Chapter 5  Rural Knowledge Centres as Facilitators in Farmer-Expert Information Exchange and Rural Capacity Building

5.1 Existing Scenarios at the Study Area

The Mandal Agricultural Officer (MAO) is a local agricultural expert provides advice, education and technical information to the local farming community. He/She is assisted by two field staff known as Agricultural Extension Officers (AEO), to satisfy the information needs of farm communities lives in their jurisdiction. In this study, AOs jurisdiction (study area) is 21 revenue villages. He/She is well connected to variety of agriculture knowledge producing agencies, and plays a pivotal role in the state agricultural extension system\(^\text{15}\) (Figure 7). Subject to the

\(^{15}\) The Agricultural Extension work was reorganized from Department of Agriculture in 1960s based on Crop Development Schemes designed by the Government of India. It was again re-organised into two wings, ie, Extension and Inputs in 1976. The extension wing transfer technology from research communities at lab to farm communities at field level by preparing the plans right from Farm level, Village level to District level. Input wing assess the farm input requirements and handle department godowns. For better span of control and enforcement of quality control orders, this was again reorganized in 1993 by introducing subject matter specialists with key supervisory cadre, Assistant Directorate of Agriculture, for geographical agriculture sub divisions comprising 2–8 mandals. Yet 254 offices were deployed in Andhra Pradesh. Agriculture officer and Agriculture Extension Officer were appointed at Mandal level for solving village farming community problems. (source: http://agri.ap.nic.in/, Last visited Dec 2005).
necessity, the MAO and AEOs do visit farmer fields to better understand the problems. Apart from this they do routine administration work such as developing reports on input requirements, proper distribution of seeds and subsidies according to the guidelines of the state commissioner of agriculture. However, it is not that easy for an MAO assisted by two AEOs to provide need based timely advices by visiting 21 village farmers fields physically (understanding the problem for providing right advice). As pest and disease outbreaks are more or less in similar time in almost all villages, farmers need right advice from the extension department at critical stages. However current public extension systems are in a state of disarray to satisfy the information needs of farmers. In most of the cases the information needs of farmers are met by either family friends (who are not very well informed about the modern agricultural practices) or pesticide shop owners (who never bother about the welfare of farmers). A recent ICAR publication reported that expert-farmer ratio is 1:2000 and each farmer receives only 43 min. of AO time in a year. The virtual mode of extension services through contemporary ICTs and Rural Knowledge Centres would resolve some of these issues and develop alternative avenues for strengthening the existing system. In this study, an attempt has been made to conduct a study to identify the arrangements needed for proper use of ICTs and Rural Knowledge Centres (RKC) to enable effective information transfers between farmers and experts. The study results of ICT mediated Asynchronous and Synchronous mode of information transfers presented in following paragraphs.
5.1.1 Case 1: Information Exchange in Asynchronous Mode

As an outset of the study, a web based content management system (Figure 8) was developed, and training was provided to the ICRISAT experts and Village Net Work Assistants (VNAs) on the use and operation of the CMS. The resources were mobilized which includes human
resources (both ICRISAT experts and VNAs agreed to carry out this service for the benefit of the farm communities), available information, and records (onsite and electronic) to keep track of the farmer visits and feedback. The VNAs and Village Volunteers distributed pamphlets (Figure 9) in local language (Telugu) to bring awareness about the service in the local farm communities. The method has been defined to carry out the agro advisory service such as the VNAs either collect the questions from the farmers (or) farmers come and post their questions at RKC. The questions were transmitted through web-based content management system by VNAs for the experts’ advice. The experts receive the question by accessing the web-based content management system and provide solutions on the same. The VNAs receives the answers and informs to the respective farmers; and also write down on the black board positioned outside of the RKC (Figure 10). Both the VNAs (record books maintained at RKC) and web-based content management system keep track of all the question and answers and feedback collected from the users. It was decided that the service should be open to everyone irrespective of age, sex, religion, caste and level of literacy.
Figure 8: Web Based Content Management System
Figure 9: Pamphlet distributed to bring awareness on the ICT mediated distance agro-advisory service
The first set of questions received (transliterated from Telugu to English) on 1 October 2004 and provided answers on 7 October 2004 (Table 4). The data revealed that the questions were not clear, for instance “I have pest problem in my field”, and the ICRISAT experts were forced to seek several clarifications from the VNAs over phone for problem diagnosis. Consequently the whole process was delayed. After analyzing these details, it was decided to train the VNAs on ICT mediated agro-advisory process. The details of the onsite training program conducted for three days are as follows:
**Day One:** The VNAs were requested to observe the process of *collection of questions* – *processing of questions* – *transmitting them to the experts*. During this process the responses were received on the same day, because the trainers have also asked questions (on the stage of the crop, previous crop, kind of problem, and period of plant’s sickness) before receiving a question from the farmers. At the end of the day, the trainers have explained to the VNAs and Village Volunteers, the way the answers were received immediately, and made them clear for receiving answers to the questions posted in a distant mode should have adequate information for diagnosing the problem.

**Day Two:** The VNAs and Village Volunteers were requested to practice the Day One process for conducting the ICT mediated distant agro-advisory service. The critical observations were made during the practicing sessions, and shared with them at the end of the day. The VNAs and Village Volunteers received answers at the end of the day from the experts for the questions posted by them. They have realized the need of processing questions before sending them to the experts. During the process it was found that the processing of answers are also required at receiving end to make them more localized for effective usage.

**Day three:** The VNAs and Village Volunteers were requested to repeat the Day One process with needed correction on Day two to make them more habituated to the process.
Observations

- Most of the farmers were not able to read and write; they were not aware of the details an expert would need to diagnose a problem.

- It was observed that 80% of the questions were related to pest and disease problems (sometimes it reached to 100%), 20% were related to information about locally suitable varieties, seed availability, water scarcity issues etc.

- Prior to the training, the VNAs and Village Volunteers were transmitting the farmers’ questions to experts without any value addition. For example:

  **Before training:** ICRISAT experts received a question ‘I see flower dropping in my castor field, please advise me’ from Sivaramulu, 32 years old, resident of Jaanampeta village.

  **ICRISAT experts’ response:** Expected more details to understand the problem before providing the solution, because of their concern for reliability. Most of the ICRISAT experts were not familiar with local terms (localization is a serious issue in agricultural extension, because local names vary from one location to another even within a province. Experts often used scientific names in their discussions).

  **After training:** The same question was repeated - ‘In 3-month old castor crop in my 4-acres land, I have observed two kinds of flowers, red and green; only the red flowers turned in to fruit and the green flowers dropped, please advise me’ from Shantamma, 35 years old, resident of Vemula.
**Advice of ICRISAT experts:** Green flowers were male flowers, after fertilization male flowers dropped, and the red female flowers turned into fruit. This is natural phenomenon and there was no need for taking up any measure.

- After the training program, the confidence levels of the VNA’s have been increased, and farm communities started receiving solutions within 48 hours.

- The farm community expressed satisfaction with the service available at the RKC.

Satyanarayana Reddy, 45 years old literate but poorly informed farmer, resident of Jaanampeta village, says ‘earlier we used to take the advice from the pesticide shop dealers on random mixing of the pesticides. Now with the help of this service we are able to figure out the accurate dosage. It saves money.’

Chandrakala, 30 years old, a resident of Kommireddypalli village, says ‘we are happy with the service, I brought quinolphos for a pest problem in my field, and it worked. Earlier, I used to buy mono (monocrotophos), on the advice of pesticide dealer for any problem in my field. I used to get mixed results’. The experiment showed that ICT-enabled hubs would be useful in creating a para-extension worker out of a rural youth with only marginal investment. This would be valuable in a situation where the public sector extension has become weak or unavailable.
Conclusion

A number of emerging ICT mediated agricultural extension model projects consider fulfilling farmer-queries as a key service, and use variety of ICT and techno infrastructure ranging from telephone to web based interfaces to enable information exchange between farmer and expert. The findings of this study reveals that there is a need of intelligent intermediaries to make remarkable difference in farmer-expert information exchange, and adding an element of learning among the credible “info-mediaries” might lead to more effective and satisfactory (from the farmer’s point of view) responses than design of interfaces on telephone or PC-based platforms.

<table>
<thead>
<tr>
<th>No. of ques. received</th>
<th>Repeated questions Date</th>
<th>New ques.</th>
<th>Unanswered</th>
<th>Date of answers provided</th>
<th>Process duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 October</td>
<td>8</td>
<td>3</td>
<td>-</td>
<td>0</td>
<td>7 October</td>
</tr>
<tr>
<td>2 October</td>
<td>6</td>
<td>4</td>
<td>-</td>
<td>0</td>
<td>7 October</td>
</tr>
<tr>
<td>14 October</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>0</td>
<td>18 October</td>
</tr>
</tbody>
</table>

After training

| 24 October            | 2                       | 0         | 2          | 0                       | 24 October       | 8 hours         |
| 4 November            | 17                      | 12        | 5          | 0                       | 5 November       | 31 hours        |
| 14 November           | 24                      | 16        | 8          | 0                       | 15 November      | 26 hours        |

Table 4: Analysis of the (questions) data collected during ICT-mediated agro-advisory process

In the experiment, it was observed that the time-to satisfactory response declined from about 6 days to less than 24 hours, going down to as low as 8 hours with the help of trained
intermediaries. There is remarkable difference before and after training in refining farmers queries before passing to the experts; and refining answers from the experts before passing to the farmers routed through an online content management systems and email communication system [133]. From this study it is evident that there is a need of rural capacity development for handling the effective information and knowledge transfers and information management.

5.1.2 Case 2: Information Exchange in Synchronous Mode

In this study, a two-way video-conferencing facility (donated by the Indian Space Research Organization in association with the M S Swaminathan Research Foundation) was used to examine and observe the effectiveness of synchronous platform (no time delays with Video Conferencing) with Asynchronous platform (time delays with web based online content management system).

Infrastructure for Video Conferencing (VC) was installed at both the Addakal hub centre (AMS office) and the ICRISAT-VASAT office. The timing for video conferencing was scheduled between 1400 – 1600 hrs on the request of rural farm families. Followed by training to the AMS staff and VNAs, the study was conducted for Kharif 2005 i.e., June – November 2005. During the VC time the AMS staff and the ICRISAT-VASAT staff act like facilitators to enable the communication between the farmers and experts. Since it was a new experience for both experts and farmers in the initial sessions the time spent for the communication adjustments and technical adjustments were more than the time spent for agro-advisory, however, over a period of
time they overcome the problem by maintaining few communication protocols, and habituated to the whole process.

**Observations**

- Farmers found it as good as face-to-face interaction with the experts, and they appreciated the tool as it provided them with a wider reach and better impact.

- Experts were able to examine the affected specimens displayed by farmers via video and diagnose with a fairly high degree of accuracy. They however admitted that a short training on how to interact via video would facilitate better articulation with their remote clients.

- Employing videoconferencing for facilitating farmer-experts interaction has brought out several additional benefits. The questions and answers recorded during the VC serve as high quality content. These offer excellent opportunities to develop need-based content such as FAQs on groundnut and livestock management that could be immediately distributed through CDs to all RKC s for future usage.

- The VC sessions organized with the centers located in other parts of India encouraged farmer-farmer interactions.

- The VC session organized with the then President of India, and then Chief Minister of Andhra Pradesh encouraged taking policy level decisions in favour of farming community.
Conclusion

The videoconferencing process required certain adjustments in communication habits because of high latency in connection (resulting in delay in voice reaching the destination). Except the cost factors, the VC found better than the asynchronous mode of communication for enabling effective information and knowledge transfers between and across rural communities, scientists, educators, administrators, health care providers, technology enablers for improving the agro-ecological and socio-cultural conditions of each village. Based on their experiences, experts of ICRISAT recommended that the VC is an effective tool for rural capacity building through open learning methods.

Figure 11: Farmer-Expert Communication: Synchronous Mode
5.1.3 Case 3: Video Conferencing as a tool for Rural Capacity Building

After a refreshing training to the AMS volunteers on basic computer operations, Telugu (local language) digitization, and Video Conferencing (VC) operation, virtual classes were organized from January 2006 on day to day agricultural practices and advisories on Groundnut crop (Figure 12). At the request of farming communities and the AMS volunteers (from farming community family) the classes organized from 1400 – 1600 hrs. During these sessions the women noted down the important points relevant to them. The recorded sessions CDs were provided to the volunteers. Following the virtual classes the trained rural women were organized farmers meetings in their respective villages in the evening hours and shared their notes with them. The questions from the farmers were reviewed during the sessions. Moreover the volunteers digitized the content and prepared power point slides in local language (Telugu) for future usage.

The AMS volunteers, trained rural women, with higher secondary level school education and farm community background, developed locally relevant information from the ICRISAT generic learning modules on groundnut by following experimental ICT mediated open distance framework. It was observed that the learning modules were rich in locally accepted words (Figure 13), and this method was widely used in later stages by the VASAT coalition partners for generating locale specific content from a generic content pool [134], for instance Maharashtra Knowledge Corporation Limited and Pune University adopted (in Marathi Language, Local Language of the region) the ICRISAT-VASAT content and trained 30,000 rural youth.
RKCs as facilitators in farmer-expert information exchange and rural capacity building

Figure 12: ICT mediated ODL approach for Rural Capacity Building

Figure 13: Content Created by Rural Women
5.2 Evaluation

An evaluation study was conducted in between July – August 2006 at the end of the season, by interviewing the rural farm families in the study area and results were presented in the following sections.

Interviews with 80 women and 60 men who underwent the ICT based training programmes showed that all of them learnt certain new dimensions in drought management. Ms. Punyamma of Nandipet village said that she learnt that she should focus on low water requirement crops such as sorghum and millet. In the village of Janampetta, Vimalamma, the VNA, said that she learnt about crop rotation in the ICT based training programmes over video conferencing. She talked about the crop rotation in her Self Help Group meetings, which has led to large scale planting of “groundnut after paddy” as a system of crop rotation. According to her over 200 farm families in and around her village took up such crop rotations. Ms. Vimalamama has been able to obtain answer through video conferencing for queries raised by 75 farmers during last 6 months, in her village, which has around 500 households. She said that most of the farmers who approach her for solutions are small and marginal farmers who come from marginalized sections of the society. The medium and large farmers do not approach the spokes or hub as they have access to government extension officers. Thus RKC was able to have a positive bias towards small and marginal farmers who had little or no access to organized extension services, and served very well to cater to such information demand emanating from the small and marginal farmers. Similar viewpoints were presented by the VNA at Vemula who said that small and
marginal farmers from the marginalized sections of the community visit her and seek solutions. The on-farm trial experiments and supply of micronutrients and biopesticides provided by the ICRISAT-VASAT project have further added value to the role of RKC and she wanted the establishment of NPV production centre in her village. The centre at Komireddypalli has been attracting small and marginal farmers numbering 30 to 40, who meet once in a week in the centre and discuss various aspects. According to the VNA, she receives 15 to 20 questions per week from the farming community in her village.

An attempt was made to build a profile of the users based on the RKC register of Janampeta and Vemula (Table 5).

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Number of Visitors</td>
<td>32</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>Number of Male visitors</td>
<td>8</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Number of Female Visitors</td>
<td>24</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Number of Small and Marginal Farmers</td>
<td>27</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Number of Medium and Large Farmers</td>
<td>5</td>
<td>13</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5: Profile of Visitors at Rural Knowledge Centre

The data of the first month of the season and last month of the season of Janampeta and Vemula were analyzed for understanding the profiles of the user patterns. During July 2005, both
Jaanampeta and Vemula had large number of female visitors. However during December 2005, the profile changed completely at Vemula, which was visited by more males. Similarly, during July, most of the visitors to Vemula were medium and large farmers whereas the visitors during December were mainly small and marginal farmers. The discussions with the farm families in the later seasons revealed that the reason for this change is because of the changes in the cropping season. The ICT mediated Agro-advisory in both asynchronous and synchronous, rural capacity building through VC, and other services being offered at RKC won the faith of the rural families residing in the villages.

Within a short span of time, the ICT enabled RKC initiatives have created effective information flows and continuous learning cycles between experts and rural farm families; and among villagers particularly among women. Since the AMS is women federation, the hub operators and VNA (spoke) operators playing a role of facilitators and info-intermediaries.

5.2.1 VNAs as Knowledge Intermediaries and Gender Issues

AMS being a women’s organization, focuses on woman as “development agent”. The integration of these development agents in the predominately “male farmer’s” world has resulted in certain interesting premises. When enquired whether male farmers accept their role as knowledge intermediaries the three VNAs of Jaanampeta, Vemula and Komireddyppalli said that small and marginal farmers from the “lower” caste groups do not have problems in accepting women as knowledge intermediaries, since women play a major role in decision making in agriculture. On
the other hand medium and large farmers belonging to “upper” castes do not respond to women as knowledge intermediaries since gender differentials are strong in these groups in agriculture decision-making. In the village of Komireddypalli, some of the farmers during discussions referred VNAs as *agricultural officers* and they said that they visit AMS to get agricultural advices.

When the video conferencing was taking place between the President of India and AMS, some of the males protested outside saying that they should have a lead role in the entire process. AMS was able to resist their demand and at the same time obtained apologies for their behavior. The introduction of the ICT in the AMS has helped to keep its accounts and financial transactions transparent. Some of the senior members of the organization have to leave the organization, when the members, through computerizing the accounts, found evidences of mismanagement.

The huge financial transactions and the control over credit have empowered these women. Their ability to face conflicts and capacity to negotiate in the political platforms has been further strengthened with the introduction of ICT enabled RKCs.

### 5.2.2 Institutional Linkages

The study pointed out that the AMS has established strong linkages with ICRISAT as per their agreement, however, the AMS staff and VNAs found it difficult to have linkages with Agriculture Department, Animal Husbandry Department, Commercial Banks and Agricultural University. According to ICRISAT experts, and VNAs the district administration and the local level officers of various departments have been regularly invited for various programmes. While
one of the field officers claimed that he had never visited the hub at the AMS office, the VNAs showed photographs of the officer interacting with VNAs in the hub. Some of the officers felt that if ICRISAT could enter into formal agreement with their departments there would be a sustained interaction between the departments and project.

In the village of Vemula, some of the small and marginal farmers felt that agriculture department still plays a major role in the district’s agriculture. However there is only one officer for the mandal who is assisted by two personnel to cover 7500 farmers in 28,000 acres. Thus, there is one extension agent per 3750 farmers covering 14,000 acres. This ratio is inadequate and even if it is assumed that these persons have less administrative responsibility and more time for extension work, it would be physically impossible to answer problems, facilitate linkages, supply inputs, distribute subsidies, convey information and act as knowledge brokers. They require support from para extension workers such as VNAs and Village Volunteers and continuous flow of information. At present they do not have access to these resources. The field officers of the Department of Agriculture agree that if their department is appropriately integrated with ICT enabled RKCs, their role as extension agents could be further strengthened.

It was observed that the input suppliers and traders are the main source of information to farmers all over India. Addakal is no exception to this practice. However, this market influenced information offers little scope for knowledge platform. The VNAs pointed that before the introduction of the ICT in Addakal, the farmers were the silent passive listeners to the information supplied by traders. After the introduction and interaction through ICT, the farmers have started debating with the input traders, the relevance of their information. The debates,
dialogues and discourses, which are the important components of community based knowledge management, have been strengthened with the introduction of ICT enabled RKCs.

Andhra Pradesh has also been experimenting *Raitu Mitra Groups (RMG)*, an SHG movement exclusively for farmers. Though this movement is not as strong as women’s SHGs, in some places RMG are playing active role. In Addakal, though there are more than 150 RMGs, only 30 RMGs are functioning. The members of RMG now and then visit the *hub and spokes* as individual farmers, but RMG as a group do not have formal linkages with the ICT enabled RKCs.

The State Agricultural Universities (SAUs) offer scope for continuous information flow and facilitate knowledge management process. There is a scope for linking the Regional Agricultural Research Station at Palem and the District Agricultural Advisory and Transfer of Technology Centre (DAATTC) of Acharya N.G.Ranga Agricultural University (ANGRAU). DAATTC usually consists of four to five scientists from the field of agronomy, entomology, extension and fisheries. This centre closely interacts with the agricultural department at the district level and facilitates the transfer of technology. It trains the departmental staff and farmers and regularly facilitates the transfer of technology after refining it to suit the local condition. This unique institutional arrangement is considered as a step towards capacity building and continuous learning among the departmental staff. In a year it conducts training covering more than 3000 officials and farmers. Exploring such relationship between the ICT enabled RKCs and these institutions would help to improve the interactions between farmers and extension officials of the State Government. Similar efforts should be made in the case of animal husbandry also.
Moreover the linkages with private sector can also contribute substantially in providing information and market linkages.

Realizing the need for such an institutional approach, ICRISAT has taken certain steps to bring various partners into consortium mode. The mission of the Consortium is to contribute to improvements in the livelihood, income and food security of farmers through provision of new generation knowledge, learning and information services, and to offer enhanced capacity strengthening and continuing education services to course developers, extension personnel, university students and rural learners.

5.3 Conclusion

Dialogues and discourses at vertical and horizontal levels are the important components of knowledge management at a community level. There are evidences that the ICT initiatives at Addakal have enlarged the canvass for dialogues and discourses particularly at vertical level. The interaction between the scientific community and the village community has been strengthened. During these interactions the villagers are able to debate about the scope and problems of new interventions. Participatory research through on-farm trials has enabled the village community to play a major role in knowledge management. The feedback from the village community has helped ICRISAT to further strengthen its research.

However, there is a need to strengthen the interaction at the horizontal level. ICRISAT [135] points out that the peoples living in desertification-prone areas hold local technology and knowledge (TK) resources that are critical in the search for solutions. Traditional TK interacting
with contemporary TK can help partners think ‘outside the box’ to come up with new practices that are appropriate to their conditions. But finding practical means for engaging such intensive, ongoing dialogue across time, distance, and cultural gaps remains a challenge. ICT enabled RKC based initiatives of this kind can help in building ongoing dialogue across time, distance and cultural gaps. Such a process requires a stronger interaction between the community in knowledge management and consolidation of traditional knowledge.

5.4 Recommendations

In a research and development process, it is essential that the target group for whom the research is being conducted should be consulted and the feedback is integrated in the research for improving the knowledge, product or services. Many organizations do not have institutional mechanisms for completing this loop. ICT enabled RKCs offers such a platform through which scientists can test the relevance of their activities vis-à-vis the user group. In this context ICT enabled RKC strategy could serve as a strategy not only for ICRISAT but also for all other CGIAR and agricultural research institutions in addressing the “last mile problem” of lab to land programmes.

Since many countries are investing less and less resources in extension, National Agriculture Research and Extension Systems (NARES) are looking for cost effective, socially acceptable, "outcome oriented" extension system. Evolution of various extension models, as action research is important to support NARES. Hence this approach could be integrated in NARES through capacity building and policy advocacy.
Recently, CGIAR in its *Desertification, Drought, Poverty and Agriculture; Building Livelihoods, Saving Lands* has identified “Breaking Technology and Knowledge Barriers: Increasing Impact with an "ICT for Development" Strategy as an important theme. According to the study results “the Rural Knowledge Centre strategy” has shown great promise when appropriately implemented, providing an information exchange platform that can benefit the poorest farm families in villages”. 