

Farmers' Interaction With Researchers Through Ham Radio Network In Tamil Nadu, India – An Analysis

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A feed-forward and feed-back knowledge exchange network links farmers with researchers, improves the capacity of researchers and extension staff, and benefits all concerned

ABSTRACT

Regular two-way flow of information and knowledge between researchers and farmers is important for continued and sustained agricultural development. Accordingly, the Commonwealth of Learning (COL) and the International Rice Research Institute (IRRI) jointly funded and supported the Tamil Nadu Rice Research Institute (TRRI) and the Soil and Water Management Research Institute (SWMRI) to use the HAM Radio and audio-cassette recording for radio broadcasts.

TRRI and SWMRI with IRRI develop the contents for interactive communication and provide technical support to farmers. COL provided the communication equipment, and helps develop open distance learning methods. The Centre for Ecological Research (an NGO) provides training to farmers and researchers in using HAM radio and maintains the equipment.

The HAM network interconnects TRRI and SWMRI with five villages. Daily one-hour interaction between farmers and researchers started from 2002. HAM villages use whiteboards to announce the salient points of discussion to their fellow farmers in the village. The topics of interest to farmers are those related to insect pests and diseases, rice-fallow crops and soil fertility and nutrient management.

Researchers recorded, edited, and disseminated useful conversations on HAM radio through public radio stations and local newspapers in Tamil Nadu and Pondichery to farming communities beyond the project area. HAM project enhanced the feed-forward and feedback communications between the farming and the scientific communities for their mutual benefit. Experience gained will help to effectively use information technology for agricultural development in remote areas.

INTRODUCTION

National and international research has developed a number of new varieties and environment-friendly crop management technologies. How to communicate this critical knowledge to millions of farmers is a big challenge to research and development community. Against a background of rapid changes in markets and fast developing new technologies in the research pipeline, the demand for real-time information and up-to-date knowledge has become greater in all fields including agriculture. Access to knowledge on latest technologies is highly useful for farmers to continuously improve their farming practices and for policy makers to formulate effective and forward-looking agricultural policy. Agricultural growth in rural areas require three critical inputs: (a) diffusion of modern farming technologies; (b) integration of market with production that enables cost gains to be shared throughout the market chain; and (c) a market-linked crop diversification. All these inputs require the two-way flow of information and knowledge among researchers, extension/development staff, farmers, and policy makers.

HAM AND AGRICULTURE: HOW? & WHY ?

Agriculture, many a time, becomes a gambling with monsoon. Farmers often suffer from drought or flood or adverse policies. For example, during 1978, a severe cyclone destroyed the crops, houses and farm animals in the Cauvery Delta region of Tamil Nadu, India. All communication channels were disrupted in the region; only HAM radio communication came to the rescue of the general public and poor farmers. This

was how the HAM radio was linked to agriculture for the first time in India. Similar to HAM radio, telecenters play active role in knowledge enrichment in countries like India, for organizing teletutorials to students; in Uganda, for rural community; and in Paraguay, for teaching basics of education (Latchem, 2001).

It is an opportune moment to utilize the information technology in the farming sector to simultaneously increase agricultural production, enhance marketing opportunities, and improve farmers' livelihood. The HAM Radio Project was designed to link the research-extension staff with farmers of selected pilot villages in Thanjavur and Nagapattinam districts of Tamil Nadu, India, through interactive communication. This project started simultaneously at Tamil Nadu Rice Research Institute (TRRI), Aduthurai and Soil and Water Management Research Institute (SWMRI), Thanjavur on 25th April 2001. The project has been jointly funded and supported by the Commonwealth of Learning (COL), Canada and the International Rice Research Institute (IRRI), Philippines. In close collaboration with IRRI, the TRRI and SWMRI develop the contents for interactive communication and provide technical support to farmers. The Center for Ecological Research (CER, an NGO) is the local partner responsible for training and maintenance of the HAM equipment.

The COL-IRRI-TNAU-CER collaborative project is aimed at constructive public service through facilitating the communication of scientific information and experiences related to special interest in agriculture among farmers, extension officials and researchers. In short, the project through an interactive delivery system, amateur radio or HAM, enables farmers to directly access emerging technical knowledge from researchers, while researchers gain valuable local knowledge information directly from farmers. Such direct interaction between researchers and farmers will enhance the relevance of research by reorienting it to farmers' real problems and needs. This project is expected to narrow down or remove the existing divide between research and actual farming circumstances in rural areas.

HAM RADIO NETWORKING

MATERIALS, TRAINING, AND DELIVERY

The communication technologies are audio-based, using HAM Radio and audiocassette recorders. HAM Radio, unlike the broadcast radio, is a two-way wireless communication system that facilitates interactive communication, especially during times of emergency and natural disasters (cyclones, floods or earthquakes) when all other forms of communication fail. HAM users may also exchange personal

information, which are not related to politics, religion or entertainment or for any pecuniary (commercial) gain. With modern electronic communication technology, an interface enables users to connect their HAM radio sets and computers for their wireless e-mail and bulletin board system and for very fast communication and error free operation. Yet, it requires no special qualification to obtain a valid license, but the users must be at least 12 years old. Also, HAM users who obtain licenses from the Wireless Planning and Co-ordination wing, Ministry of Communication, Government of India include public, private and community in all walks of life, including rural/urban, rich/poor, civilian/military, farmers/ administrators, politicians and others. The combination of HAM and audio cassette serves a wide range of teaching and learning tools, being simple, the most accessible, the most affordable and the most appropriate technology for economically, educationally and spatially disadvantaged, rural, resource-poor, farming communities.

The HAM radio network connects three villages in the New Cauvery Delta viz., Pasupathikovil, Vandaiyariruppu, and Chinnapulikudikadu, to SWMRI, Thanjavur, and two villages of Ammanpettai and Therazhandur in the Old Cauvery Delta to TRRI, Aduthurai. All five villages and the two research stations are interconnected for simultaneous interaction.

HAM villages have also been provided with whiteboards to make announcements to villagers concerning agricultural issues emanating from daily HAM radio discussions. Each HAM village has also been provided with a cassette tape recorder to record the conversations in cassettes, edit them (if necessary), and provide them to fellow farmers in the villages for dissemination of technical information of interest to them. To further enhance the value of the HAM radio, the project supplements communications on HAM with cassette tape recording at the research stations and dissemination of edited information through local radio stations and newspapers to reach larger farming communities beyond the project area.

HAM RADIO INTERACTION

Farmers of five pilot villages have been interacting with researchers for one hour per day on all working days between 15.30 and 16.30 h from April 2002. The interactions for the period of April 2002 to July 2003 have been analyzed to understand the nature of interaction and information flow. The results are grouped under different categories and presented in this report. The analysis gives an idea about the farmers' needs and areas of interest that will guide researchers and extension staff to take appropriate follow up action and proceed further in assisting farmers.

A FEEDBACK TECHNOLOGY

FEEDBACK ON AGRICULTURAL TECHNOLOGIES

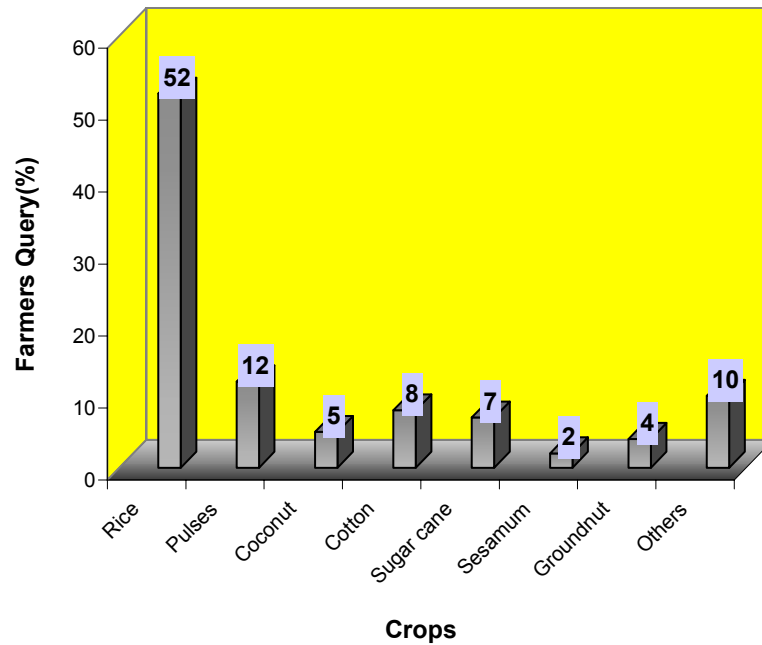
Farmers in the HAM net work villages have raised the maximum number of queries on pest management (19 %), followed by rice fallow crops (13 %), nutrient management (11%) and diseases (10%), (Table 1). This means that farmers in the Cauvery delta zone face serious pest and disease problems (29% of all questions) not only on rice but also other crops grown in rotation with rice or grown on upland. It appears that farmers' knowledge on pest management is low at present and requires adequate training. The researchers and extension staff can use this information as a guide to develop their R&D programs, plan their training activities, and organize field demos targeted to specific pest management areas. This method of demand-driven and targeted R&D activities will be highly effective as they squarely meet farmers' real needs and aspirations, and address their constraints as revealed by the HAM radio interaction.

Table 1. Questions raised by farmers during HAM radio interaction, Tamil Nadu, India, April 2002 to July 2003.

Subject	Inquiry, % of total
Pests	19
Rice fallow crops	13
Nutrient management: Fertilizer, foliar nutrition, micronutrients	11
Miscellaneous	11
Diseases	10
Horticultural crops	7
New varieties	4
Hybrids	3
Weeds	3
Seed treatment	3
Alternate cropping system	3
Others	10

It may be possible that the pesticide retailers in the region do not provide the right information to their farmer clients on pest problems and how to select and use the pesticides properly. If this is the case, pesticide retailers must be targeted for training on local pests, the peak period of incidence, and the types of pesticides they should stock for different crop pests occurring in different seasons. Here again targeted and need-

Fig. 1. HAM Radio interaction on crops

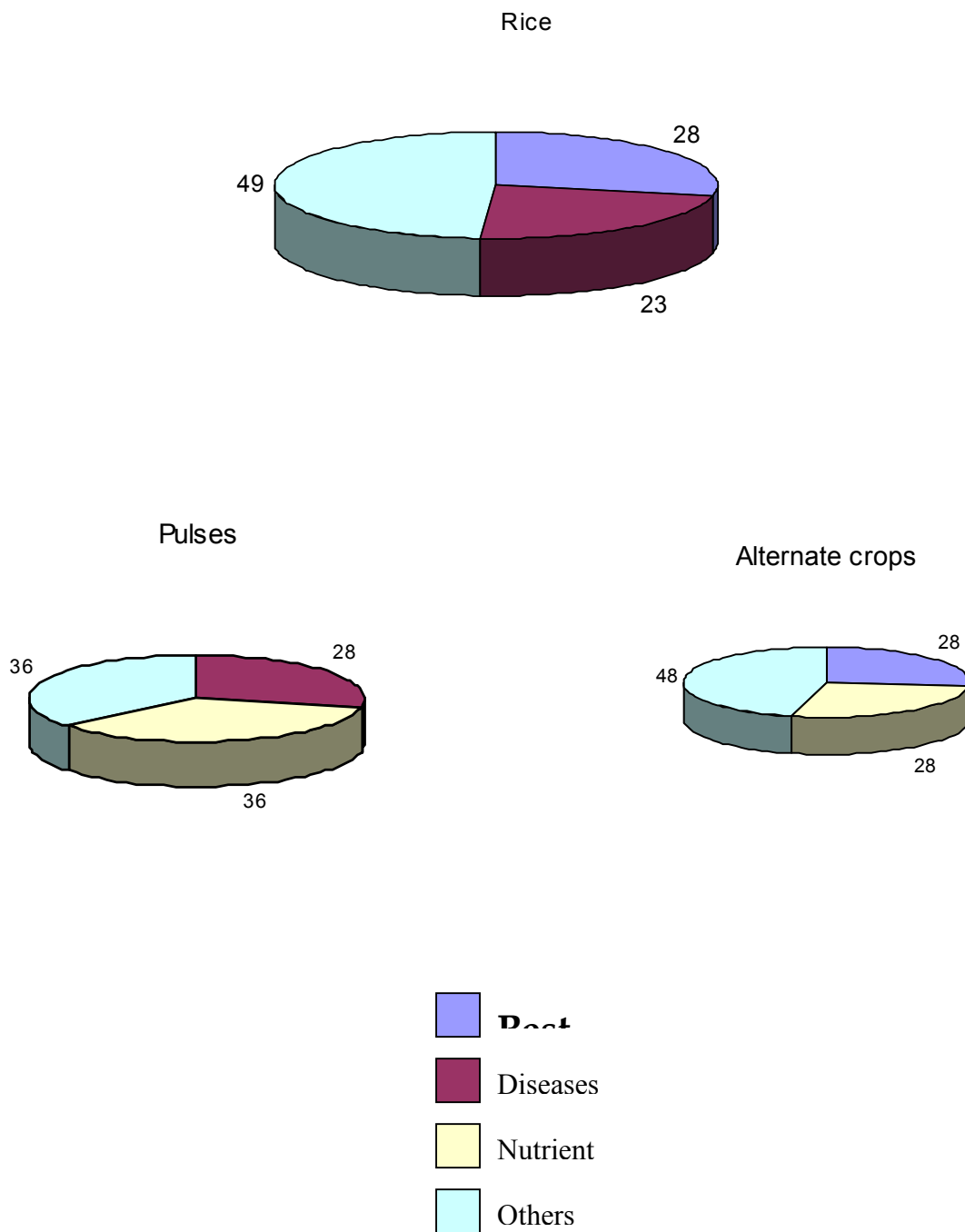


based training of pesticide retailers will be highly effective and rewarding to both trainers and trainees.

FEEDBACK ON CROPS

The HAM interactions included queries on rice and other crops such as grain legumes (pulses), cotton, coconut, sugarcane, sesame, and groundnut (Fig.1). Fifty two per cent of the farmers' questions were related to rice crop cultivation, while 12% of the questions were on grain legumes (pulses) that are generally cultivated as rice fallow crops. Other crops grown in rotation with rice such as cotton, sesame, or groundnut attracted fewer questions from farmers. The queries on specific crops about various technologies are presented in Figure 2.

Fig. 2 HAM interaction about technologies in different crops (%)



HAM radio network orients follow-up actions

The information generated during the HAM Radio interaction paves way for follow up actions with the help of extension functionaries, HAM club members and active farmers. This includes,

- imparting specific training to farmers at village site itself
- organizing lectures on specific topics of interest to farmers through HAM network
- timely broadcasting of information of wider interest through local radio stations and publication in local newspapers
- arranging interactive discussion with farmers, extension staff, and other stakeholders
- arranging practical, on-site education of farmers through field visits and demonstrations
- forecasting for planning agricultural operations, pests and diseases control

OVERVIEW OF FOLLOW UP ACTIVITIES UNDERTAKEN

1. Field visits undertaken

- I. Based on farmers' request made through HAM radio, scientists of TRRI, Aduthurai inspected farmers' fields at Ammanpet village on 26.08.2002. The problem was identified as rice bacterial leaf blight and suitable recommendations were given.
- II. ii. Based on the request made by HAM club farmers, the entomologist of SWMRI visited the Chinnapulikulidikadu and Sadayarkovil villages and inspected summer blackgram fields on 6.3.2003. The problem was identified as the stem fly and necessary management practices were recommended.

2. Forecasting on agricultural messages

- i. Forewarning of the incidence of bacterial leaf streak disease in the village of Ammanpet on 31.10.2002 by the scientists of TRRI, Aduthurai
- ii. Forewarning of the incidence of blast and bacterial leaf blight in farmers' field of Ammanpet and Therazhandur villages on 29.11.2002 and prophylactic measures were recommended by the scientists of TRRI, Aduthurai.
- iii. Forewarning of incidence of caseworm in Ammanpet village on 03.12.2002 by the scientists of TRRI, Aduthurai

3. Special lectures delivered

Scientists of TRRI and SWMRI offered lectures on subjects of wider scale interest as well as based on the emerging needs of farmers arising through HAM radio interaction. The topic, speaker, date and time of lecture were announced well in advance through HAM network. The president of the HAM clubs spread the message through display boards kept in a prominent place of the village. Farmers listened to the lecture, then discussed and clarified their doubts at the end of the lecture. The list of lectures given by researchers is presented in Table 2.

Table 2. Special lectures delivered by researchers through HAM radio to HAM villages of Tamil Nadu, India during 2002-2003.

Messages	Name of Research Station	HAM club	Date
IPM on rice	SWMRI	Ammanpet Chinnapulikulidiku u	05.08.02
Directing wet seeding of rice	SWMRI	Ammanpet	19.08.02
Botanicals in disease control	TRRI	Ammanpet	31.10.02
Mushroom cultivation	TRRI	All HAM clubs	12.12.02 13.12.02
Cultivation aspects and medicinal values of <i>Aloe vera</i>	SWMRI	Pasupathikoil Ammanpet	21.02.03
Hybrid rice cultivation	TRRI	Theralandur	25.02.03
Hybrid rice cultivation	TRRI	Pasupathikoil	28.03.03
Hybrid rice cultivation	TRRI	Ammanpet	31.03.03

4. Meetings organized

HAM club meetings were organized based on request from different clubs to discuss face-to-face emerging problems and issues raised by farmers. The meetings were organized by inviting specific clientele groups such as farmers, rural women group, etc., with the help of the local HAM club. Farmers of other HAM clubs were also able to hear the proceedings through HAM network system. The outcomes of the meetings were

documented and the discussion points were broadcast through local radio station. The details of meetings organized by different HAM radio clubs are furnished in Table 3

Table 3. Village HAM club meetings and topics discussed, Tamil Nadu, India, 2002-2003.

Name of HAM club	Agenda	Date
Therazhandur	Training rural women on agricultural and allied enterprises	27.12.02
Ammanpet	- do -	23.1.03
Pasupathikoil	- do -	28.1.03
Therazhandur	HAM club meeting	28.01.03

A FEED-FORWARD TECHNOLOGY FOR WIDER SCALE DELIVERY BEYOND PROJECT AREA

1. Publication of relevant information of wider interest in local newspapers

To further enhance the value of the HAM radio, the project supplements communications on HAM with cassette tape recording and dissemination of useful conversations through local radio stations and newspapers to reach larger farming community beyond the project area. Selected information of wider interest published in local newspapers are given in Table 4. The idea is to enrich scientific research through feeding in farmers' local experience and wisdom, and at the same time providing up-to-date scientific knowledge to the rural people for their information and education.

Table 4. Edited HAM radio interactions published in local newspapers in Tamil Nadu, India, April 2002 to July 2003.

Messages	Date
a. Dinamalar	
Control of Brown Plant Hopper in samba and thaladi rice crop	22.12.02
Management of Rice Blast	24.12.02
Control of leaf folder, stemborer and leaf mite in samba and thaladi crop	24.12.02
Rodent management	08.01.03

Production technologies for rice fallow blackgram	29.01.03
Crop and varieties suitable for Masippattam (Feb-March)	20.02.03
Management of leaf curl virus and Yellow mosaic virus in rice fallow pulses	13.03.03
Cultivation aspects of sesame in rice fallow period	17.03.03
Control of early shoot borer in sugarcane	04.04.03
Care to be taken during loading of harvested canes	07.04.03
b. Dinathanthi	
Management of Rice Blast	04.01.03
Control of leaf folder, stemborer and leaf mite in samba and thaladi crop	25.12.02
DAP spraying in rice fallow pulses	15.02.03
Crop and varieties suitable for Masippattam (Feb-March)	15.02.03
Fertilizer management for sugarcane	21.05.03
Ratoon crop management of sugarcane	23.05.03
Control of boll worms in rice fallow cotton	25.05.03
Control of sucking pests in rice fallow cotton	27.05.03
c. Dinaboomi	
Management of grain discoloration in rice	09.02.03
d. Malai Malar	
Management of stem rot in summer rice crop	31.05.03

2. Public broadcasting of relevant information through local radio stations

The project supplements the farmer-researcher interactive communications on HAM radio with dissemination of useful conversations through local radio stations. The recording can cover farmers' local knowledge or wisdom expressed through conversations with researchers, comments and responses from the scientific community. Topics broadcast through local radio stations during 2002-2003 are provided in Table 5.

Table 5. Edited HAM radio interactions broadcast through local radio stations in Tamil Nadu and Pondicherry, India, April 2002 to July 2003.

Messages	AIR, Station	Date
Thrips control in direct seeded rice and bund cropping of pulses	Tiruchirapalli	21.11.02

Correction of Zinc deficiency	Tiruchirappalli Karaikkal	09.12.02 05.12.02
Control of Leaf folder, stem borer and leaf mite in samba and thaladi rice crop	Tiruchirappalli Karaikkal	12.12.02 11.12.02 12.12.02
Management of Rice blast	Karaikal	24.12.02
Production technologies for rice fallow blackgram	Tiruchirappalli Karaikkal	31.01.03 29.01.03
Selection of suitable crops and varieties based on the prevailing condition in Cauvery Delta Zone	Karaikal	02.02.03
Management of grain discoloration in rice	Tiruchirappalli Karaikkal	13.02.03 06.02.03
DAP Spraying for Rice Fallow pulses	Tiruchirappalli Karaikkal	20.02.03 21.02.03 20.02.03
Crops and varieties suitable for Masippattam (Feb-March)	Tiruchirappalli Karaikkal	24.02.03 21.02.03
Management of Leaf curl virus and yellow mosaic viral diseases in rice fallow pulses crop	Tiruchirappalli Karaikkal	01.03.03 02.03.03
Fertilizer recommendation for rice fallow cotton	Tiruchirappalli Karaikkal	13.03.03 12.03.03
Control of early shoot borer in sugarcane	Tiruchirappalli Karaikkal	02.04.03 03.04.03
Care to be taken during the leading of harvested canes	Tiruchirapalli	10.04.03
Care to be taken during the firing of sugarcane trash	Tiruchirapalli	17.04.03
Control of sucking pests in rice fallow cotton.	Karaikkal	02.05.03
Fertilizer management for sugarcane	Tiruchirappalli Karaikkal	08.05.03 07.05.03
Ratoon crop management of sugarcane	Karaikkal	20.05.03
Correction of Magnesium deficiency in Rice fallow cotton.	Tiruchirappalli Karaikkal	30.05.03 28.05.03
Management of stem rot in summer rice crop	Tiruchirappalli Karaikkal	04.06.03 27.06.03
Advantages of summer ploughing	Tiruchirappalli Karaikkal	13.06.03 19.06.03

Sterility in Rice fallow cotton – Reason and recommendations	Karakkal	20.06.03
Seed treatment practices for kuruvai rice crop	Karaikkal	21.06.03
Management of alternaria blight in bellary onion	Karaikkal	08.07.03
Control of Leaf mite and mealy bug in kuruvai rice crop	Tiruchirappalli Karaikkal	14.07.03 11.07.03 13.07.03 17.07.03
Control of Leaf minor and perforator in cotton crop	Tiruchirapalli	17.07.03

3. Helping farmers during emergency

- During the unusual heavy rains and flooding at harvesting time in February 2002, farmers were advised on how to save the grain, where to get additional grain legume seeds for re sowing and how to dry the grain soon after threshing in wet weather.
- During the drought period in June-December 2002, researchers advised farmers on contingent crop plan, rice variety to be grown etc. for overcoming the situation.

4. Linking dignitaries and policy makers with farmers of HAM villages

HAM radio network system enabled the farmers to discuss with important dignitaries visiting any of the HAM villages. Farmers of other HAM clubs were also benefited and able to exchange their opinions and receive guidance from visiting dignitaries. The details of the dignitaries who discussed with farmers through HAM radio network during 2002-2003 are furnished in Table 6.

Table 6. Special guests' interaction with farmers in HAM villages, Tamil Nadu, India during 2002-2003.

Name of person	Date
Krishna Alluri, COL, Canada	5.11.01
David Walker, COL, Canada	5.12.01

Jana Janakiraman, GU, Canada	15.7.02
S. Nagarajan, Director, IARI, New Delhi	19.07.02
Marietes Tiango, IRRI, Philippines	06.08.02
V. Balasubramanian, IRRI	05.09.02, 28.01.03, 15.07.03
C.Ramasamy, Vice-Chancellor TNAU, Coimbatore	23.01.03
Meera shenoy, Advisor (PSC), Rural Development, Govt. of AP	30.03.03
M.S. Swaminathan, Deputy Chair Planning Commission	21.04.03
K.T. Kosalaraman, District collector	
T.S. Sridhar, IAS, Secretary, DOA, Chennai	21.06.03
Hameed khan, CPCRI, Kerala	

GUIDANCE FOR FUTURE PLANNING

By analyzing all the information and discussion points and evaluating clients' needs, it has been proposed to intensify training and demonstration on the following topics through HAM radio network.

- Mushroom cultivation
- Kitchen garden
- Farming system components with special importance to fish farming, poultry farming etc.
- Vermi-composting from agricultural and industrial wastes
- Dairy farming
- Goats/sheep rearing
- Experts' speech on organic farming
- Small-scale production and marketing of ***Pseudomonas fluorescens*** and *Trichoderma viridias*
- Production of spawn for mushroom cultivation
- Preparation of fruit jam and jelly
- Inter-cultivation of Aloe vera in coconut gardens

- Medicinal plants and their market potential.

EVALUATION FOR FOLLOW-UP AND IMPROVEMENT

It is necessary to monitor and evaluate HAM network centers by conducting periodic survey in the project area and compare with non-project area. This would give an opportunity to evaluate the project operators themselves for further improvement and to initiate follow up actions. The HAM radio project main center (TRRI) and sub-center (SWMRI) in Tamil Nadu, India undertook the situation survey at the start of the project in the HAM and control villages. The survey was conducted to study the impact of communication on the adoption of agricultural technologies in the Cauvery delta region. Fifty farmers were selected by simple random sampling method. The survey assessed farmers' information sources and their access to new knowledge and technologies. Farmers in all the selected villages were eager to get various kinds of information from the researchers or extension officers if they were provided with free HAM Radio contact. The post evaluation to be conducted in the HAM and control villages would measure our successful interventions and weak points in implementing this project. On the basis of monitoring and evaluation, modifications will be made for future operation.

MOBILIZING RESOURCES FOR SELF-HELP OPERATION

This is a pilot project funded by COL, Canada and IRRI, Philippines with limited infrastructure facilities. The farmers in the respective HAM villages formed HAM clubs for utilizing the benefits through HAM network. The HAM clubs could enroll more members and mobilize funds through subscription and contributions from other stakeholders. Based on the performance, the HAM clubs could propose projects for dissemination of new technologies through meetings/seminars/demonstrations inviting farmers beyond the project area. This would be a way of mobilizing funds and serving the farming community simultaneously.

KEY BENEFITS OF THE PROJECT

- Empowering farmers to actively seek technical advice from researchers and extension staff
Organization of emergency assistance to farmers in times of severe drought or flood.

- Establishment of reliable communication links between farmers and researchers that enable researchers to monitor their field activities in villages
- Timely collection of farmers' feedback on new techniques and other issues
- Establishment of linkage between TRRI/SWMRI/TNAU, IRRI and COL for facilitating distance education and exchange of information.

SUMMARY AND CONCLUSIONS

The audio-based communication technology using HAM radio is simple, reliable, interactive, and inexpensive. In close collaboration with IRRI, the TRRI and SWMRI developed the contents for interactive communication and provided technical support to farmers. The COL provided the HAM communication equipment and advised on the use of audio-based technologies for open distance learning. The CER, an NGO, was responsible for training the users in HAM radio operation and maintenance of the equipment. The HAM network interconnects two research stations (TRRI and SWMRI) and five villages in the Cauvery Delta zone of Tamil Nadu, India. The salient points of the project are,

- dissemination of farming information in the project area
- dissemination of useful HAM interactions through local radio and newspapers to farmers beyond the project area
- regular interaction held at fixed hours indicated that HAM network enhanced the feed-forward and feedback communication between the farming and the scientific communities for their mutual benefit.
- farmers in the Cauvery Delta of Tamil Nadu appear to be less informed about crop pest management. The researchers and extension staff can use this information to develop demand-driven R&D programs
- such demand driven and targeted R&D activities will be very effective to meet the farmers' real needs as revealed by HAM radio interaction.

The experience gained from this project will be helpful to effectively use the information technology for the development of agriculture and empowerment of farmers in remote areas of any country in the Commonwealth and beyond.

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