radio and television on all days were 58.33 per cent and 56.66 per cent respectively. He found no association between mass media exposure of farmers and their reading behaviour.

Joseph (2004) in his study on the analysis of mass media exposure of farmers in Kerala found that majority (61 percent) of the farmers had medium level of exposure to mass media and, 2 percent and 17 percent had high and low exposure to mass media respectively ,out of 300 farmers selected for study. He revealed that, owing to high

level of literacy in Kerala, it was found that news paper was an important channel for disseminating information .Hence most of the respondents farmers were reading newspaper on all days.

**Attitudes towards ICT**

Rai (1965) observed that adopters of the new ideas had favorable attitude towards government programme and also said that greater the number of information source sought, greater was extent of adoption.

Padmanabhan (1995) in a study conducted amoung agricultural labourers observed a significant positive relationship between attitude of agricultural labour towards scientific agriculture and their efficiency

Balachandranath (1998) indicated that there was positive and significant relationship between information needs on field's agriculture with attitude towards scientific agriculture practices

Babu (2005) found that in case of farmer respondents there is no visible relationship between attitude and dependent variables. He also quoted that reason like low e-learning, lack of exposure to modern technologies etc are causes for such an incident.

**Awareness about ICT**

Anonymous (2002) revealed that usage of Gyandoot is very low and hours of the rural poor generally have minimal interactions with government institutions and are not aware and not making much use of gyandoot and its services. According to the ODI survey, only 31 percent of poor people are aware of Gyandoot, while among the rich awareness levels jumped to 77 percent. The ODI survey also found that out of 221 poor people surveyed, only 9 (4 percent) used Gyandoot. And none of the 16 daily wage laborers surveyed by CEG-IIMA were aware of Gyandoot. Most telekiosks, thus, end up reaching out mostly to the middle and upper rural classes, not to poor laborers or landless farmers.

Babu (2005) in his study on comparative analysis of e-readiness and perception of ICT found that farmers are having direct and positive relationship between awareness about ICTS of respondent, e- readiness, extent of participation and perception

**Information source utilization**

Saradamani (1983) opined that women were aware of radio programs for farmers and listened to them. But they would follow the suggestions only if they felt they were beneficial to them

Singh and Mishra (2002) reported that newspapers are utilized by large percentage of farm families, even if T.V was found to be maximum utilized mass media amoung at the other media.

Ahire and Shenoy (2005) found that newspaper, television and agricultural magazines were frequently used mass media channels by the mango growers to seek the information regarding mango production technologies.

Suresh (2007) mentioned in his study that information source utilization was having a significant relationship of both newspaper and farm magazines .And he also mentioned that the more the information source utilization more will be the information relevance.

Sarala (2008) in her study on perception of agricultural officers and selected progressive farmers on computer mediated communication- reported that usage of information sources for agriculture officers is moderate to high .She also reported that KAU has major role to play in development of agricultural information systems suited to farm field.

**7. Preferences of farmers towards different content formats**

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

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

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

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

Word (2002) mentioned that website users have the power to go where they please from information chunk to audio file ,to database, to graphic, to text summary ,to video, to archive', and then either back again or off to an external site to consult primary sources and original documentation.

Indrani (2007) used optimal audio-visual representation for illustrating concepts for illiterate and semi-literate users of computers. She presented to 200 illiterate subjects each of 13 different health symptoms in one representation randomly selected among the following ten: text, static drawings, static photographs, hand-drawn animations, and video, each with and without voice annotation. The goal was to see how comprehensible these representation types were for an illiterate audience. The main results found that voice annotation generally helps in speed of comprehension, but bimodal audio-visual information can be confusing for the target population;

According to Dube (2000) there are several story telling forms or formats which are commonly used by websites.

1. Print plus

This is the basic form of online journalism, used in website. The form is built around a article, often one that was specifically written for online medium, such as wire newspaper story. Other elements such as photos, links and video are then added to the

page containing story. This format is primarily a way to repackage news produced by traditional media and does not take full advantage of the internet medium.

2. Clickable interactives

These are simply interactive versions of a traditional newspaper and TV graphics, used to provide information to supplement a story .Generally they combine linear and non-linear story telling giving the user choices but guiding him or her along a path. Animation, audio and video can be incorporated. It is very time consuming to produce.

3. Slide shows

These are more than just an easy way to present multiple images about a subject .The form can be used to tell stories all by itself, by combining descriptive photos and using the caption field to convey additional information.

4. Audio stories

The use of audio can be incredible when one is able to use sounds that cannot be described in words. Here along with the sound file, speaker's photo should also be linked with text.

5. Narrated slide shows

This combines sideshows, audio, and the video files to create powerful stories. The producer selects a series of photos and audio sound bites that complement each other.
As the images appear one after the other, the corresponding audio clips play automatically.

6. Animated stories

Stories can be told entirely through animation when photographs or video clips ate not available. However over use of it on web diverts the user's attention.

7. Interactive webcasts

Links to related stories and other materials like chats and polls can be provided with streaming video, making the experience richer than mere webcast that is TV on the web.

8. Multimedia Interactives

In this they combine various formats to create new package .This sophisticated way of doing this is to use flash information technology which integrates text, clickable graphics, audio, photos and video and sometimes even polls or quizzes.

**8. Information Needs of farmers using E-extension programmes**

As found out by Meera (2002), the main focus of e-extension in agriculture is meeting the farmers' needs for information.

Meera (2002) also opined that in drought-prone and less endowed areas, future ICT initiatives should provide information services such as facilitation of access to land records, question-and-answer services, information on rural development programmes, weather forecasting, marketing information, best package of practices for dry land agriculture, information on crop insurance and post-harvest technology. In the case of well endowed areas where cooperative setups are prevalent, ICT initiatives should focus on providing services such as question and answer sessions, cooperative-related accounting methods, market information, input prices/availability and early warning systems for disease and pest problems.

Further, Meera (2002) suggested that where commercial farmers are dominant, as in the *ikisan* area, e-extension services should provide early warning of disease and pest problems, question-and-answer services, information on cropping systems and planning, best and latest packages of practices for commercial crops, weather forecasting, soil testing and sampling, post-harvest technology, input prices/availability, farm business information and crop insurance.

Anonymous (2003a) reported that Information Needs Assessment Model (INAM) aims at identifying the information needs of the rural communities. INAM comprises a set of activities, which ensure that the information needs emerging as a result are based on ground realities and past experiences. The set of activities include theme analysis, existing community information systems analysis, profile analysis and prioritization of information needs.

Dhameja and Meduri (2003), stated that Information needs are to be treated as a 'key resource' which facilitates sharing, exchanging retaining as well as managing the knowledge input properly. The technological infrastructure is significant, but more important is the information and human systems that are critical to its success. The successes of ICT initiatives depend on the government working with communities to define and meet their specific development needs. Also, there is need for an integrated approach based on the real information needs of the potential users, and not on a mere 'technical fix.' Efforts need to be made to link isolated islands of information within a country to the information superhighway to enrich the availability and use of local content.

Khairnar (2003) noticed that the information needs of farmers across the country are varied and the following needs across the three states in select districts of Uttaranchal, Uttar Pradesh and Maharashtra: Farmers need to know: what to grow? When to grow? How to grow more? How to store & preserve? When to sell? and What price to sell at?

**9. Problems in using ICT**

Cecchini, (2003) found that in rural India, direct ownership and use of ICT for instance though a PC with Internet access-applies only to a very minimal fraction of the population. Although the availability of content in local languages and the use of graphic and voice interfaces can make e-government applications more accessible to poor people, illiteracy and low levels of education are powerful obstacles to the use of computers and other ICT tools.

Cecchini and Raina (2003) revealed that setting up an e-government project in a poor rural area is a huge challenge from the technological point of view. Electric power is a big problem in Dhar, as almost six hours load shedding is a daily norm, with the breakdown at times lasting for three to four days. In the case of Gyandoot, for instance, it is the four blocks more distant from the district capital-out of a total of 13 blocks-that do not have telekiosks or are experiencing most problems. They also revealed that Gyandoot offers about twenty services. However, only a handful of them are requested and of those in demand included a few-like grievance redressal, applications for income, domicile and caste certificates or information on the below

poverty line. They also state that although the impact of Gyandoot is very limited, the few users are quite satisfied about its services.

IIMA (2003) says the low number of women users can indeed be attributed to the social structure of Dhar, which confines women to their homes and does not encourage their participation in business or public affairs.

Maru (2003) pointed out that from the Indian case, the infrastructure/network development approach, especially for the use of the internet and digital technologies, is lopsided. Without useful and relevant content, most of the government and Public /sector initiatives, even if the network is established, cannot be sustained. The expectations of all initiatives, especially as regards to the timeline, are too high.

Philip (2006) mentioned that majority of the farmers expressed small font size used in the web content as their problem. Dull text colour (87.5%),less number of photos (70.83%) ,difficulty in handling of computer mouse (79.16%),slow down loading and uploading of photos/files(82.5%) and initial operation of computer are in english (35%) were the other problems expressed by farmers.
This would be conclude that due to the severity of problem their was a farmers dissatisfaction on farmers preference on computer. So by accomplishing all this difficulties it can be made proof for better farmer participation and learning in computer technology.

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# *Materials and Methods*

# CHAPTER -3
# RESEARCH METHODOLOGY

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

3.1 Research design
3.2 Locale of study
3.3 Sampling procedure
3.4 Selection, operationalisation and measurement of variables
3.5 Procedure involved in data collection
3.6 Statistical tools employed

## 3.1 RESEARCH DESIGN

According to Kerlinger (1994) expost facto research is a systematic, empirical enquiry in which researcher does not have direct control over independent variables, because their manifestations have already occurred or because they are inherently not manipulable. Information technology and its application in agriculture is an emerging topic. The ICT sector in Karnataka state is in its early phases of growth. There are only few formal studies regarding aspects of ICT and agriculture development in Karnataka. Hence both survey and exploratory research designs were used for study.

## 3.2 LOCALE OF THE STUDY

The objectives of the study necessitated the selection of Hassan district in Karnataka as one of the locale of research for the following reasons.

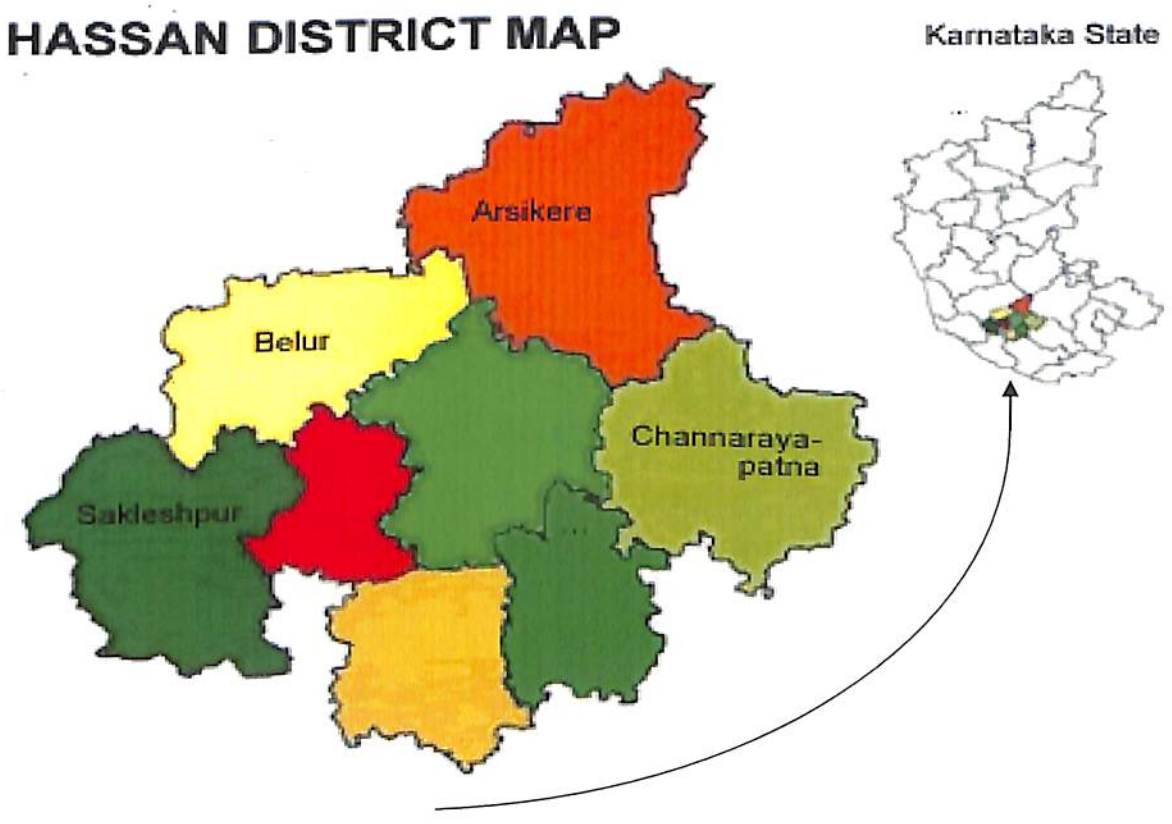


**Fig.1 Map of Hassan district in Karnataka showing locale of the study**

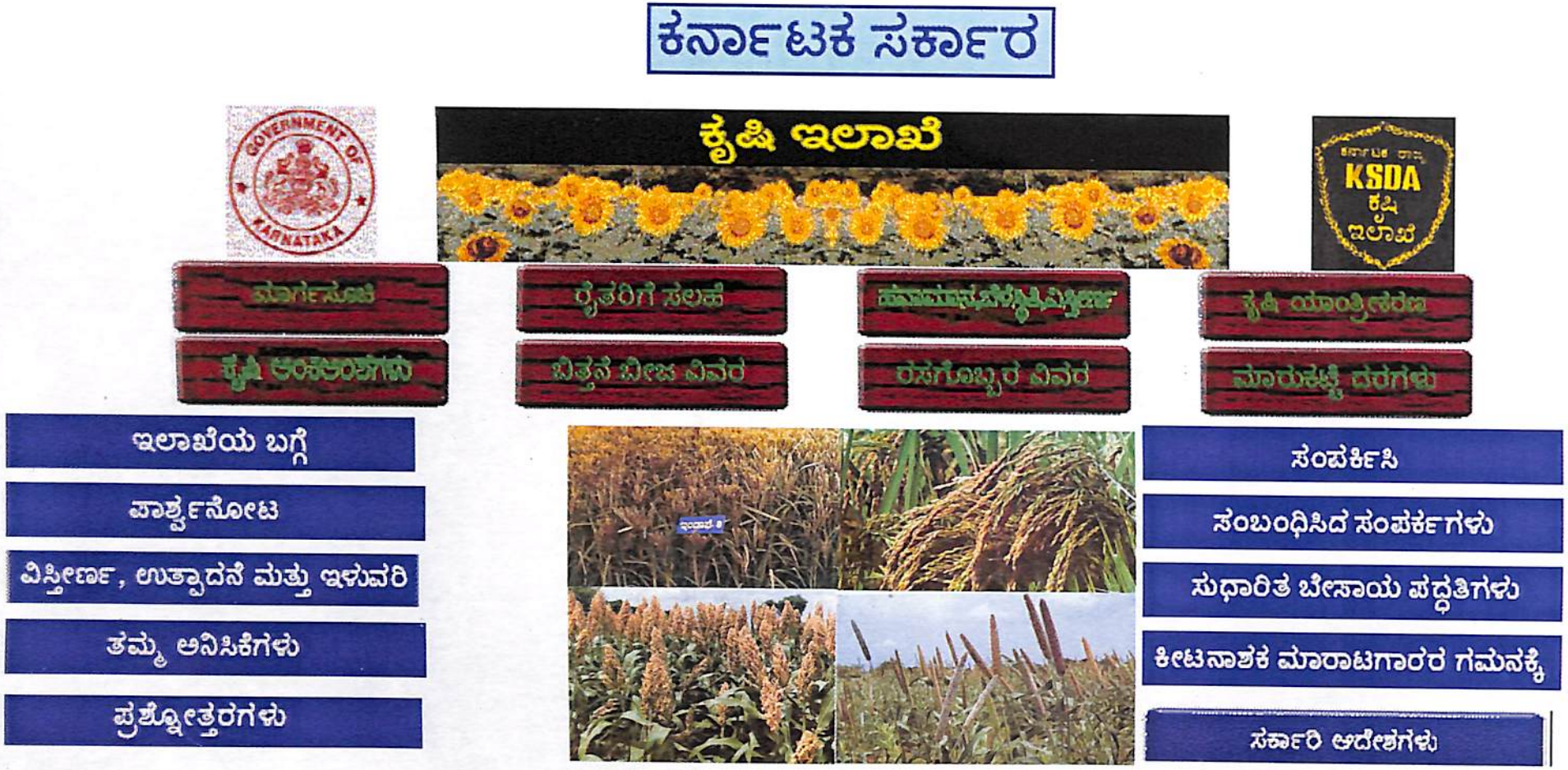


**Fig.2: Home page of raitamitra website**


ಕರ್ನಾಟಕ ಹೈಬ್ರಿಡ್ ಬತ್ತ – 2: ಮಾಧ್ಯಮಾವಧಿ

## ಭತ್ತ

ಭತ್ತವನು ನೀರಾವರಿ ಬೆಳೆಯನಾಗಿ ರಾಯಚೂರು ಮತ್ತು ಬಳ್ಳಾರಿ ಜಿಲ್ಲೆಗಳಲ್ಲಿ ಬೆಳೆಯುತ್ತಾರೆ. ಈ ಎರಡು ಜಿಲ್ಲೆಗಳಲ್ಲಿ ಇದನು ನಾಲೆ ನೀರಾವರಿಯಲ್ಲಿ ಬೆಳೆದರೆ, ಬೆಳಗಾಂವಿ ಮತ್ತು ವಿಜಾಪೂರ ಜಿಲ್ಲೆಗಳಲ್ಲಿ ಕೆರೆ ನೀರಾವರಿಯಲ್ಲಿ ಬೆಳೆಯುತ ್ತಾರೆ. ಈ ಭಾಗದಲ್ಲಿ ಭತ್ತವು ೬೧,೦೦೦ ಹೆಕ್ಟೇರ್ ಪ್ರದೇಶದಲ್ಲಿ ಆವರಿಸಿದೆ.

## ತಳಿಗಳು

**Fig.3 A content text plus picture format showing the package of practice of paddy**

| ಕಾಲ | ತಳಿಗಳು | ಅವಧಿ(ದಿನ) | ಕಾಳಿನ ಗುಣ |
|---|---|---|---|
| ಮುಂಗಾರಿ ಮತ್ತು ಬೇಸಿಗೆ | ಗಾಮಾ -೩೧೮ (ಅವಿನಾಶ) | ೧೩೫-೧೪೦ | ಮಧ್ಯಮ ದಪ್ಪ |
| | ಜಯ | ೧೪೦-೧೪೫ | ಉದ್ದ ದಪ್ಪ |
| | ವಾಣಿ | ೧೪೦-೧೪೫ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ಸೋನ | ೧೪೦-೧೪೫ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ಪ್ರಕಾಶ | ೧೪೫-೧೫೦ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ಐ.ಆರ್-೨೦ | ೧೩೦-೧೩೫ | ಮಧ್ಯಮ ಸಣ್ಣಗೆ |
| | ಪುಷ್ಟಾ | ೧೨೫-೧೩೦ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ಮಧು | ೧೨೦-೧೨೫ | ಮಧ್ಯಮ ಸಣ್ಣಗೆ |
| | ಮಂಗಳಾ | ೧೦೫-೧೧೫ | ಮಧ್ಯಮ ಸಣ್ಣಗೆ |
| | ಪ್ರಗತಿ | ೧೩೦-೧೩೫ | ಮಧ್ಯಮ ಸಣ್ಣಗೆ |
| | ಮಂಡ್ಯವಾಣಿ | ೧೩೦-೧೩೫ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ಸೋನಾ ಮಸೂರಿ | ೧೪೦-೧೪೫ | ಉದ್ದ ಸಣ್ಣಗೆ |
| | ತೆಲ್ಲ ಹಂಸ | ೧೨೦-೧೨೫ | ಉದ್ದ ಸಣ್ಣಗೆ |

## ಬಿತ್ತನೆ ಕಾಲ:

ಸಸಿಮಡಿಯಲ್ಲಿ ಬೀಜ ಬಿತ್ತಲು ಹಾಗೂ ಪೈರು ನಾಟಿ ಮಾಡಲು ಸರಿಯಾದ ಕಾಲಃ

| ಕಾಲ | ತಳಿಗಳೆ | ಸಸಿ ಮಡಿಯಲ್ಲಿ ಬಿತ್ತನೆ ಕಾಲ | ನಾಟಿ ನಾಡುವ ಕಾಲ |
|---|---|---|---|
| | ೧.ಜಯ, ಸೋನಾ. ವಾಣಿ ಮತ್ತು | | |

1. Hassan is a district having number of progressive farmers in plantation crops in Karnataka and the results of the study can be made use of in states like Kerala, where a large number of farmers are cultivating plantation crops .

2. The raitamitra e-extension programme of Karnataka was believed to have more usage in district of Hassan.

## 3.3 SAMPLING PROCEDURE

The study was conducted in Hassan district (Southern Transition Zone) of Karnataka state during the year 2006-2008.Hassan district consists of eight blocks out of which four different blocks were purposively selected for the study. In this selected blocks different hoblies were considered for study. Here the farm counseling centers called raitamitra are being set up at hobli level by Department of Agriculture. The details of all 120 farmers who participate in raitamitra program through this counseling center are considered to be respondents .The details of them were gathered from Personal interview and a list was prepared for each farmer, which served as the sampling frame. From the list so prepared, the respondents were selected following simple random sampling with proportionate allocation.

Accordingly 36 farmers were selected from Arsikere block and 20 farmers from Belur block and, 45 and 19 farmers were selected from Sakleshpura and Channarayapatna block respectively from Hassan district. Thus a sample of 120 farmers formed the sample of the study.

| Name of the blocks | No. of farmers selected randomly |
|---|---|
| Arsikere | 36 |
| Belur | 20 |
| Sakleshpura | 45 |
| Channarayapatna | 19 |
| Total | 120 |

## 3.4 SELECTION, OPERATIONALIZATION AND MEASUREMENT OF VARIABLES

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

### 3.4.1 Selection of variables

Based on review of relevant literature and discussion with experts, an exhaustive list of socio-economic characteristics was prepared *(Appendix 1)*. To know the relevancy of each of the variable, they were subjected to judges rating. Thirty extension scientists were chosen as judges and their responses were obtained on a five-point continuum viz., 'most important', 'more important', 'important', 'less important' and 'least important'.

The responses thus obtained were rated using frequency analysis to select the final variables. The selected variables with their frequencies are presented in *Appendix 11*.

Those Independent variables that emerged as most important in the relevancy rating were:

1. Age
2. Educational status
3. Annual income
4. Computer use efficiency
5. Trainings undergone
6. Cosmopoliteness
7. Media exposure
8. Awareness about ICT
9. Attitude towards ICT
10. Information source utilization.

3.4.1.1 Dependent variable

The selected dependent variable for the study is Extent of participation of farmers in e-extension program.

**3.4.1.1 Dependent variable**

**1. Extent of participation of farmers in the e-extension program of Raitamitra**

Extent of participation was operationally defined as the degree of involvement of rural people in e-extension program enabled rural development initiative. Extent of participation was measured by assessing how often they use raitamitra website. In this case a score- 0, 1, 2, 3, 4, and 5 were assigned to their extent of participation, making the maximum score that can be attained 5 and minimum 0.

The scale followed by Karthikeyan (1997) was adopted for the present study with some modifications.

| Frequency of Method | Score |
|---|---|
| Weekly | 5 |
| Fortnightly | 4 |
| Monthly | 3 |
| Occasionally | 2 |
| Seldom | 1 |
| Never | 0 |

**3.4.1.2 Operationalisation and measurement of independent variables/characteristics**

The selected 10 variables are operationalised and measured as follows. Here respondents are categorized into three groups based on mean and standard deviation (*Farmers who are above mean + standard deviation, those farmers in between mean-standard deviation and mean + standard deviation and who are below mean-standard deviation*)

### *3.4.1.2.1 Age*

Age of the respondent was operationally defined as the number of completed years of the respondent at the time of the study. The scale used by Simi (2005) was followed in the present study

Farmers are categorized into following three categories.

| | |
|---|---|
| Young | < 32 |
| Middle | 32-46 |
| Old | >46 |

### 3.4.1.2.2 Educational status

Educational status was operationally defined as the extent of literacy attained by the respondents. It was measured by adopting the scoring system followed in the socioeconomic scale of Trivedi (1963) with appropriate modifications

| **Education** | **Score** |
|---|---|
| Up to secondary school | **1** |
| Secondary school completed | **2** |
| Graduation and above | **3** |

### 3.4.1.2.3 Annual income

This refers to the total earnings of all the family members of the respondents in one year .This was obtained by adding the income of each member of the family for one year.

In present study procedure used in the socio-economic scale of Venkataramiah (1980) was adopted

| Sl No | Category | Score |
|---|---|---|
| 1 | Rs < 50000 | 1 |
| 2 | Rs 5000-25000 | 2 |
| 3 | Rs 25000-50000 | 3 |
| 4 | Rs 50000-1,00,000 | 4 |
| 5 | Rs 1,00,000 & above | 5 |

***3.4.1.2.4 computer use efficiency***

It was operationally defined as the extent of working knowledge that the farmers have in operating computer and internet use.

An arbitrary scale developed for this purpose was used to quantify the computer use efficiency. The scale consisted of nine statements. The range of score was from 1-9. The responses were collected by giving scores as below.

Positive response - 1
Negative response- 0

.

***3.4.1.2.5 Trainings undergone***

This was operationised as the number of training programmes attended by the farmers related to computer aspect

The scale developed by Parimala (2003) with appropriate modifications was followed for the present study. The scores assigned were

Trainings undergone

| | | | |
|---|---|---|---|
| Nil | -0 | Twice | -2 |
| Once | -1 | More than twice | -3 |

An additional score was assigned for each additional training.

| **Trainings undergone** | **No.** |
|---|---|
| Nil<br>Once | 0<br>1 |
| Twice | 2 |
| More than twice | 3 |

***3.4.1.2.6* Cosmopoliteness**

It is operationalised as the respondent's frequency and purpose of visit to the nearest city. This scale used by R.R. Chaudari et al (2007) was used with slight modification. The scoring procedure was as follows

| Frequency (score) | | | | | Purpose of the visit(score) | |
|---|---|---|---|---|---|---|
| Daily | 2-3times /week | once in a week | once in a fortnight | once in a month | Agriculture | Non agriculture |
| 5 | 4 | 3 | 2 | 1 | 1 | 1 |

The total score of the respondents was calculated by summing the scores of frequency and purpose of visit

### *3.4.1.2.7* **Media exposure**

This variable was operationalised as the extent of use of mass media such as newspaper, radio, TV, magazines, browsing internet and media forum.
The scale used by Ram & Jung (1990) with slight modifications was followed for the study.
The scale consists of six statements. The range of score was from 2-0.
Their extent of exposure tomass media was made into 3 categories namely, regular, occasional and never .The scoring procedure was as follows

| Sl No | Media | Regular (score) | Occasional (score) | Never (score) |
|---|---|---|---|---|
| 1 | Reading newspaper | 2 | 1 | 0 |
| 2. | Listening to radio | | | |
| 3. | Reading magazines | | | |
| 4. | Viewing TV program | | | |
| 5. | Browsing internet | | | |
| 6. | Media forums | | | |

### *3.4.1.2.8* **Awareness about ICT**

It was operationally defined as the level of awareness of respondents regarding various information communication technologies (ICTs). To asses the awareness about ICTs, Nine ICTs namely raitamitra, Krishi Marta Vahini, e-bhoomi, Kissan call centre, Expert system, video conferencing, Tele conferencing, Tele medicine project, Nemadi were listed in the form of a table and correspondingly three levels of

awareness namely Aware, Some What aware and Unaware were also listed. Respondents were asked to choose their levels of awareness about ICTs.
The scale developed by Babu (2005) was used for the study with slight modifications.
The scoring procedure followed is as follows

| SL NO | ICT | Aware | Somewhat aware | un aware |
|---|---|---|---|---|
| 1 | | **2** | **1** | **0** |

### *3.4.2.9* Attitudes towards ICT

The variable was operationlised as the positive or negative mental predisposition of respondents towards their ICTs .The respondent's attitude was measured using the following procedure. The scale developed by Babu (2005) was considered and adopted with appropriate modification. Here ten statements were selected and rated on a five point continuum namely strongly agree, agree, undecided, disagree and strongly disagree with scores of 5,4,3,2 and 1, respectively for positive statements and the reverse for negative statements. Respondents were asked to choose from this five point continuum. And the total score was their attitude score towards ICTs. The maximum possible score was 50 and minimum possible score was 10

| Sl No | Statements | SA | A | UD | DA | SDA |
|---|---|---|---|---|---|---|
| 1 | | **5** | **4** | **3** | **2** | **1** |

### *3.4.1.2.10* Information Source Utilization

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

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

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

| **Sources** | **Frequency** | | | **Extent of use of information** | | |
|---|---|---|---|---|---|---|
| | Regular | Occasional | Never | Adequate | Somewhat adequate | **N**ot Adequate |
| | 3 | 2 | 1 | 3 | 2 | 1 |

**System factors**

To asses the system factors of respondents, a list of 11 system variables like usefulness of information, location specific information ,simplicity of language, clarity, font type, quick access, visual content including photograph and video, layout and design, style of writing, opportunity of interactivity and provision of hyperlinks were given in tabular form . The respondent were asked to rate these system variables according to their interest associated with high level of participation on a five point continuum most important, more important, important, less important, least important with scores 5,4,3,2 and1, respectively

**Information needs**

To know about the information needs of farmers, a list of areas where farmers need information were given in a tabular form. The respondents were asked to rate their needs in these areas on a three point continuum viz; Most needed, Needed', 'Not Needed', with scores of, 3, 2 and 1, respectively

***Knowledge gain***

It refers to the extent of understanding and proficiency possessed by a farmer at the time of filling up the questionnaires, as evidenced from his/her responses to the set of questions prepared on the basis of items presented in the website

A teacher made knowledge test was adopted. One score was given for every correct answer and summing up of the scores gave the total knowledge score. The range of scores was from 0-7.

**Preferences of formats**

Preferences of formats were assessed using 9 statements. Respondents were asked to choose from a three point continuum 'Most preferred', 'preferred' and 'Least preferred' and assigned with score 3, 2, and 1 respectively. The total score obtained was taken as their preferences towards formats, so the maximum possible score was 27 and minimum possible was 9. The formats selected for the study are; Slide show, Video, Text plus picture ,Animated audio, Multi interactivity ,Charts ,Clickable interactivity, Text plus audio and Text matter only

**Problems in using raitamitra website**

The problem faced by respondents in accessing raitamitra website were assessed using following procedure.

A list of 12 problems were given to the respondents and they were asked to rank these problems from 1 to 12 as they perceive, giving rank 1 to the biggest problem. The mean ranks of each statement were calculated and were tested using Kendall's coefficient of concordance ('w')

## 3.5 PROCEDURE ADOPTED FOR DATA COLLECTION

The data for the present study were collected using a pre-tested and structured questionnaire. Part A- Socio-economic, Technological and Psychological characteristics of the farmer. Part -B Extent of participation of farmers in e-extension program as well their system factors and information needs of farmer participants and

their knowledge gain from website ,preferences towards formats and their problems confronted from the website . Utmost care was taken in finalising the wording and formats of the questionnaire to eliminate mistakes and any element of ambiguity regarding the various items.

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

## 3.6 STATISTICAL METHODS USED

The data collected were processed and analyzed in accordance with the objectives of the research problem. The following non-parametric and parametric statistical tests were used in this study in accordance with the nature of data and relevant information.

1. **Frequencies**
   Simple frequency was used to rank the items and make simple comparison wherever needed.

2. **Percentages**
   Percentages were calculated for making simple comparison wherever necessary

3. **Spearman's rank order correlation coefficient**
   Spearman's rank order correlation coefficient was used to find out the relationship between variables.

4. **Kendall's coefficient of concordance**

The degree of agreement among the respondents about the ranking of the variables is measured by this coefficient. Here number of farmers have been asked to rank a list of political concerns, from most important to least important. Kendall's *W* can be calculated from these data. If the test statistic *W* is 1, then all the survey respondents have been unanimous, and each respondent has assigned the same order to the list of concerns. If *W* is 0, then there is no overall trend of agreement among the respondents, and their responses may be regarded as essentially random. Intermediate

values of *W* indicate a greater or lesser degree of unanimity among the various responses.

5. **Quartiles**

A **quartile** is any of the three values which divide the sorted data set into four equal parts, so that each part represents 1/4th of the sampled population.

Besides this, other summary statistical tools like mean and standard deviation were used wherever necessary to analyse the data.

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

# *Results*

# *CHAPTER - 4*
# RESULTS

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

4.1 Categorisation of respondents based on the dependent variable-extent of farmer participation in raitamitra
4.2 Categorisation of respondents based on the explanatory variables viz. age, education, annual income, computer use efficiency, trainings undergone, cosmopoliteness, media exposure, awareness about ICT, attitude towards ICT and information source utilisation
4.3 Relationship between extent of farmer participation and socio-economic, techonolgical and psychological characteristics.
4.4 System factors associated with participation in e-extension programmes
4.5 Information needs of the respondents
4.6 Knowledge gain by farmers through the raitamitra
4.7 Preferences of farmers towards selected formats of presentation through the website
4.8 Constraints in using raitamitra programme

## 4.1 Categorisation of respondents based on the extent of farmer participation in e-extension program of raitamitra

Table 4.1 Classification of respondents based on their extent of participation in raitamitra program

(n=120)

| Extent of participation | Frequency | Percentage |
|---|---|---|
| Low | 58 | 48.35 |
| Medium | 51 | 42.49 |
| High | 11 | 9.16 |

n=120

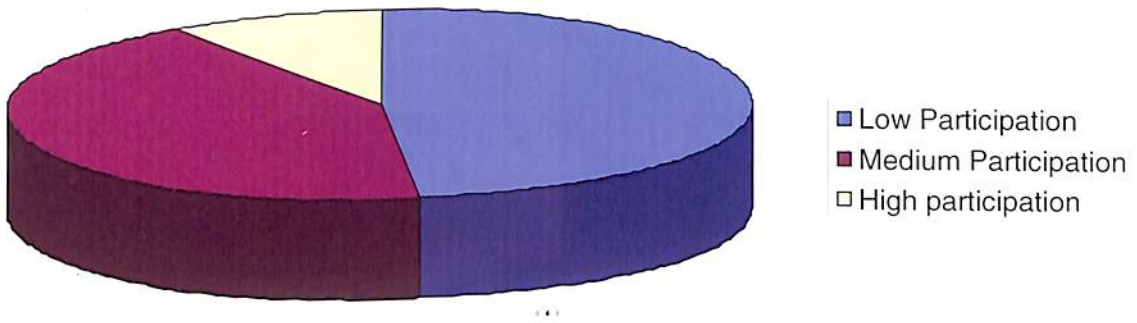


**Fig. 4 Classification of farmers based on extent of participation in E- extension program**


**Fig.5 A picture showing farmers accessing information from the website raitamitra.nic.in**

It is observed from the table that nearly half (48.33%) of the farmers had low extent of participation. while 42.49% of the respondents had medium and 9.163% of the respondents had high extent of participation in the e-extension program through raitamitra

Almost half of the respondents had low extent of participation in e-extension program of raitamitra.

**4.2 Categorisation of respondents based on the explanatory variables viz. age, education, Annual income, computer use efficiency, trainings undergone, cosmopoliteness, Media exposure and Awareness about ICT, attitudes towards ICT and information source utilisation.**

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

Table 4.2 Mean and Standard deviation of variables is given below

| Sl.No. | Variable | Mean | SD | Mean-SD | Mean+SD |
|---|---|---|---|---|---|
| 1 | Age | 41.12 | 7.75 | 33.37 | 48.87 |
| 2 | Education | 1.68 | 0.72 | 0.96 | 2.4 |
| 3 | Annual income | 3.4 | 0.92 | 2.48 | 4.32 |
| 4 | Computer use efficienc | 1.6 | 1.80 | -0.2 | 3.4 |
| 5 | Trainings undergone | 0.36 | 0.66 | -0.3 | 1.02 |
| 6 | cosmopoliteness | 4.28 | 1.244 | 3.03 | 5.524 |
| 7 | Media exposure | 3.70 | 2.17 | 1.53 | 5.87 |
| 8 | Awareness about ICT | 5.02 | 3.30 | 1.72 | 8.32 |
| 9 | Attitude about ICT | 31.7 | 2.78 | 28.92 | 34.48 |
| 10 | Information source utilisation | 29.49 | 11.48 | 18.01 | 40.97 |
| 11. | Extent of participation | 1.83 | 1.063 | 0.76 | 2.89 |

It could be observed from the table that mean score for age of the respondents is 41.125 and Standard deviation is 7.75, mean score for education is 1.68 and standard deviation is 0.72, mean score for income is 3.4 and standard deviation is 0.92, mean score for computer use efficiency is 1.6 and standard deviation is 1.8, mean score for Training is 0.36 and standard deviation is 0.66, for cosmopoliteness mean score is 4.28 and standard deviation is 1.244, mean score for media exposure is 3.7 and standard deviation is 2.17.

The mean score for Awareness about ICT is 5.025 and standard deviation is 3.3, for Attitudes towards ICT mean score is 31.7 and standard deviation is 2.78,mean score for Information source utilization is 29.49 and standard deviation is 11.48.Mean score obtained fro extent of participation is 1.83 and standard deviation is 1.063.

**1. Categorisation of respondents based on age**

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

Table 4.3 Classification of Farmers based on age.

(n=120)

| **Age** | **Frequency** | **Percentage** |
|---|---|---|
| Young(<32) | 13 | 10.83 |
| Middle age(32-46) | 77 | 64.16 |
| Old (>46) | 30 | 25.01 |

Table (4.3) reveals that 10.83% of the respondents come under the young group. Respondents from 32 to 46 years of the age comes under the middle age group. Middle age group constitutes (64.16 %). Respondents from 47-55 years forms the next group. The old age group constitutes 25.01%.

Nearly two third of the Farmers are in their middle age group

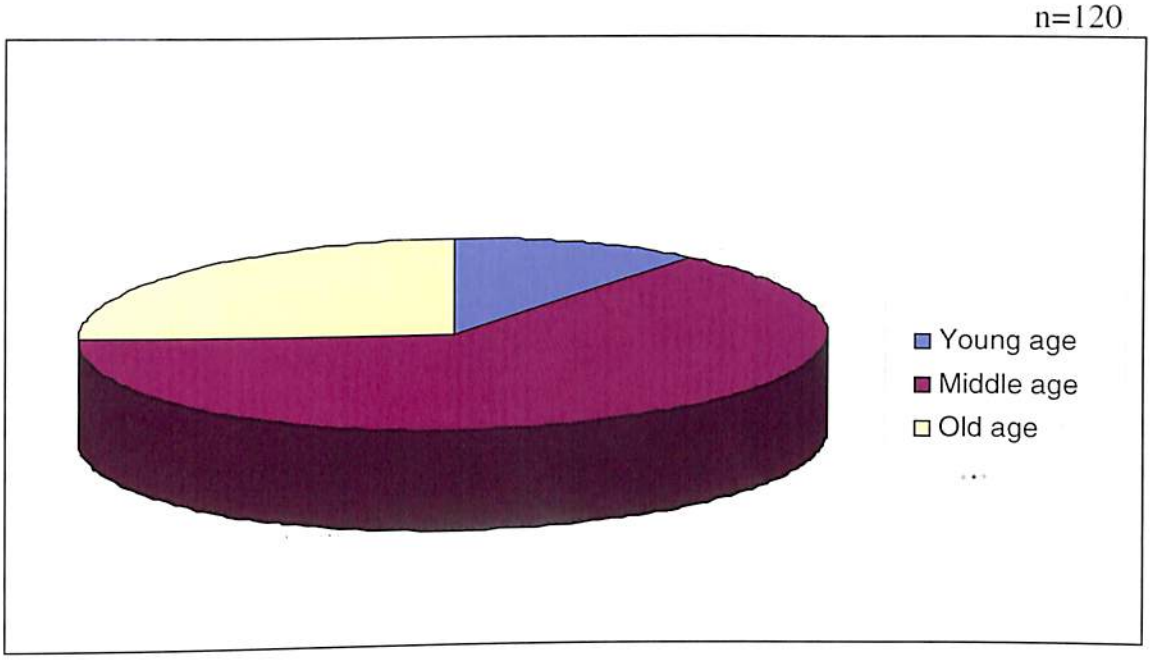


**Fig.6 Classification of farmers based on Age**

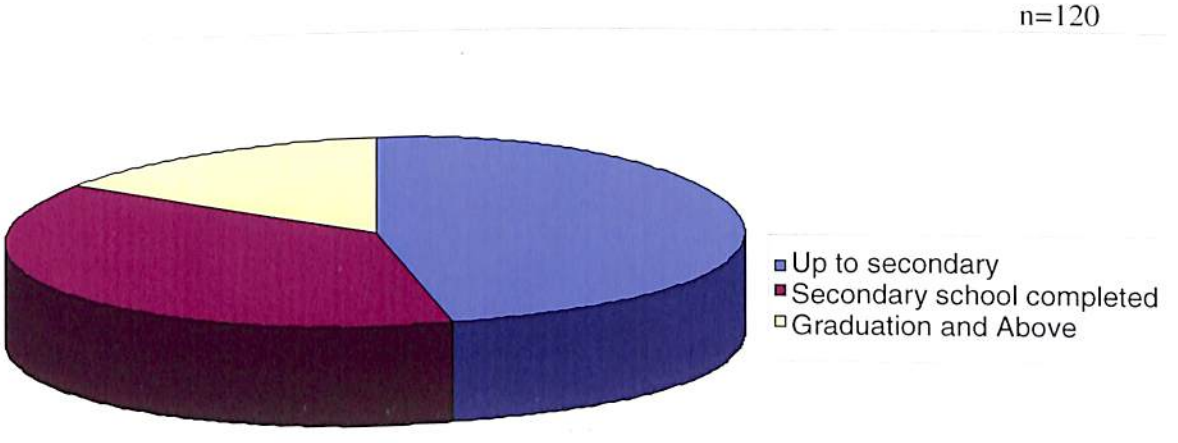


**Fig.7 Classification of farmers based on Educational status**

**2. Categorisation of respondents based on education**

Table 4.4 Classification of Farmers based on education

(n=120)

| **Education** | Frequency | **Percentage** |
|---|---|---|
| Up to secondary school | 56 | 46.66 |
| Secondary school complete | 46 | 38.33 |
| Graduation and above | 18 | 15.01 |

It could be observed from the table that 46.66% of the farmers are having up to secondary school qualification. 38.33% are in secondary school completion without any additional degree. The percentage of farmers holding Degree and above are still less (15.01%).
Nearly half of the farmers are having up to secondary school qualification

3. Categorisation of respondents based on Annual income

Table 4.5 Classification of farmers based on Annual income

(n=120)

| **Income** | Frequency | **Percentage** |
|---|---|---|
| Low | 20 | 16.6 |
| Medium | 45 | 37.50 |
| High | 55 | 45.84 |

It is observed that 16.6 % of the farmers had low income, where as 37.50 of farmers belong to middle income group and remaining 45.84% in high income group.
Nearly half of the farmers belong to high income group

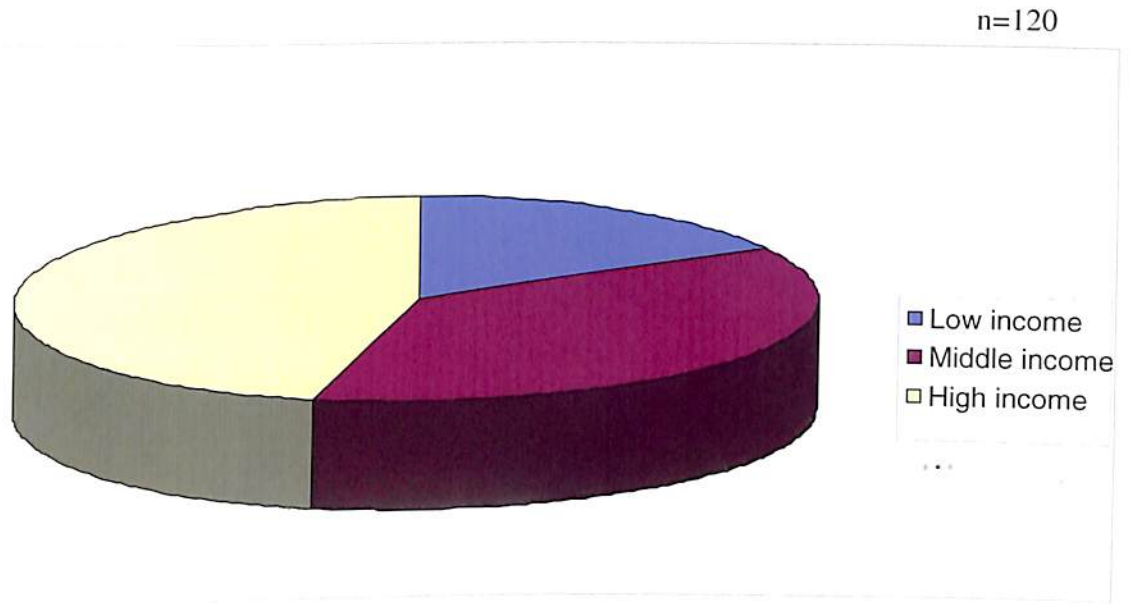


**Fig.8 Classification of farmers based on Income**

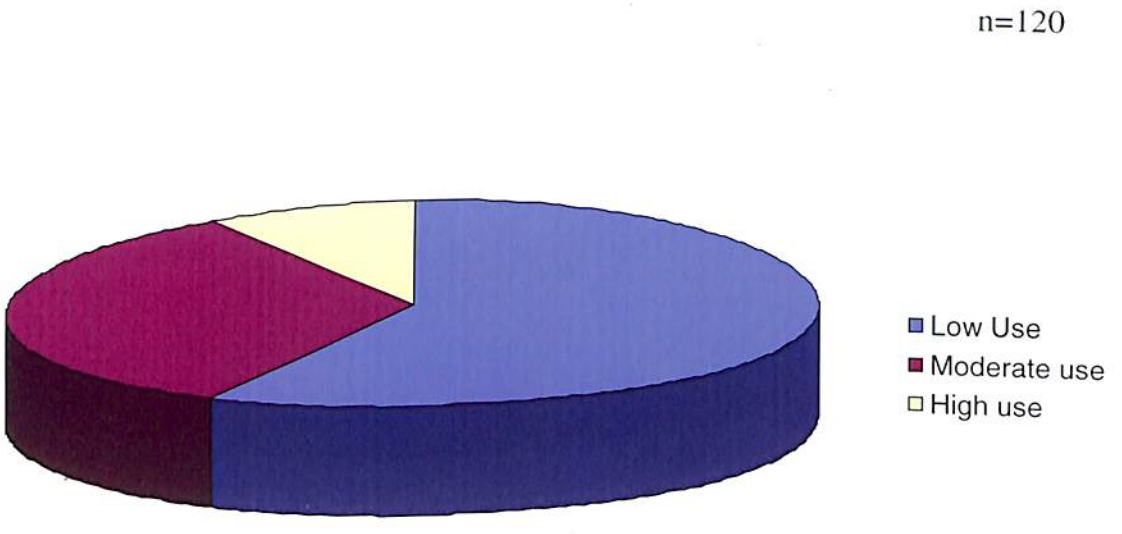


**Fig.9 Classification of farmers based on Computer use efficiency**

**4. Categorisation of respondents based on computer use efficiency**

Table 4.6 Classification of respondents based on the computer use efficiency

(n=120)

| **Computer use efficiency** | **Frequency** | **Percentage** |
|---|---|---|
| Low | 70 | 58.34 |
| Moderate | 40 | 33.31 |
| High | 10 | 8.35 |

It is observed that 58.34 percent of farmers belong to low computer efficiency group and 33.31% are moderately efficient. Those who are highly efficient in computers are comparatively less (8.35%).

More than three fourth of farmers are in low to moderate computer use efficiency group

5. Categorisation of respondents based on trainings they have undergone in computer applications.

Table 4.7 Classification of farmers based on trainings they have undergone

(n=120)

| **Trainings undergone** | Frequency | **Percentage** |
|---|---|---|
| None | 87 | 72.5 |
| One | 23 | 19.16 |
| Two | 9 | 7.5 |
| More than two | 1 | 0.83 |

It could be observed from the table that 72.5% of farmers have not undergone any training on computer applications .Only 19.16 % of the farmers have undergone at least one training programme. The percentage of farmers exposed to two trainings

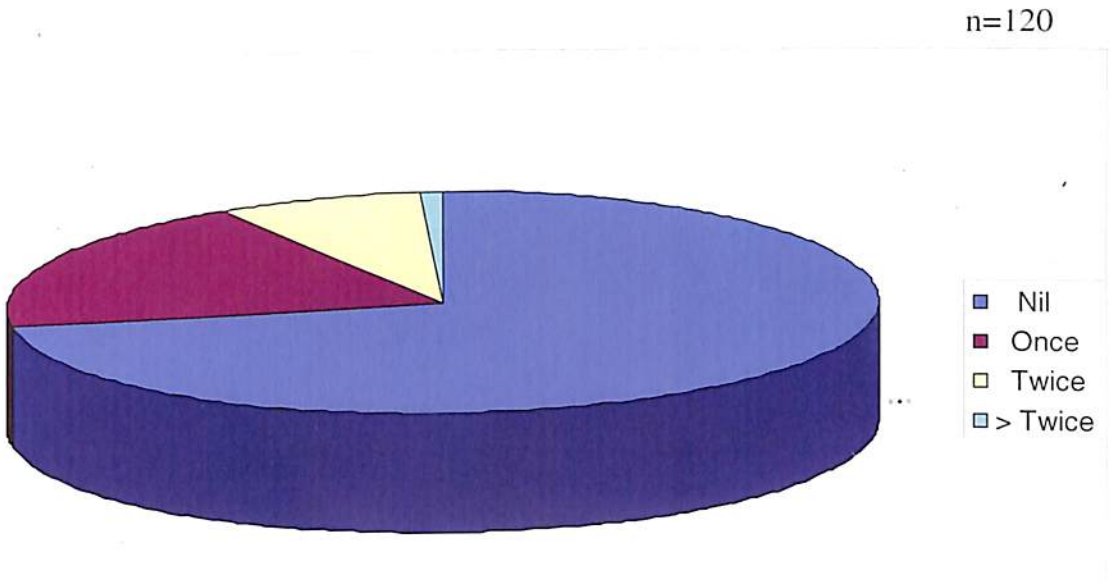


**Fig.10 Classification of farmers based on Training undergone**

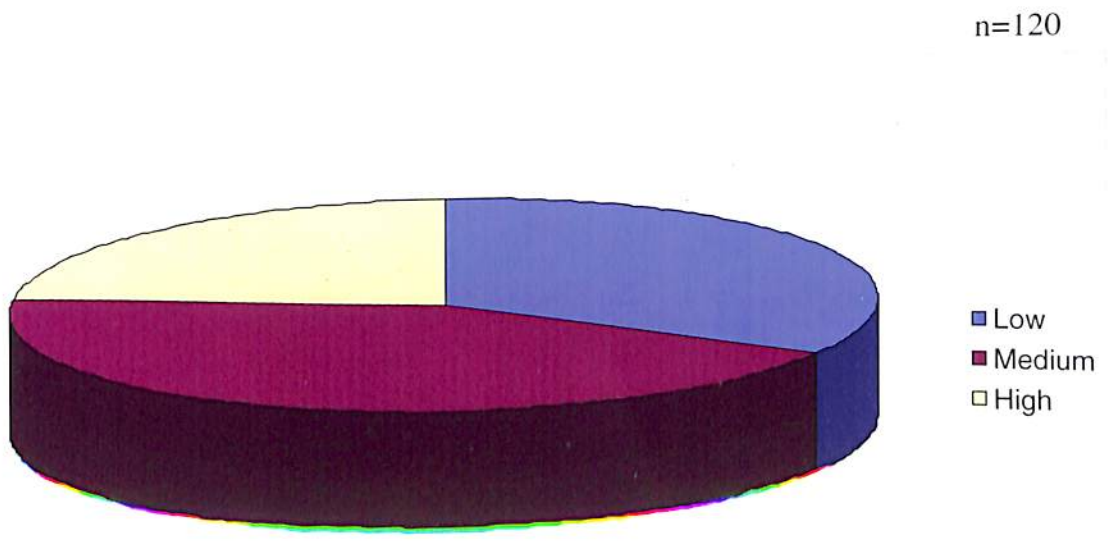


**Fig.11 Classification of farmers based on Cosmopoliteness**

programmes are comparatively very less (7.5%).Only one farmer has undergone more than two training.

Nearly three fourth of respondents have not undergone any training programme in computer applications

**6. Categorisation of respondents based on Cosmopoliteness**

Table 4.8 Classification of respondents based on the cosmopoliteness

(n=120)

| Cosmopoliteness | Frequency | Percentage |
|---|---|---|
| Low | 40 | 33.6 |
| Moderate | 53 | 43.7 |
| High | 27 | 22.7 |

It is observed that 33.6% of the farmers had low cosmopoliteness. Nearly half of the farmers had moderate cosmopoliteness i.e. 43.7%, where as 22.7% of the farmers had high cosmopoliteness.

Nearly half of the farmers are having moderate level of cosmopoliteness.

**7. Categorisation of respondents based on media exposure**

Table 4.9 Classification of respondents based on media exposure of farmers

(n=120)

| Media exposure | Frequency | Percentage |
|---|---|---|
| Low | 52 | 43.33 |
| Medium | 43 | 35.83 |
| High | 25 | 20.84 |

Nearly half of the respondent (43.3%) had low level of media exposure followed by medium (35.83%) and high (20.84%) level of media exposure

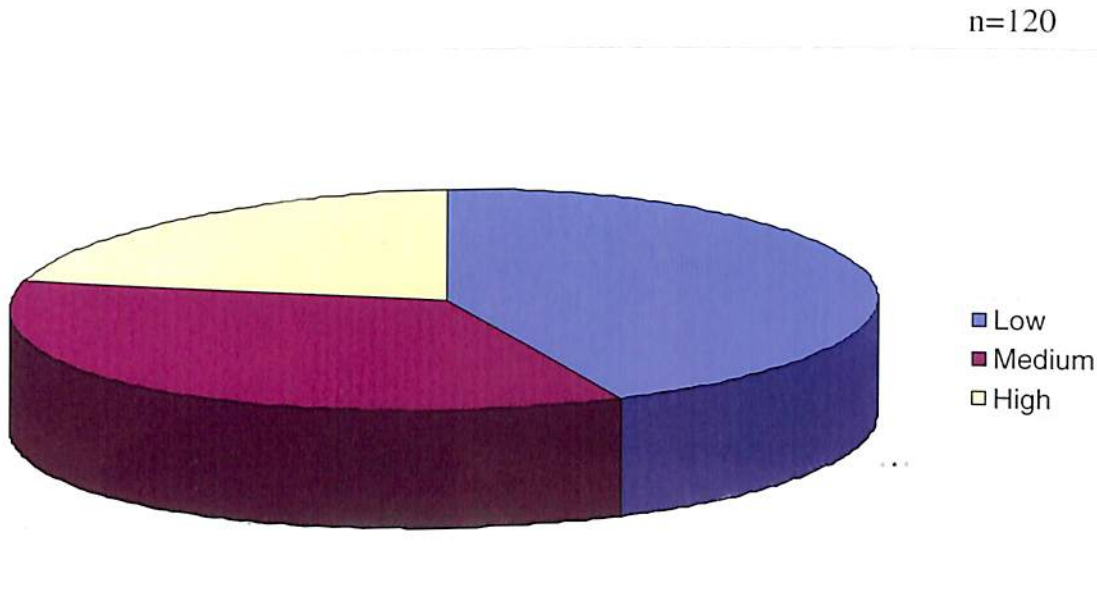


**Fig.12 Classification of farmers based on Media exposure**

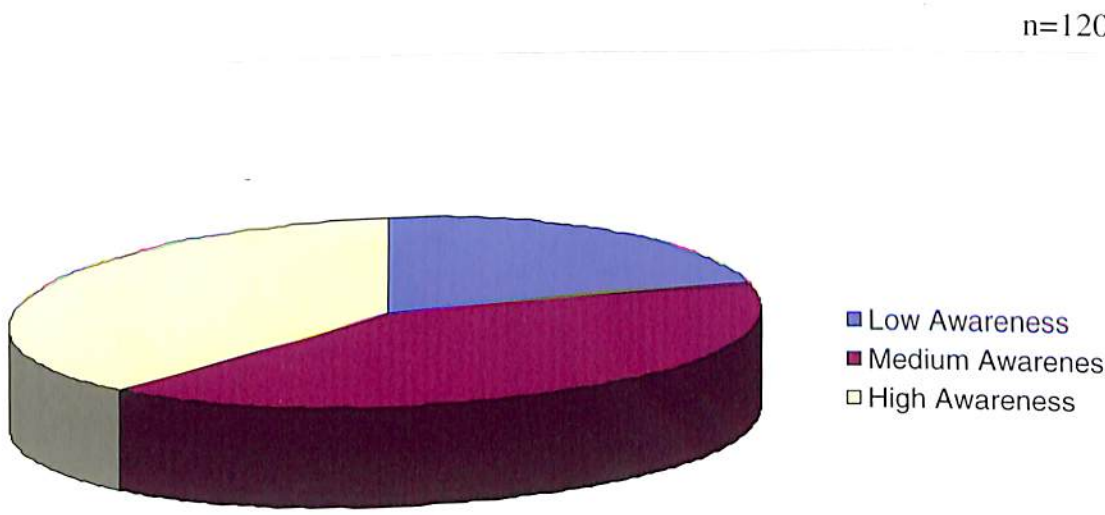


**Fig.13 Classification of farmers based on awareness about ICT**

**8. Categorisation of respondents based on awareness about ICT**

Table 4.10 Classification of respondents based on awareness about ICT

(n=120)

| Awareness about ICT | Frequency | Percentage |
|---|---|---|
| Low | 25 | 20.8 |
| Medium | 50 | 41.7 |
| High | 45 | 37.5 |

It is observed that 20.8% of the farmers had low level of awareness about ICT and 37.5 percent of the farmers had high level of awareness. The farmers having medium level of awareness was 41.7%.

**9. Categorisation of respondents based on attitude towards ICT**

Table 4.11 Classification of respondents based on attitude towards ICT

(n=120)

| Attitude towards ICT | Frequency | Percentage |
|---|---|---|
| Unfavourable | 28 | 23.3 |
| Favourable | 51 | 42.5 |
| Highly Favourable | 41 | 34.2 |

It is observed that 23.3% of the farmers had unfavorable attitude towards ICT. Nearly half of the farmers had favourable (42.5%) attitude. This was followed by 34.2% of the farmers who had highly favorable attitude towards towards ICT.
Nearly one fourth of farmers had unfavorable attitude towards ICT.

**10. Categorisation of respondents based on information source utilisation**

Table 4.12 Classification of respondents based on information source utilisation of farmers

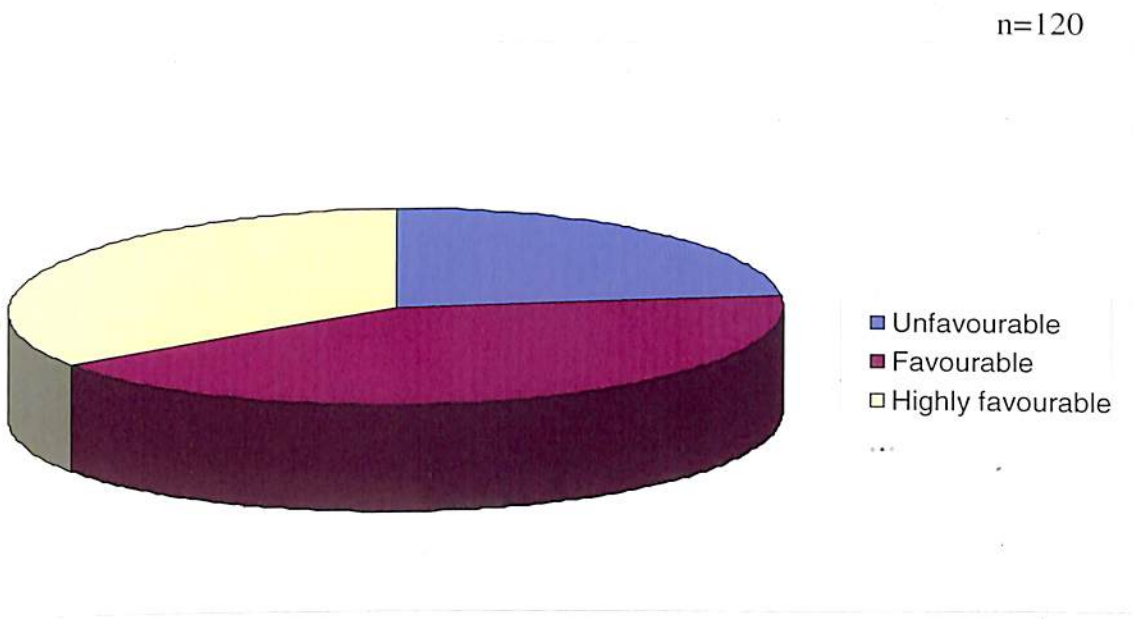


**Fig.14 Classification of farmers based on Attitude towards ICT**

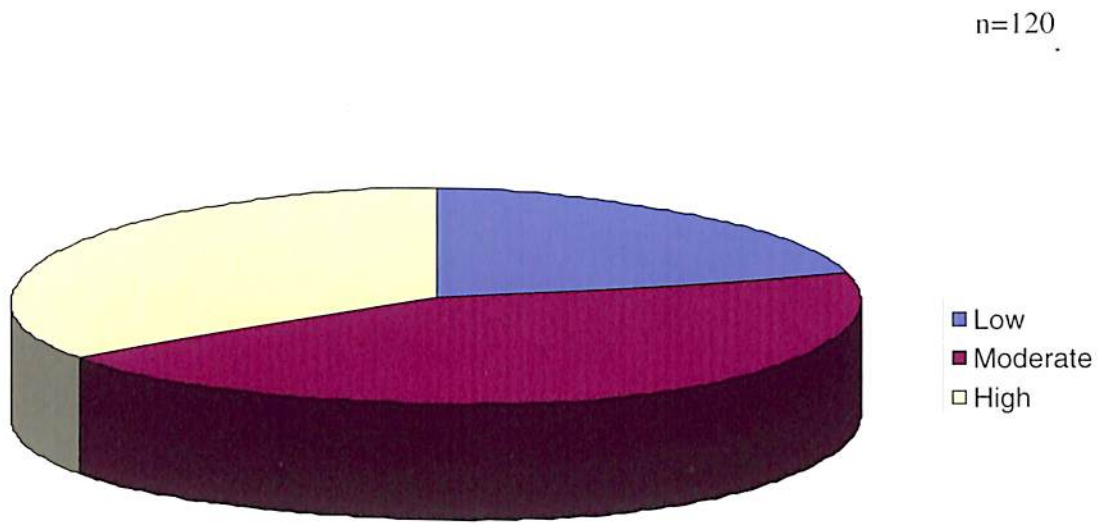


**Fig. 15 Classification of farmers based on information source utilization**

(n=120)

| Information source utilisation | Frequency | Percentage |
|---|---|---|
| Low | 25 | 20.8 |
| Moderate | 54 | 45.0 |
| High | 41 | 34.2 |

Nearly half of the (45.0%) farmers use information sources moderately. The percentage of farmers who use information source less are 20.8% and 34.2% of farmers had high level of information utilization.

More than two third of farmers are having low to moderate level of utilization of information.

**4.3 Relationship between extent of farmer participation and socio-economic, technological and psychological characteristics.**

Table 4.13 Relationship between extent of farmer participation and socio-economic, technological and psychological characteristics

| Sl. No. | Factors | Correlation coefficient |
|---|---|---|
| 1 | Age | **-0.273**** |
| 2 | Education | **0.480**** |
| 3 | Annual income | **0.548**** |
| 4 | Computer use efficiency | **0.628**** |
| 5 | Trainings undergone | **0.445**** |
| 6 | Cosmopoliteness | **0.514**** |
| 7 | Media exposure | **0.551**** |
| 8 | Awareness about ICT | **0.650**** |
| 9 | Attitudes towards ICT | **0.237**** |
| 10 | Information source utilization | **0.751**** |

** Significant at 0.01 level of probability

Table 4.13 brings out the relationship between extent of farmer participation and explanatory variables

It is observed that age had negative and significant relationship with extent of participation at one per cent level of probability. Other variables such as

Education, Annual income, Computer use efficiency Trainings undergone, Cosmopoliteness, Media exposure, Awareness about ICT, Attitudes towards ICT, Information source utilization had positive and significant relationship with extent of participation at one per cent level of probability.

### 4.4 System factors associated with participation in e-extension

System factors are the various variables which influences the respondents' high level of participation. The variables are classified according to the farmer's importance given to factors.

The variables below were recasted into descending order based on the importance given by farmers using Kendall's rank score W test.

Table 4.14. Shows the Classification of system factor variables

n=120

| Sl No | Variables | Mean score | Rank |
|---|---|---|---|
| 1. | Use fullness of information | 8.39 | 1 |
| 2. | Location specific information | 8.31 | 2 |
| 3. | Simplicity of language | 8.17 | 3 |
| 4. | Clarity | 7.21 | 4 |
| 5. | Font type | 7.06 | 5 |
| 6. | Quick access | 6.57 | 6 |
| 7. | Visual content including photographs & video | 6.43 | 7 |
| 8. | Layout & design | 5.55 | 8 |
| 9. | Style of writing | 4.32 | 9 |
| 10 | Opportunity of interactivity | 2.29 | 10 |
| 11 | Provision of hyperlinks | 1.71 | 11 |

### 4.5 Information needs of the Farmers

Information needs were assessed by taking their opinion regarding relevancy of the listed information categories

Table 4.15 information needs of farmers

N=120

| Sl no | Information needs | Mean score | Rank |
|---|---|---|---|
| 1. | Marketing information | 8.46 | 1 |
| 2. | Package of practice | 8.30 | 2 |
| 3. | Inputs price | 7.60 | 3 |
| 4. | Weather information | 7.31 | 4 |
| 5. | General information | 6.90 | 5 |
| 6. | How to do type of information | 6.87 | 6 |
| 7. | Organic farming | 5.95 | 7 |
| 8. | Management of pest and disease | 4.10 | 8 |
| 9. | Post harvest technology | 3.60 | 9 |
| 10. | Question and answer services | 3.45 | 10 |
| 11 | Information on crop insurance | 3.45 | 11 |

The information needs were arranged in their descending order based on Kendall's rank score W test. Hence it can be concluded that Marketing information, Package of practice, Input price, Weather information, General information are the most needed information as opined by farmers, and How to do type of information, Organic farming, Management of pest and disease are the other areas in which farmers needed information. Information on post harvest technology, question and answer services and information on crop insurance are the areas in which farmers needed least information.

### 4.6 Knowledge gain by farmers through the raitamitra

**Categorisation of respondents based on knowledge gain in raitamitra**

Table 4.16 Classification of farmers based on knowledge gained through raitamitra website

(n=120)

| Knowledge gain | Frequency | Percentage |
|---|---|---|
| Low | 24 | 20.8 |
| Medium | 52 | 42.5 |
| High | 44 | 36.7 |

It could be observed from the above table that (20.8%) of the respondents are in the category of low knowledge. Nearly half (42.5%) of farmers have medium level of knowledge gain and 36.7% of farmers are in the high category with respect to knowledge gain.
Nearly two third of the farmers had gained low to medium level of knowledge from raitamitra.

### 4.7 Preferences of farmers towards selected formats of presentation

Table 4.17 Preferences of farmers were assessed by taking their preferences given on selected formats of presentation by using Kendall's w test.

N=120

| Sl No | Preferences | Meanscore | Rank |
|---|---|---|---|
| 1. | Slide show | 7.54 | 1 |
| 2. | Video | 6.97 | 2 |
| 3. | Text plus picture | 5.86 | 3 |
| 4. | Animated audio | 5.15 | 4 |
| 5. | Multi interactivity | 4.92 | 5 |
| 6. | Charts | 4.49 | 6 |
| 7. | Clickable interactivity | 3.65 | 7 |
| 8. | Text plus audio | 3.29 | 8 |
| 9. | Text matter only | 3.13 | 9 |

The preferences are arranged in the descending order based on Kendall's rank score W test. It could be concluded that Slide show, Video, Text plus picture, Animated

audio are the most preferred formats for farmers ,and Clickable interactivity, Text plus audio, Text matter are comparatively least preferred formats.

### 4.8 Constraints or problems in using raitamitra

Constraints of respondents in accessing the raitamitra are studied. The farmers were asked to rank the listed constraints in the order of its severity. A score of 1 was given to the biggest constraint. Their agreement in ranking is tested using Kendall's coefficient of concordance. The results are presented in table 4.19

Table: 4.18 Constraints or problems in using raitamitra- as perceived by farmers.

| Sl No | Constraints or problems | Meanscore | Rank |
|---|---|---|---|
| 1 | Lack of awareness about website | 2.54 | 1 |
| 2 | Problems in language | 2.63 | 2 |
| 3 | Lack of Local relevance to information | 3.13 | 3 |
| 4 | Electricity problem | 3.66 | 4 |
| 5 | Lack of infrastructural facilities | 5.32 | 5 |
| 6 | Technical problem | 5.43 | 6 |
| 7 | Technology fear | 8.42 | 7 |
| 8 | Small font size | 8.81 | 8 |
| 9 | Less number of photos | 8.93 | 9 |
| 10 | Slow down loading of information | 9.44 | 10 |
| 11 | Cultural barriers | 9.79 | 11 |
| 12 | Dull text colour | 9.79 | 12 |

The mean rank score obtained by each constraint is given in the table. Lower values indicate the severity of the constraint. It is evident from table that there is agreement among the respondents about constraints in using raitamitra website. The biggest constraints as opined by farmers are lack of awareness about website, problems in language and lack of local relevance to information.

# *Discussion*

# CHAPTER -5
# DISCUSSION

The study being a pioneer attempt to assess the extent of farmer participation and effectiveness of e-extension, there are only a few research studies in this area to point out conformity or disagreement. Hence in few cases the result of this study is discussed without referring past studies. The salient features of the results are interpreted and discussed in this chapter in the same sequence as given in the previous chapter under the following headings.

5.1 Categorisation of respondents based on the dependent variable - Extent of farmer participation in raitamitra
5.2 Categorisation of respondents based on the independent variables viz. age, education, annual income, computer use efficiency, trainings undergone, cosmopoliteness, media exposure and awareness about ICT, attitude towards ICT and information source utilisation
5.3 Relationship between extent of farmer participation and socio-economic, technological and psychological characteristics.
5.4 System factors associated with participation of farmers in e-extension programme
5.5 Information needs of farmer participants in e-extension programme
5.6 Knowledge gain by farmers through the raitamitra
5.7 Preferences of farmers towards selected formats of content presentation through raitamitra
5.8 Constraints in accessing information from the website raitamitra

## 5.1 Categorisation of respondents based on extent of participation in e-extension programme.

Table 4.1 highlights the fact that almost half of the respondents had low level of participation in e-extension programme of raitamitra. There was considerable

variation in the extent of participation of farmers in raitamitra programme. With regard to the habits of media use and affinity for particular media, individuals have consistent

habits and preferences which lead them to be more or less available, more or less selective and active in the amount and kind of their media use.

In general, preferences also seen early as to form particular pattern of likes and dislikes for broad kind of contents (McQuail, 1994). This may be one of the reasons for variations in extent of participation in raitamitra programme

It is important for a farmer to have participation in new communication technologies for enhancing his production and raising the standard of living. While the technologies are undergoing rapid changes, the farmer has to necessarily upgrade and participate with modern communication tools. The profile analysis of farmer participation showed that most of the high participants are from young age group of which majority are graduates. The reason for low extent of participation may be lack of immediate benefit as influenced by the felt needs of the individual. Another reason may be the low level of follow up put by project authorities as complained by some of the farmers. Exact estimate of technology needs of the farmers are required for ensuring higher levels of farmer participation in e-extension programmes like raitamitra. Appropriate levels of technology induction needed for the farming population in a given context should also be assessed correctly.

5.2 Categorisation of respondents based on socio-economic, technological and psychological factors.

5.2.1 Age

An analysis of data furnished in table 4.3 clearly points out that majority of farmers were in the age group of 32-46 years. This is in conformity with the findings of Babu (2005). The reason for this may be the fact that younger group in a population are more educated and acquire necessary knowledge and skills for participating in advanced technologies like e-extension programmes.

5.2.2. Educational status

Data in table 4.4 indicates that nearly half of farmers were having education only upto secondary school level. This may be due to the general trend in the levels of education in Karnataka. In the findings of Manjula (1995) and Kumar et al. (2003) education was found to have positive influence on farmer's participation in technology programmes.

It is universally accepted that education is a determinant which modifies behavioral components such as knowledge, skill and attitude of individual. Higher the education greater will be the changes that result from participation in ICT programmes

5.2.3 Annual income

As result in Table 4.5 discloses nearly half of the farmer respondents belonged to high income group. In the findings of Babu (2005) income has a grater influence on farmer participation in e-readiness. He reported that majority of the farmer beneficiaries of Kissan Kerala were having high and middle income. It is believed that participation in any activity increases as income increases and which indirectly influences a person's behavior for the new activity and economic motivation.

5.2.4 Computer use efficiency

It is evident from table 4.6 that more than half of farmers were in low (58 percent) level of efficiency in computer usage. This is in conformity with findings of Sarala (2008). Farmers as the heads of the family have to coordinate and manage various agricultural activities for their livelihood security. The work related to the farm itself is voluminous. In addition to that, because of the introduction of farm planning programmes, farmers are involved in that development activity at all the stages from formation of the programme to the execution. This busy schedule of regular farm activity makes them away from any technological activity including participation in ICTs .Computers in raita samparka kendra or in agriculture office helps to increase the efficiency of farmers from their visit. Computers use efficiency needs to be improved by providing skill based training in computer use and computer accessing device use.

5.2.5 Trainings undergone

A perusal of Table 4.7 reveals that three fourth of respondents have not undergone any training in any computer aspect. In the findings of Parimala (2004), training had a positive influence on a successful entrepreneur. Subramanian (1994) reported that most of the trainees were found to have gained medium to high level of knowledge about dairying due to training i.e., two third (64.5 %) of the trainees after undergoing training gained medium level of knowledge and one fifth of the traineer (20.80%) gained high level and the rest (14.3 %) gained low level of knowledge after training. Gloria (1991) observed a general increase in awareness and knowledge gain in post harvest practices as a result of the training. It could be concluded from the present study that farmers had

not undergone sufficient number of training in computer use which could have a bearing on participation in e-extension programme

5.2.6. Cosmopoliteness

Data presented in table 4.8 shows that nearly half (43.7%) of the respondents were having moderate level of cosmopoliteness. This result shows they are becoming more outgoing. Perhaps the exposure to computer use efficiency applications expanded this way of thinking, bringing about this categorization. The study by Babu (2005) reported that majority of the farmers (65 %) were having low cosmopoliteness, which had greater influence on perception of ICTs. As the farmers become more cosmopolite, they can effectively gain information about what is happening outside their village related to information needs in agriculture.

5.2.7 .Mass media exposure

From Table 4.9 it is found that most (43.3%) of the farmers were having low level of exposure to mass media. Since the respondents were already exposed to raitamitra, this result is not surprising. This is not in conformity with the findings of Babu (2005). It has been argued, that mass media exposure has contributed to the change in the farming conditions and still continues to raise the performance level of farmers. Thus the farmer who is more exposed to technological information from mass media can have more active response to the innovative farming practices. Mass media use by individuals are both limited and motivated by complex interacting forces in society and in the personal biography of the individual(McQuail,1994).Various complex social and psychological variables would have contributed towards differential levels of mass media use by the farmers.

5.2.8. Awareness about ICT

From table 4.10 it is observed that nearly half of the farmers (41.7%) were having medium awareness about ICT. This is in conformity with the findings of Babu (2005) who found that majority of farmers were having low level of awareness about ICT. He also mentioned that awareness about ICT has a direct influence on e-readiness and perception of farmer. It is the major cause for low e-readiness and perception of farmers. Through advertisements, extension programmes, and by organising more training programs in computer use farmers can be made aware of various ICT programmes in implemented for their benefit.

5.2.9. Attitude towards ICTs

A perusal of table 4.11 reveals the interesting fact that only one fourth of farmers had unfavorable attitude towards ICT. This is in conformity with the findings of Babu (2005). The perception amoung raitamitra farmers about the advantages and usefullness of technologies transferred through the websites may be the reason for favourable attitude of majority of farmers towards modern ICTs.

5.2.10 Information source utilization

Data presented in table 4.12 indicates that nearly half (45%) of farmers utilize information sources moderately. The percentage of farmers who use information source less are 20.8 % and those who utilise information source very much are 34.2%. The utilization of information sources for more than two third of the farmers is low to moderate. The information source utilization is a vital component in a communication process. If proper communication packages are available, the farmers can access information easily and utilise them effectively. The department of agriculture has a major role to play in the development of agricultural information dissemination strategies suitable to the farmer's fields.

**5.3 Relationship between extent of farmer participation and various independent variables.**

5.3.1 Age and extent of farmer participation in e-extension programme

In the study, age showed a significant negative relationship with extent of participation in e-extension programme. Young farmers were more actively participating in the e-extension programme through raitamitra. With advancement of age, certain pattern of media use would set in the individual (Comstock *et al*, 1978).This pattern of complex media use associated with age would have influenced the extent of farmer participation in e-extension programme resulting in a significant negative relationship. This result of the study is in conformity with the findings of Babu (2005).

5.3.2 Educational status and extent of farmer participation in e-extension programme.

In the study, education emerged as a factor having significant positive relationship with extent of farmer participation in e-extension programme. A level of formal education

achieved by the farmer was a factor in determining the extent of participation in e-extension programme. Higher education and work commitment may lead to different content choices – more informational contents or content favoured by dominant educational and cultural value (McQuail, 1994). Higher levels of education may motivate the farmer and cultivate necessary skills and knowledge in them for participating in advanced technologies like ICTs.

5.3.3 Annual income and extent of farmer participation in e-extension programme.

Annual income in this study showed a positive and significant correlation with the extent of farmer participation in e-extension programme .Income governs the media use pattern of the audience (McQuail, 1994). Higher income always influences person's urge for new activity .This finding of the study is in line with the earlier finding of Babu (2005).

5.3.4 Computer use efficiency and extent of farmer participation in e-extension programme.

Computer use efficiency in this study showed a positive and significant correlation with the extent of participation in e-extension programme .The realization of the opportunities offered by e-extension programmes require a culture of information and new skills. Participation in e-extension programme is governed by computer literacy and skill in accessing information from the website .It is only natural that farmers having more efficiency in using computer will have more participation in e-extension programmes.

5.3.5 Trainings undergone and extent of farmer participation in e-extension programme.

The independent variable trainings undergone also exhibited a highly positive and significant correlation with extent of farmer participation in e-extension programme through raitamitra.nic.in. Lack of training is a fundamental barrier to participation in e-extension programmes. The assistance of intermediary agencies are required for training farmers in the use of e-extension programmes. Capacity building of framers through effective training programmes in the field of ICT application in agriculture will

ensure a higher level of farmer participation in the e-extension programmes. Effective application of ICT tools in agricultural extension requires a greater understanding of the potential benefits of the technologies in question. The farmer needs to be empowered through various training programmes for ensuring a higher level of participation in e-extension programmes.

5.3.6 Cosmopoliteness and extent of farmer participation in e-extension programme.

Cosmopoliteness in the study showed a positive and significant correlation with extent of farmer participation, It is only logical to assume that one who is highly cosmopolite has more chances of getting awareness about the advanced technology than one who is less cosmopolite .Contacts outside the village would provide a farmer more awareness about various ICTs and information from varied sources. This result of the study is in conformity with findings of Babu (2005)

5.3.7 Mass media exposure and extent of farmer participation in e-extension programme.

In this study, exposure to mass media showed positive and significant correlation with the extent of farmer participation .The farmers who gathered information from the e-extension were also reinforcing or seeking information from other mass media sources like farm magazines, newspaper, television programmes, radio etc. A framer who had high utilization pattern of information from raitamitra website would have high level of utilization of other mass media also. This findings of the study is supported by earlier finding reported by Babu (2005)

5.3.8 Awareness about ICTs and extent of farmer participation in e-extension programme.

In this study awareness about ICT showed a positive and significant correlation with the extent of farmer participation .It is often assumed that lack of awareness constitutes the major constraint in the widespread use of e-extension programmes through various websites. Lack of awareness about the websites coupled with twin factors of fear and inhibition of the technology are the most challenging barriers to overcome for promoting the technology transfer through e-extension programmes.

5.3.9 Attitude towards ICTs and extent of farmer participation in e-extension programme.

The results obtained in the present study revealed a positive and significant correlation between attitude towards ICTs and extent of participation in the e-extension programme. The websites raitamitra.nic.in is disseminating scientific management practices in various fields of agriculture. Usually an individual's attitude towards an object would be related with specific behaviour. It could be concluded that a favourable attitude towards ICTs would elicit a favourable behaviour change in the farmer towards higher levels of participation in e-extension programmes .This result of the study is in conformity with the findings of Babu (2005).

5.3.10 Information source utilization and extent of farmer participation in e-extension programme.

In this study, a positive and significant relationship was obtained between information source utilization and farmer participation in e-extension .The farmer participants of raitamitra website may be utilizing information from various other information sources on the contents accessed from the website, there by reinforcing the information. They may also be contacting other information sources on additional information on the technologies published in the website raitamitra. So naturally there would be a positive correlation. This finding of the study is supported by earlier findings of Sarala (2008).

## 5.4 System factors associated in farmer participation in e-extension programme.

The perception of the farmer participation of e-extension programme of raitamitra.nic.in about the system factors associated with higher level of participation are presented in table 4.15.These factors were arranged in the order of the ranks on the basis of relative importance given to them by the framer participants. Three system factors viz; usefulness of information, location specific information and simplicity of language obtained higher ranks in the analysis followed by clarity ,font type, quick access ,visual content including photographs ,

video , layout and design in that order. The three system factors viz; style of writing, opportunity for interactivity and provision for hyperlinks obtained the last three ranks.

The data presented in table 4.15 reveals that a well structured farmer centric portal enhances farmer participation in e-extension programmes. Content is the most important factor in a website that enhances farmer participation. Farmers obtain value from the website when they are able to locate the content they need in a simple language. Usefulness of information and local applicability of information are the two most important factors that make a website useful to the farmers. Having a technological frame work and locally adoptable content are pivotal for the successful functioning of e-extension programmes.

**5.5 Information needs of the farmer participants of e-extension programme.**

It is evident from table 4.16 that marketing was the most important field in which farmer participants of e-extension programme through raitamitra.nic.in needed information. This was followed by package of practices for various crops, input price and weather based farm advisory services, general information, how to do it type of information ,organic farming and management of pests and diseases. The result of the study indicates a growing integration of farming activities with the market. The important crops in Karnataka are often adversely affected by the trends in the national and international markets. In the era of globalization and market led extension, farmers require timely information on what to grow, when to grow, where to grow, how to grow and where to sell. An added dimension of information needs is the requirement of information based on weather changes. This aspect of information requirement is gaining more importance in the backdrop of climate change and global warming.

**5.6 Knowledge gain by farmers through raitamitra**

Data presented in table 4.17 indicates that two third of farmers had low to medium level of knowledge gain as a result of participation in the e-extension programme through raitamitra.nic.in. Only 36.7 percent of farmer participants had high level of knowledge gain. The reason for the low level of knowledge gain from the website may be due to the low level of participation in the e-extension programme through

raitamitra. Nearly half of the participants had only low level of participation in the e-extension programme. Since ICT being a new medium for the farmers for information gathering, they may be depending on other sources of information also for meeting their information requirements.

### 5.7 Preferences of farmers towards selected formats of content presentation

It could be observed from table 4.18 that slide show, video and text plus picture were the most preferred formats of content presentation for farmers. This was followed by animated audio, multi interactivity, charts, clickable interactivity plus audio. Text matter only was the least preferred format for content presentation. Learning will become more effective when more number of human senses are involved. A combination of writing with various types of visual elements and animation enhances farmer participation in the programme. Online presentation is more about showing, telling, demonstrating and interacting. For farmer participants with less education, content presentation through formats such as slide show, video and text plus picture are more effective .Majority of the web users usually scan web pages instead of reading every word. So more number of videos, slides and pictures are needed for attracting their attention to the contents presented in the website.

### 5.8 Constraints faced by farmers in accessing information from the website raitamitra

The results presented in table 4.19 reveal that lack of awareness about the website was the major problem faced by the farmers in using the website raitamitra.nic.in. Problems in language, lack of local relevance of information, electricity problem, lack of infrastructural facilities and technical problem were the other major constraints expressed by the farmers in using the website. It is evident from the results that majority of farmers are yet to become aware of the website raitamitra.nic in and derive desired benefits from e-extension. More over, the less usage of local languages and more usage of English language in software contents of e-extension also cripple the use of the website by the farmers. These is a marked shortage of relevant information in local languages that respond to the local needs of the farming

community. Developing locally adaptable e-extension technology modules in local language will help the programme reach the majority of the farmers in rural areas. The absence of telephone lines, electricity and other infrastructural facilities also hinder the widespread use of the website raitamitra.nic.in. The reliability and local adaptability of the content need to be continuously monitored and refined for ensuring high level of farmer participation in the e-extension programme

## 5.9 SUGGESTIONS FOR BETTER INFORMATION DISSEMINATION THROUGH THE WEBSITE raitamitra.nic.in

In this study farmer participation and effectiveness of e-extension program has studied in order to achieve good farmer participation. On the basis of salient findings of the study, the following suggestions are put forward for effective farmer participation in the e-extension programme of the website raitamitra.nic.in.

1. Farmer awareness on the potential benefits of e-extension services through the web portals need to be enhanced through effective extension strategies

2. Information available through the website raitamitra is mostly in English, which the vast majority of farmers can not understand or read .There is a marked shortage of information relevant to local conditions in local language that responds to the needs of the farmers. There is an urgent need for significant investment and support for local content development in Kannada language

3. A special technical cell should update the information on the raitamitra website on a daily basis, giving advice to farmers on specific crops in each taluk based on the seasonal crop conditions prevailing in those areas .Such an updating of the portal will greatly enhance the local relevance of technical advice rendered to individual farmers.

4. The information on prices of various commodities in different markets in the State can be posted on the portal on a daily basis. In the mean time, the Agriculture Marketing Department should consider setting up of an e-commerce facility linked to storage godowns to facilitate online sale and purchase of agriculture produce.

5. The realization of new opportunities offered by e-extension in agricultural development requires new skills in the use of ICT tools which the farmers are lacking .Emphasis should be placed for training of farmers especially the young farmers in using ICT tools.

6. Formats for content presentation through the website have to be carefully crafted and integrated by including comfortable formats like slideshows, videos and pictures.

7. The electric power and telecommunication infrastructure is poorly developed in rural areas. Shared infrastructure development through public-private partnership may be considered as an option for information dissemination through digital medium in rural areas.

8. The Government may initiate well thought out policies and strategies that facilitate the harnessing of new ICTs for information dissemination as part of agricultural development strategy.

9. Promotion of skilled intermediaries from department of agriculture or NGOs may be necessary for circumventing the weakness of the rural masses in terms of computer literacy, education and awareness.

10. The results of the present study indicate the need for more comprehensive movement regarding agricultural information dissemination through e-extension programmes. This calls for concerted efforts from the part of extension agencies both in public and privates sectors.

# *Summary*

# Chapter-6

## Summary

E-extension is emerging as a powerful tool in the transfer of technology process in agriculture information communication through internet has facilitated the quick transfer of innovative farm technologies to a relatively large number of farmers. Internet is considered as one of the great transformational technologies that changed the way people think, communicate, learn and work. A number of projects that aim at delivery of timely and useful information, to farmers through the medium of internet have been initiated in the recent past. The website raitamitra.nic.in is one of the pioneering efforts in Karnataka State that play an increasingly valuable role in transferring innovative farm technologies to farmers through internet. No rigorous systematic study has so far been conducted to study the extent of farmer participation in the e-extension programme through this website. Hence the present study entitled "A study on farmer participation and effectiveness of e-extension through the website raitamitra.nic.in" was undertaken with the following specific objectives:

1. Extent of participation of farmers in the e-extension programme
2. Socio-economic, technological and psychological factors associated with high levels of participation
3. System factors associated with high levels of participation
4. Information needs of farmer participants in the e-extension programme.
5. Effectiveness of the website in terms of gain in knowledge by the farmers.
6. Preferences of farmers towards selected formats of presentation through the website.
7. Problems confronted by the farmers in accessing information from the website.

The study was conducted in four blocks of Hassan district in Karnataka state namely Arsikere, Belur, Channarayapatna and Sakleshpura. A total of 120 farmers formed the sample size of the study.

The data were collected by interviewing the respondents individually with the help of a well structured and pre-tested interview schedule developed by the investigator for the

study .The data were subjected to various statistical analysis like Karl Pearson product moment correlation, Mean, Frequency, Standard deviation, Quartiles and Kendall's 'w' test and inference were drawn.

## 6.1 SUMMARY OF FINDINGS

The main findings of the study are summarized below

1. Nearly two third of the farmer participants of e-extension programme were in middle age (32-46) group

2. Nearly half of the farmers had educational qualification upto secondary school.

3. Half of the farmers belonged to high income group and 16.6 percent and 37.5 percent belonged to low and medium income group respectively.

4. More than half of the farmers were in low level of efficiency in computer usage

5. Three fourth of the respondents have not undergone any training in computer related aspects.

6. Nearly half of the farmers had moderate level of cosmopoliteness.

7. More than three fourth of the farmers were having low to medium level of media exposure.

8. More than half of the farmers had low to medium level of awareness about ICT.

9. Majority (42.5 percent) of the farmers had a favourable attitude towards ICT. Only one fourth of the farmers had unfavorable attitude towards ICT.

10 Nearly half (45 percent) of the farmers used information sources moderately. About 34.2 percent of farmers had high level of information source utilization.

11 Almost half of the respondents had only low level of participation in e-extension programme through raitamitra.

12 Age had negative significant relationship with extent of farmer participation, which means young farmers were more actively participating in the e-extension programme.

13 Variables like educational status, annual income, computer use efficiency, trainings undergone, cosmopoliteness, media exposure, awareness about ICT, attitude towards ICT and information source utilisation had positive and significant relationship with extent of farmer participation.

14 Factors related to content like usefulness of information and location specificity of information were regarded as the most important system factors by the farmers for effective participation in e-extension programme.

15 Marketing, package of practices recommendations and weather information were regarded as most important areas in which farmers needed information.

16 Nearly two third of the farmers gained only low to medium level of knowledge from the website raitamitra.nic.in and 36.7 percent of the farmers gained high level of knowledge.

17 The study indicated that slide show, video, text plus picture and animated audio were the most preferred formats of content presentation for farmers

18 Farmer participants of the study identified lack of awareness about the website, problem in language and lack of relevance of information as the biggest constraints in using the website .

## 6.2 SUGGESTIONS FOR BETTER INFORMATION DISSEMINATION THROUGH THE WEBSITE raitamitra.nic.in

1.Farmer awareness on the potential benefits of e-extension services through the web portals need to be enhanced.

2. There is an urgent need for significant investment and support for local content development in Kannada language

3. A special technical cell should update the information on the raitamitra website on a daily basis, giving advice to farmers on specific crops in each taluk based on the seasonal crop conditions prevailing in those areas .

4. The information on prices of various commodities in different markets in the State can be posted on the portal on a daily basis.

5. The realization of new opportunities offered by e-extension in agricultural development requires new skills in the use of ICT tools which the farmers are lacking.

6. The formats for content presentation like slideshows, videos and pictures should be incorporated in website

7. Shared infrastructure development through public-private partnership may be considered as an option for information dissemination through digital medium in rural areas.

8. The Government may initiate well thought out policies and strategies that facilitate the harnessing of new ICTs for information dissemination.

9. Promotion of skilled intermediaries from department of agriculture or NGOs may be circumventing the weakness of the rural masses in terms of computer literacy.

10. The results of the present study indicate the need for more comprehensive movement regarding agricultural information dissemination through e-extension programmes.

## 6.3 SUGGESTIONS FOR FUTURE RESEARCH

a The study was confined to four blocks in Karnataka State .Therefore, a comprehensive study covering more number of farmers from a wider geographical area may be undertaken.

b. The scope of the present study was limited to a single website operated by a Government agency. There is a need to carry out studies on the effectiveness of other major websites operated by both private and public agencies.

c. More comprehensive studies on constraints in transferring messages through the e-extension programmes may be carried out.

d. Studies on the utilization pattern of technologies transferred through the agri web portals and the extent of adoption of these technologies may be undertaken.

e. Experimental studies involving farmer participants on effective formats of content presentation may be carried out.

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# *Appendices*

*Appendix 1*

**A study on farmer participation and effectiveness of e-extension through the website raitamitra.kar.nic.in**

For farmers

List of independent variables suggested for study

Kindly rate your response in the following continuum based on how relevant you find each of these variables to the extent of farmers participation in e-extension through the website raitamitra.kar.nic.in

Please indicate by marking tick mark { √ } in appropriate column

MR- More relevant R- relevant
NR- Not relevant LR- least relevant

| sl no | Variables | MR | R | LR | NR |
|---|---|---|---|---|---|
| 1. | Age | | | | |
| 2. | educational status | | | | |
| 3. | Gender | | | | |
| 4. | Computer use ability | | | | |
| 5. | Trainings undergone | | | | |
| 6. | Annual Income | | | | |
| 7. | Material possession | | | | |
| 8. | Cosmopolite ness | | | | |
| 9. | Social participation | | | | |
| 10 | knowledge about computer technology | | | | |
| 11. | Organizational participation | | | | |
| 12. | Media exposure | | | | |
| 13. | Distance to the nearest city | | | | |
| 14 | Awareness about ICT | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 15 | Attitude towards ICT | | | | |
| 16 | level of aspiration | | | | |
| 17. | leadership ability | | | | |
| 18. | progressiveness | | | | |
| 19 | Self interest | | | | |
| 20 | Self confidence | | | | |
| 21 | empathy | | | | |
| 22 | Information source utilization | | | | |
| 23 | Economic motivation | | | | |
| 24 | Scientific orientation | | | | |
| 25 | Communication ability | | | | |

## *APPENDIX – II*

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

| Sl. No. | VARIABLES | Mean relevancy scores obtained on judges rating |
|---|---|---|
| **1** | **Attitudes towards ICT** | **4.43** |
| **2** | **Awareness about ICT** | **4.43** |
| **3** | **Cosmopoliteness** | **4.40** |
| **4** | **Educational status** | **4.30** |
| **5** | **Computer use efficiency** | **4.27** |
| **6** | **Information source utilization** | **4.27** |
| **7** | **Age** | **4.27** |
| **8** | **Trainings undergone** | **4.10** |
| **9** | **Annual Income** | **4.07** |
| **10** | **Media Exposure** | **4.03** |
| **11** | **Scientific orientation** | **3.93** |
| **12** | **Progressiveness** | **3.90** |
| **13** | **knowledge about computer technology** | **3.87** |
| **14** | **level of aspiration** | **3.80** |
| **15** | **Empathy** | **3.77** |
| **16** | **Self confidence** | **3.70** |
| **17** | **Economic motivation** | **3.67** |
| **18** | **Achievement motivation** | **3.67** |
| **19** | **Self interest** | **3.67** |
| **20** | **Organizational participation** | **3.63** |
| **21** | **Scientific orientation** | **3.63** |
| **22** | **Gender** | **3.57** |
| **23** | **Communication ability** | **3.53** |
| **24** | **Material possession** | **3.53** |
| **25** | **social participation** | **3.50** |

## APPENDIX III

*KERALA AGRICULTURAL UNIVERSITY*
**COLLEGE OF HORTICULTURE**
**K.A.U. - P.O., Thrissur-680656**

**Interview schedule for data collection for the study on,**

"**A study on farmer participation and effectiveness of e-extension through the website raitamitra.kar.nic.in"**

1. Name of the farmer
2. Name of the Hobli: Block:
2. Do you have computer in home:
3. Do you have internet connection :

**A) Extent of participation farmers in the e-extension programme**

| Frequency of Method | Score |
|---|---|
| Weekly | 6 |
| Fortnightly | 5 |
| Monthly | 4 |
| Occasionally | 3 |
| Seldom | 2 |
| Never | 1 |

**B.) Socio-Economic, Technological and psychological factors associated with high levels of participation**

**1) Age**

| | |
|---|---|
| Young | < 32 yrs |
| Middle | 32-46 yrs |
| Old | > 46 yrs |

**2.) Income**

| SL.No | Category | Score |
|---|---|---|
| **1** | **<5000** | **1** |
| **2** | **5000-25000** | **2** |
| **3** | **25000-50000** | **3** |
| **4.** | **50000-1,00,000** | **4** |
| **5** | **1,00,000 & above** | **5** |

**3.) Educational status**

| Category | score |
|---|---|
| Up to Secondary school | 1 |
| Secondary school completed | 2 |
| Graduation and above | 3 |

**3.) Computer Use efficiency**

| Sl No | Statements | Yes | No |
|---|---|---|---|
| 1 | I Can Do basic work using MS word | | |
| 2. | I can do tables & drawings in a computer | | |
| 3 | I can burn CD | | |
| 4. | I can Search information which I want | | |
| 5. | I can correspond through e-mail | | |
| 6. | I can scan pictures | | |
| 7. | I can down load interesting information | | |
| 8. | I can copy & save a file into a floppy | | |
| 9. | I can take print out of a page | | |

**4.) Trainings undergone (Computer aspects)**

**Name:** **Duration:**

| Nil | Once | Twice | More than Twice |
|---|---|---|---|
| | | | |

**6.) Cosmopoliteness**

| Frequency(Score) | | | | | Purpose of your visit(score) | |
|---|---|---|---|---|---|---|
| Daily | 2-3 times /week | once in a week | once in a fortnight | once in a month | Agriculture | Non agriculture |
| 3 | 2 | | | | 2 | 1 |
| | | | | | | |

### 7.) Media Exposure

| Media | Regular | Occasional | never |
|---|---|---|---|
| Reading newspaper | | | |
| Listening to radio | | | |
| Reading Magazines | | | |
| Viewing TV program | | | |
| Browsing internet | | | |
| media forums | | | |

### 8.) Awareness about ICT

| ICT | Aware | Some what aware | un aware |
|---|---|---|---|
| **Raitamitra** | | | |
| **Krishi Marta vahini** | | | |
| **e bhoomi** | | | |
| **Kissan call centre** | | | |
| **Expert system** | | | |
| **Video conferencing** | | | |
| **Tele conferencing** | | | |
| **Tele Medicine Project** | | | |
| **Neemadi** | | | |

### 9) Attitudes towards ICT

| Sl No | Statements | SA | A | UD | DA | SDA |
|---|---|---|---|---|---|---|
| **1** | **computers are not useful to farmers** | | | | | |
| **2** | **We can get any information from internet** | | | | | |
| **3.** | **computer mediated communication is an effective means of communication for farmers** | | | | | |
| **4.** | **computer plays a important role in agricultural development process** | | | | | |
| **5.** | **Computer in this office is highly beneficial to farmers** | | | | | |
| **6.** | **It is silly to think that there will be attitude change of farmers through computer usage** | | | | | |
| **7.** | **I like using internet and other ITC tools** | | | | | |
| **8.** | **Modern ITC are better than older technologies** | | | | | |
| **9.** | **Modern ITC provide the accurate & up to date information** | | | | | |
| **10.** | **Use of ITC provides opportunity for overall development** | | | | | |

## 9. Information source utilization

| 1.) Mass media source | Frequency | | | Extent use of information | | |
|---|---|---|---|---|---|---|
| | Regular | Occasional | No | Adequate | Somewhat adequate | Not Adequate |
| **Radio** | | | | | | |
| **Television** | | | | | | |
| **NP** | | | | | | |
| **internet** | | | | | | |
| **2.) Formal personal source** | | | | | | |
| **Agricultural officer** | | | | | | |
| **Higher officials (ADA)** | | | | | | |
| **university / ICAR scientists** | | | | | | |
| **3.) In Formal personal source** | | | | | | |
| **Progressive farmer** | | | | | | |
| **Local leaders** | | | | | | |

## C). System factors associated with high levels of participation

| Sl no | Variable | MI | I | LI | LSI |
|---|---|---|---|---|---|
| 1 | Font Type | | | | |
| 2. | Style of writing | | | | |
| 3. | Layout & design | | | | |
| 4. | Visual content including photographs & video | | | | |
| 5. | Location of specific information | | | | |
| 6 | Oppurtunity for interactivity | | | | |
| 7. | Provision of hyperlinks | | | | |
| 8. | Simplicity of language | | | | |
| 9 | Quick access | | | | |
| 10 | Clarity | | | | |
| 11 | Usefulness of information | | | | |

D**) Information needs of farmer participants in the e-extension programme**

| Sl no | Information Needs | MN | N | ND |
|---|---|---|---|---|
| 1. | Marketing information | | | |
| 2. | General information | | | |
| 3. | Question answer service | | | |
| 4. | Weather information | | | |
| 5. | Organic farming | | | |
| 6. | Package of practices | | | |
| 7. | Inputs price | | | |
| 8. | Information on crop insurance | | | |
| 9. | Management of pests and diseases | | | |
| 10. | Post harvest technology | | | |
| 11. | How to do type of information | | | |

E) **Effectiveness of the website in terms of gain in knowledge by the farmers**.

1. Name the website which gives the information about marketing aspect?
2. Name the website now which you are using?
3. Did you gain any information by going through website, if yes?
   Name one:
4. Mention any three content of this website, which provides information to you?
5. What do you means by NIC?
6. In what way your marketing awareness has been changed by going through this website?
7. Name of the recent varieties known for a crop?

**F) Preferences of farmers towards selected formats of presentation through the website**

| Preferences | Always | Sometimes | Never |
|---|---|---|---|
| Slide show | | | |
| Charts | | | |
| Animated Audio | | | |
| Audio | | | |

| | | | |
|---|---|---|---|
| Clickable interactivity | | | |
| Multi interactivity | | | |
| Video | | | |
| Text matter | | | |
| Text plus picture | | | |

**G) Problems confronted by the framers in accessing information from the website (please rank them as you perceive giving rank 1 to the biggest constraint)**

| **Problems** | |
|---|---|
| Electricity problem | |
| Problems in foreign language | |
| Lack of infrastructural facilities | |
| Technical problem | |
| Lack of local relevance to information | |
| Lack of awareness about website | |
| Cultural barriers | |
| Technology fear | |
| Small font size | |
| Less no of photos | |
| Dull text colour | |
| Slow downloading of information | |

# A STUDY ON FARMER PARTICIPATION AND EFFECTIVENESS OF E-EXTENSION THROUGH THE WEBSITE raitamitra.kar.nic.in

**By**

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**(2006-11-130)**

**ABSTRACT OF THE THESIS**

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**(AGRICULTURAL EXTENSION)**

***Faculty of Agriculture***

***Kerala Agricultural University, Thrissur***

**Department of Agricultural Extension**

**COLLEGE OF HORTICULTURE**
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**2009**

**ABSTRACT**

A number of e-extension programmes have been initiated in India in the past few years for providing digital access to farmers in modern farming technologies through the medium of internet. Raitamitra.nic.in is a prominent web portal operating in the State of Karnataka for orchestrating knowledge extension services and provisioning basic and applied information on various farming activities to the farming community. A comprehensive study was undertaken with the objective of finding out the extent of farmer participation in e-extension through the raitamitra website and various personal, socio-psychological and system factors associated with farmer participation in e-extension programme. The preference of farmers towards various formats of content presentation, information needs of the farmers and problems faced by farmers in using the website were also studied.

The study was conducted in Arsikere, Belur, Channarayapatna and Sakleshpura blocks of Hassan District in Karnataka State. A total of 120 farmers formed the sample size of the study. Extent of farmer participation in the website was the dependent variable for the study. The independent variables of the study were age, educational status, income, computer use efficiency, trainings undergone, cosmopoliteness, media exposure, awareness about ICT, attitude towards ICT and information source utilization.

Results of the study on the extent of farmer participation in the e-extension programme of the website raitamitra.nic.in revealed that almost half of the respondents had only low level of participation in the programme .Only nine percent of the farmers had high level of participation in the e-extension programme.

The results of correlation analysis revealed that nine personal and socio-psychological characteristics namely educational status, annual income .computer use efficiency, trainings undergone, cosmopoliteness ,media exposure ,awareness about ICT ,attitude towards ICT and information source utilization had positive and significant correlation with the extent of farmer participation in e-extension programme. The

variable age exhibited a significant negative correlation with extent of farmer participation in e-extension programme.

Farmer participants perceived three system factors namely usefulness of information, location specificity of information and simplicity of the language as the most important system factors associated with higher levels of participation in the e-extension programme .The assessment of information needs of farmers revealed that marketing ,package of practices recommendations, input price and weather based advisory services were the most important areas in which the farmer participants required information. Slide shows, video and text plus picture were the most preferred formats of content presentation for the farmers.

Nearly two third of the farmers gained only low to medium level of knowledge from the website .Only 36.7 percent of the farmers gained high level of knowledge by participating in the e-extension programme of the web portal raitamitra.

Analysis of the problems faced by the farmer users of the website raitamitra.nic.in revealed that lack of awareness about website, problems in language, and lack of local relevance of information were the major constraints faced by the farmers in using the raitamitra website.