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Cyber extension for transfer of technology in India

S. Arulraj* and N.Ravikumar**
Central Plantation Crops Research Institute Kasaragod 671 124

Abstract

The Information Technology is being increasingly utilized in the Transfer of Technology process in India during the recent years. CPCRI launched its web site in April 2000 and it is encouraging to note that the web site facilities are being increasingly used by the farming community and other clients. A "user analysis" of email services at CPCRI indicated that farmers from Tamil Nadu, Karnataka and Kerala utilized the services to the maximum extent possible followed by students and entrepreneurs. They used the services mainly for obtaining information on the cultivation details, processing technologies and other institute programmes. Coconut crop continued to be the major focus of the clients' queries followed by cocoa and arecanut. Details on the plan for starting a "Net-work Programme on Cyber Extension in Horticultural Crops" are also indicated in the paper.

Key words: Cyber extension, transfer of technology

Introduction

Access to information and improved communication is a crucial requirement for sustainable agricultural development. Modern communication technologies when applied to conditions in rural areas can help in improved communication, increased participation and also in dissemination of information and sharing of knowledge and skills. It is being said that "Cyber Extension" would be the major form of technology dissemination in the near future. However, it is observed that the rural population still has difficulty in accessing crucial information in order to make timely decisions. It is essential that information availability is demand driven rather than supply driven. The challenge is not only to improve the accessibility of communication technology to the rural population but also to improve its relevance to local development.

Improved communication and information access are directly related to social and economic development. There is a concern that the gap between the information rich and information poor is getting wider. New information and communication technologies are generating possibilities to solve problems of rural poverty, inequality and giving an opportunity to bridge the gap between information-rich and information-poor and support sustainable development in rural and agricultural communities.

Limitations of Traditional Extension Methods

Before one can appreciate the question of what really makes cyber extension necessary, it may be helpful to take a look at some of the limitations of traditional extension techniques and processes:

1. **Traditional Extension is expensive**: It costs a lot of money to produce and print extension messages/ brochures. It is also expensive to train a whole chain of extension personnel (right from district level, sub divisional level, at block level to village level extension worker) to understand the new technology and to answer the possible queries from farmers.

2. **Traditional Extension is very time consuming process** for a message to pass from university/ zonal research station (ZRS)/Krishi Vigyan Kendra (KVK) to farmer, it takes many actors to understand the same and deliver it to next layer. This process takes a lot of time and effort on part of extension machinery of the state.

*Head of Division (Social Sciences) **Scientist (Computer Applications)

3. **In Traditional Extension the quality of messages gets eroded as it passes through different layers:** A number of evaluation studies of training and visit (T & V) system indicate that the quality of extension messages gets heavily eroded when it reaches the farmers.

4. **Poor Communication Capacity of existing extension systems**: Most technical staff within the line departments lack the capacity to effectively communicate with both, the research system and the stakeholders group. Firstly, the flow of the information from research to extension tends to be top-down, rather than a two-way, interactive process aimed at identifying and solving serious problems. Secondly there is little use of up-to-date communications technology, including the use of electronic communication to improve feedback and technical support between research and extension personnel, and to facilitate administrative communication.

It is thus found that the capacity of traditional extension system is very limited, and the challenge in terms of reaching all the villages and all the farmers is becoming more and more difficult to meet.

What is Cyber Extension?

Cyber Space is the imaginary or Virtual space of computers connected with each other on Networks, across the globe. These computers can access information in form of Text, Graphics, audio, video and animation files. Software tools on networks provide facilities to interactively access the information from connected servers. The cyber space thus can be defined as the imaginary space behind the interconnected telecommunications and computer networks, the virtual world.

Agricultural Extension, according to Dr. D. Benor, "relates to the process of carrying the technology of scientific agriculture to the farmer in order to enable him to utilize the knowledge and a better economy. Agricultural extension service seeks to impart the necessary skills to the farmers for undertaking improved agricultural operations, to make available to them timely information on improved practices in an easily understandable form suited to their level of literacy and awareness, and to create in them a favourable attitude for innovation and change". Thus Extension is the central mechanism in the agricultural development process, both in terms of technology transfer and human resources.

Cyber Extension thus can be defined as the Extension over Cyber Space. Cyber Extension means "using the power of online networks, computer communications and digital interactive multimedia to facilitate dissemination of agricultural technology". Cyber Extension include effective use of Information and Communication technology, national and international information Networks, Internet Expert Systems, Multimedia Learning Systems and Computer based training systems to improve information access to the Farmers, Extension Workers, Research Scientists and Extension Managers. Cyber Extension may be defined as extension over the cyberspace, the imaginary space behind the interconnected telecommunication and computer-networks, the virtual world.

Important Tools of Cyber extension include:

1. E-mail
2. Telnet
3. File Transfer Protocol
4. Gopher, Archie, Veronica
5. Usenet Newsgroups
6. World Wide Web

World Wide Web

The World Wide Web can help the extension world wide in the following ways:

i) Providing interaction among research scientists, extension workers , farmers and other rural people through e-mail

ii) Providing up-to-date news and information services, such as market prices and weather conditions

iii) A question and answer service among Scientists, Extension Functionaries and Farmers, where experts respond to queries on specialized subjects

iv) Creation and maintenance of Statistical Databases on critical agricultural and rural development parameters that can be queried on demand

v) Providing the details of Poverty Alleviation Schemes on the Internet

vi) Providing status of various Government Programmes and details about their implementation mechanism on demand basis

vii) Hosting web sites by major institutions

participating in agricultural extension, putting latest packages of practices (with more situation specific packages) for various agro-eco regions. These institutions, particularly the project Directorates may also place the diagnostic and pre-emptive farm practices for the major crops particularly the commercial crops, well in advance of the concerned crop season. This can help the extension workers to access latest information in IPM (Integrated Pest Management), INM (Integrated Nutrient Management) and other such practices for high value important commercial crops. The institutions will also be able to get direct customer feedback for their packages

viii) Launching online rural development and extension journals, newsletters etc.(with or without print version)

ix) Providing Internet access at district and block level agriculture and rural development offices. This service may also be open for rural communities on fixed days. This connectivity can also be used to download online publications on useful topics from anywhere in the world

x) Opening of cyber cafes to enable educated rural people and extension workers at village level to have direct access to world wide web for having market information etc.

xi) Providing maps that display different features, such as population density, crops planted, etc.

xii) Providing video clips to demonstrate complex procedures; and audio files for re-broadcast on local radio stations

xiii) Providing mechanism of user/beneficiary feed back for the public Sector Schemes.

Role of Internet in Technology Transfer

We are aware that Internet can play an important role in the efficient use of available resources to maximize agricultural production and productivity. Internet offers enormous potential in enhancing the efficiency of implementation, monitoring and evaluation of various development programs of the Government. It can also act as a powerful medium for the transfer of modern technology to the farmers. Internet and its publication are also very useful in agricultural research, education, extension, planning of crop production, forecasting, post-harvest management, marketing, disaster management etc. Such application of internet would ensure a proper growth of the agricultural sector on a sustainable basis. Besides, farmers can also benefit directly through the utilization of various web sites that have been launched by the Government. Generally, the collection of information on various aspects of crops/agriculture is done by the local patwari or his representative who is already preoccupied with many activities and most generally they fill the records of their own without even a visit to the site. This collected information does not provide the real picture of yield and other related issues. For this purpose, especially trained personnel be engaged that are capable to use internet especially database designed for the purpose of storing the data collected at block level. These data can be pooled for all the blocks on district level that will give a comprehensive information for each block and district. Through internet this information can be retrieved for the entire state and country. Internet web sites are other tools for the farmer to acquire information and solution. Both the development of agriculture and cooperation and ICAR have programs of the Government. These web sites can be visited on http://agricoop.nic.in and http://www.icar.org.in, respectively.

The following are the attributes of Internet Information:

a) A global encyclopedia on virtually any topic - very technical to very trivial.

b) Accessible 24 hr per day, or whenever the farmer has time or the inclination, no need for making a meeting appointment.

c) Information Overload - more information than anyone can possible have the time or the energy to sort through.

d) Quality of Information - tremendous variations depending upon the reasons (perspective) of the source organization for posting the information (environmentalist, lobbyist, legislator, research, social commentary, product sales).

e) Technical Level of Information - ranges from general public information to press release ... extension information .... Research report .... Production information....

f) Authentically / Accuracy of Information - there is no governing internet group that regulates the integrity of the displayed information.

Website facilities at CPCRI

CPCRI Website is one of the most popular Websites among the ICAR Institutes. Approximately 15000 clients are visiting this site (http://cpcri.nic.in) every year. The service was started on April 10, 2000 and the following information are available at our Website.

- About CPCRI
- Achievements
- Transfer of technology
- ATIC
  - ii. Newsletter
  - iii. Services
  - iv. Price list
  - v. Registration for planting materials
  - vi. Ask the Expert

1 AICRP on Palms

2 Frequently Asked Questions

3 Future thrust

4 Publications

5 Personnel

6 Events

7 Feed back

8 Contact us

On-line registration facilities

The users can register their requirements for planting materials, publications, CD ROMs and other technology products through the Web site. The clients can register for the following materials also that are available at our Agricultural Technology Information Centre.

Technological Inputs

To enable the farmers to obtain good quality planting materials and other critical inputs, the following technological inputs are sold at ATIC.

Items

West Coast Tall - coconut seedlings

Other Varieties of coconut seedlings

Hybrids - coconut seedlings

Poly bag coconut seedlings

Arecanut seedlings

Arecanut seednuts - Mohitnagar variety

Arecanut Seednuts - Mangala, Sumangala and Sreemangla

Mushroom spawn (*Pleurotus sp.*)

Earthworms

Vermicompost

Registration for the above materials could be done at ATIC throughout the year and the supply of planting materials would be done at the commencement of planting season. In addition to this, online registration facility through our Website (http://cpcri.nic.in) is available from February 8, 2002 onwards.

Technological products/Processed products

The following processed products, machineries and farm products are available for sales at ATIC.

Items

Arecanut de-husker

Snowball Tender Nut Machine

Coconut Chips

Priced Publications

The priced publications available for sale at ATIC at present are as follows:

Title of the publication

Coconut cultivars & Hybrids

Cocoa Crop Management

Copra Dryers

Organic Farming Technology in Coconut

Arecanut Crop Management

Thengu Sasthriya Vila Paripalanam (Malayalam)

Improved varieties and promising traditional cultivars of Arecanut

Management of coconut gardens

Mixed cropping of black pepper in coconut and arecanut gardens

Cashew Production Technology

Coconut Embryo Culture

Treatise on Palmyrah

Plant Pathology Research at CPCRI

Annotated Bibliography on coconut in India 1977-1990

Coconut Descriptor Part-I

Cocoa

CD ROMs

CPCRI could bring out a series of CD ROMs on mandate crops, which are widely popular among the clientele. We could sell more than 1250 CD ROMs so far through our ATIC Sales Counter. The following CD ROMs are available at present.

Title of the CD ROM

CD ROM on Coconut Cultivation

CD ROM on Integrated Pest Management in coconut

CD ROM on Arecanut Cultivation

CD ROM on Cocoa Crop Management

CD ROM on CPCRI - An overview

CD ROM on Coconut Descriptors Part - II

CD ROM on Integrated Disease Management in coconut

Video films

The following five video films prepared by CPCRI are available at ATIC both as VHS cassette and CD.

Topic

Integrated pests & disease management in coconut

CPCRI - at a glance

Coconut varieties and hybrids

Arecanut cultivation

Coconut cultivation

Audio-cassettes

Four audio-cassettes, prepared by CPCRI in collaboration with Directorate of Extension, Ministry of Agriculture, Govt. of India, are available for sale as cassette as well as CD.

Topic

Coconut cultivation technology

Arecanut cultivation technology

Cocoa cultivation technology

Integrated pest and disease management in arecanut

Feedback

A large number of farmers, students, extension personnel and research workers are contacting CPCRI through the "Ask the Expert Facility" in our website. Similarly, our clients could get ready made answers to the problems encountered by them in the cultivation of coconut, arecanut and cocoa crops through the "Frequently Asked Questions" (FAQ) facility available at our Website (http://cpcri.nic.in)

The web site provided valuable feedback to the scientists working in the various disciplines of research. The major problems repeatedly posed by the visiting farmers which need further research are listed below:

- Stem bleeding in coconut
- Rhinoceros beetle in coconut
- Red palm weevil in coconut
- Button shedding in coconut
- Drought management
- Control of Eriophyid Mite
- Crown choke disease in coconut
- Bud rot disease in coconut
- Control of Mahali disease in arecanut
- Yellow Leaf Disease in arecanut
- Leaf spot disease in arecanut
- Inflorescence die-back in arecanut
- Shoot hole borer attack in arecanut
- Boron deficiency in arecanut
- Stem borer attack in cashew
- Anabe disease in arecanut
- Pseudostem weevil attack in banana
- Sheath blight disease in paddy

E-mail:

E-mail (electronic mail) is the most frequently used application in the cyber extension. Currently, it is being used by over 50 million people for business and personal use. E-mail allows us to send and receive text messages to other users of the Internet. For many people, e-mail is the only Internet application used. E-mail can be sent/ read using a number of tools.

Email queries to CPCRI

Every year, about 1000 email queries are being

received at CPCRI through the Institute web site. A detailed analysis on the background of the users, their profession and the subject matter content of the email queries are presented in the table.

It is interesting to note that the subject matter content in the email queries included a wide variety of topics ranging from the details of cultivation practices in coconut, arecanut and cocoa to planting materials availablity status, availability of our technology products at the Institute, availability of publications including CD ROMs, statistical information on the mandate crops as well as information on the achievements and the research projects in progress at CPCRI. Further, it is to be noted that a considerable number of queries were related to other crops like vanilla, chillies, castor, rubber, mango, lemon grass, patchouli, aromatic plants etc. It is heartening to note that a large number of students from High School level to Post Graduate level were utilizing the web site facility.

Email services at CPCRI - user analysis

Ever since the web site was launched during April 2000, the Institute started receiving an appreciable number of email queries under the titles "Ask the Expert", "suggestions" and "observations". These email queries were attended to promptly and the timely response given by the Institute is widely appreciated.

An analysis of the users of the email services through CPCRI web site was undertaken with 140 respondents selected randomly from among the users of email services from April 2000 to March 2004.

Nationality

Though the email services offered at CPCRI is primarily meant for farmers, students, extension workers and policy makers in India, still 9.29 percentage of clients were observed to be from other countries as indicated in the Table.1.

Table. 1. Nationality of the email users

Nationality	%
India	90.71
Other countries	9.29

The other countries from where clients sent their queries to CPCRI included Australia, Syria, Nigeria, Sri Lanka, Guam, USA, New Zealand, France, UAE, Mexico, Bangladesh and Malaysia.

State wise analysis

The percentage of users from different States in India during the period under analysis is indicated in Table 2.

State	%
Kerala	18.11
Tamil Nadu	25.19
Karnataka	18.11
Andhra Pradesh	11.02
Gujarat	3.15
Other States	24.41

The analysis revealed that maximum number of clients was from Tamil Nadu followed by Kerala, Karnataka and Andhra Pradesh States. As is expected, the four states having maximum area under CPCRI mandate crops viz: coconut, arecanut and cocoa were using the email facilities available at this Institute to the maximum extent possible for improving their production and productivity.

User occupation

The occupation-wise percentage of clients using CPCRI email facilities is indicated in Table 3.

Table 3. User occupation

Occupation	%
Farmers	58.62
Students	21.84
Extension workers	5.75
Scientists	3.44
Entrepreneurs	17.24
Others	4.59

It is interesting to note that farmers were the maximum users of CPCRI email facilities. As the email services provided a rare opportunity to the farmers to contact the National Research Institute in the mandate crops directly and get the response within a short period of time directly from the scientists themselves (with maximum credibility and reliability as indicated in some other survey), farmers were using this facility to the maximum. About 58.62% of users belonged to the "farmers" category. This finding would be an eye opener to a few policy managers who still question the utility of the information technology in transfer of technology process. The next major category of clients was observed to be "students" (21.84%). The email facility was well utilized by the students especially for obtaining critical information/references which helped them in completing their educational assignments.

It is surprising to note that the 3rd major category of users was the "entrepreneurs" with 17.24 % who have surpassed the "extension workers" and "scientists" category with 5.75 and 3.44 % respectively. There is a

general trend in India towards strengthening of efforts in the utilization of food processing and value addition technologies. From the late 90s onwards, additional thrust is being given by CPCRI and other leading institutions for promoting the value addition technologies as a method for ensuring sustainability of coconut farming which was otherwise affected by wide market/ price fluctuations. Entrepreneurs play a critical role in this process. This sector needs to be encouraged further for promoting the coconut industry in general and the welfare of coconut farming community in particular.

Purpose analysis

The purpose for which email users utilized CPCRI web site facilities was analyzed and the details are presented in Table 4.

Table 4. Purpose analysis

Purpose	%age
Cultivation details	23.97
Pests & disease management	11.57
Processing technologies	18.18
Marketing	6.61
Planting materials availability	11.57
Other critical inputs availability	4.13
Institute activities/achievements	14.05
Others	9.92

As is expected, majority of the users (23.97%) approached CPCRI to get specific clarifications regarding the cultivation of coconut, arecanut and cocoa as well as other inter crops that could be grown in these gardens. About 18.18 % of users approached CPCRI for obtaining details on processing technologies.

Crop-wise analysis

The email queries from users were classified based on the crop for which they asked clarifications with reference to cultivation details, processing technologies, planting materials, marketing etc and the results are presented in Table 5.

Table 5. Cropwise analysis

Crops	%
Coconut	51.52
Arecanut	12.12
Cocoa	14.14
Medicinal & Aromatic plants and Spices	9.09
Other perennial crops	7.01
Other crops	6.06

Though, the mandate crops for CPCRI were coconut, arecanut and cocoa, the majority of the clients (51.52%) asked queries on coconut crop followed by cocoa and arecanut. As an indication of the recent shift in cropping pattern towards high value medicinal and aromatic plants as well as spices crops, 9.90 % of the clients made queries on these crops either as an inter/ mixed crop in coconut and arecanut gardens or other related clarifications.

Potential Advantages of Cyber Extension:

1. **Cyber Extension will save money, time and effort:** Scientists will prepare electronic version of messages themselves. These versions don't have to be printed and posted. This will save money and time. Cyber messages will be updated online and that saves time too. Cyber extension can provide more in-depth analysis and can also provide detailed on-farm research results to the curious users/farmers.

2. **Cyber Extension will save time, cut steps from extension process**: Cyber Extension will remove a number of steps altogether from the traditional extension process. In the context of Agriculture, the zonal workshops and training to Subject Matter Specialists (SMS) can be eliminated altogether. All the concerned will get the information immediately and queries/clarifications will also be addressed equally fast, without involving a chain of extension machinery.

3. **Cyber Extension will be information rich and interactive**: It appeals to the curious extension workers and analytical farmers. It will allow them to search and locate the information they need quickly. The extension workers can talk to the concerned scientists for more information on the subject, wherever the scientists may be. The rural technologies can be made available on CD-ROMs for quicker dissemination.

4. **Cyber Extension will offer instant international reach**: Online networks have created an instant global village. Cyber extension will eliminate the time and distance barrier that get in the way of knowing the latest information on any particular problem from any part of the world.

5. **Cyber Extension will be continuously available**: One of the key attributes of an online information service is that it is available all the time, 24 hours a day, 365 days a year. Your cyber extension functionary doesn't sleep; he doesn't go on leave. If you have connectivity, you can get information, from wherever it is available.

Now it is the job of scientists particularly the extension professionals to collate, edit and package the technical information and put it on the net. It is incumbent on all of us including the administrators and Non Government Organizations to get involved in the task of facilitating the up-liftment of the rural communities to provide information access to the last person in the rural areas and thus "Reaching the Un-reached".

Net work programme on cyber extension in horticultural crops

With the increasing use of Information Technology in India, it is imperative that ICAR Institutes also move forward and hasten the transfer of technology process through IT tools. CPCRI is maintaining its web site (http://cpcri.nic.in) during the last three years. The web site is visited by about 15,000 clients per annum. Farmers and other clients are using the web site to obtain information on CPCRI technologies; to register their planting material requirements and also to send queries. However, it was observed that more than 20% of the email queries received at the Institute concerned with the other Horticultural crops. Most of the farmers are growing two or more horticultural crops as a part of their farming system and usually do not rely on a single crop. They would prefer to receive information on all their crops from a single source.

Similarly, CPCRI has produced seven CD ROMs on various aspects of its mandate crops. The interactive mode of utilizing these CD ROMs is well received by the clients who feel at home to use such tools conveniently. Hence, it is essential that the technology packages available at all the Horticultural Institutes are brought together under a net work and are made available to the clients for interactive use. It would be further desirable that the packages are made available in six or seven regional languages also covering the major horticultural crops growing regions. Hence, the present project proposal is submitted with the following objectives:

1. To develop software on the technology packages available at the Horticultural Institutes on interactive mode
2. To net work these technology packages and make them available to the clients in an user-friendly interactive mode.
3. To concurrently evaluate the utility of these packages and make improvements in the system.

Principal Investigator : Dr. S. Arulraj
Head of Division
(Social Sciences)
CPCRI, Kasaragod.

Main center : Social Sciences Division at CPCRI, Kasaragod.

Co-ordinating centers : 21 Horticultural Institutes of ICAR.

Duration : Three years

Budget Estimate - for 22 centers - for three years

	Rs. In lakhs
Hardware at CPCRI	75.00
Hardware at other 21 Horticulture Institutes @ Rs. 2.00 lakhs per center	42.00
Accessories, Stationery and other operational expenses for three years @ Rs. 1.50 lakhs/center/annum	99.00
Research Associates - Three at CPCRI (one in Agrl. Extension and two in Computer Application) & One each (Agril. Extension) at other 21 centres	99.36
Total	314.36

Kisan chatting programme

One of the programmes envisaged in the proposed network programme is the Kisan chatting programme. A few details on this innovative programme is presented here:

Chatting is a real-time conversation via a computer. With chatting facility, one can communicate with other who is anywhere in the world. With the advent of computers and communications, one can speak with other person.

Using the Internet, we can chat with farmers and other clients living in other states without incurring long-distance charges.

Basics of chatting

Chatting in computer jargons means live conversation with other members over the net. At least two people should be needed to chat. Unlike the exchange of e-mail, chatting requires two or more users to be online at the same time and is instantaneous.

There are several types of conversations, from one-to-one conversations to large "talk shows" in which there are a few participants and numerous spectators, called multi-member conversations.

When a Scientist X wants to communicate with a farmer Y, both must be in online and login to the specific channel/chat room that they are interested in.

Channels/Chat Rooms

A chat group is called a channel. The channel usually takes up particular subjects like coconut cultivation, cocoa cultivation and so on. The name of each channel starts with the # symbol. For instance, # cocoa cultivation.

Chatting Types

There are different kinds of chatting depending on number of participants involved in chatting, mode of communication such as voice based or text based.

IRC (Internet Relay Chat)

IRC is a text based chatting feature on the Internet. It allows us to exchange ideas and information with people across the world.

As soon as we type text, it appears on the screen of each person involved in the conversation. On IRC, our conversations are live. Whatever we key into our computer is instantly broadcast to everybody else on our channel, even if he/she is logged into a server on the other side of the world.

Voice chat

Usually one person can chat at a time using the voice chat program. But if we are having a full-pledged sound card, two persons can chat at the same time. In the beginning, the sound may be a bit unclear. But as the technology advances, the sound will go on becoming clearer and clearer.

A special program called Internet Phone is needed to chat with people over the Internet.

Video conferencing

We can have face-to-face conversations with different persons living in different parts of the world. It is one type of voice chatting.

Meeting can be conducted with the help of Video Conferencing. Irrespective of whether we are exchanging information on the impact of new coconut cultivation technologies, reviewing performance, checking on the progress of some project or discussing strategy, there was no substitute till recently for a face-to-face conference.

Equipment needed

The necessary equipment needed to have a video-conference is

1 Single-chip camera
2 High-resolution monitor
3 Speakers
4 Wide-band audio module
5 Low profile microphone
6 Personal computer
7 Video cassette recorder

Conclusion

The paper clearly brings out the scope for utilizing the Information Technology for the spread of new agricultural technologies. In coconut sector, IT tools could be effectively used in the diffusion of innovations with minimum cost but maximum benefit. The research and development personnel in coconut sector shall try to use these innovative tools for ensuring better service to coconut farmers and entrepreneurs.

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