PRELIMINARY ASSESSMENT OF THE COMMUNICATION MECHANISMS USED IN THE VIRTUAL ACADEMY OF THE SEMI-ARID TROPICS (VASAT) PROJECT

María M. Albicette[1], Rosana P. Mula[2], Ram N. Kumar V.[2]

[1] National Agricultural Research Institute (INIA)
[2] International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Abstract

Information and Communication Technologies for Development (ICT4D) have shared preoccupation developing specific mechanisms and tools, considering their applicability, outcome, and impact. An analysis of an eight-year extension project in 21 villages in India suggests that the development of a multimedia approach to knowledge sharing to include extension education, considering both the local farmers´ organization and the context, brings about good results. Such outcomes are related not only to the technological frame, but also to economic, social, and ecological issues. A qualitative research taking into account farmers and local peoples´ opinions using a theoretical approach of Reflective Appraisal of Programs (RAP) presents some of the implications and lessons learned that can be adopted in the ICT4D projects.

Keywords: agriculture, multimedia, information and communication technologies for development (ICT4D), extension, knowledge sharing and innovation

1. Introduction

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is one of the 14 institutions of the Consultative Group on International Agricultural Research (CGIAR) continuously working on new and effective linkages between research and extension subsystems in the agricultural knowledge system to improve information access. Economic, social and political life in the 21st century will be increasingly using digital devices and those without Information and Communication Technologies (ICT) will be excluded (Heeks, 2008:26).

According to Balaji *et al.* (2007) and Rudgard *et al*. (2011), the Information and Communication Technologies (ICT) for Development (ICT4D) is an umbrella that includes computer hardware and software, digital broadcast, telecommunications technologies, social networks, interfaces for sharing information through the Internet, TV, radio, mobile phones, cloud computing facilities, geographic information system (GIS). It also includes the policies and laws that govern their widespread use. That digital technology domain intersects with development goals in search of a delivery mechanism (Heeks, 2008:27).

A "triple helix model" conceptual framework was used at ICRISAT to emphasize three strands to be observed as a unique chain[1]. First, there is a necessity for useful knowledge. Second, the ICT4D model is emphasized. Third, an open-distance paradigm is required in an effort to personalize learning for masses. This also takes into cognizance the future with distances being shortened by technology access.

[1] For more information about the "triple helix model": http://vasat.icrisat.org/?q=node/96

Acknowledgments: The authors wish to acknowledge the VASAT Project team and its leader, especially mentioned, Dr. Balaji. Our profound gratitude to the people of Addakal and AMS Center for sharing their time, allowing us to carry out the interviews and meetings in the field.

ICRISAT, in collaboration with other institutions and aligned with the CGIAR policies, initiated the Virtual Academy for the Semi-Arid Tropics (VASAT) Project. The objective was to develop opportunities to exchange knowledge among researchers, extension workers and farmers, focusing on the community preparedness to cope with drought (Dileepkumar et al., 2006). The project involves a platform for communication, considering that preparedness is better than relief and that the communication systems would necessarily combine top-down and bottom-up approaches, with the paradigm of open and distance learning , and ICTs applied to rural development (Balaji et al., 2007:3).

Climate change is one scenario that affects farmers, and resource-poor farm households continuously rely on technologies for creating or improving their incomes and livelihoods (Heeks, 2008:29). This paper explored to assess the mechanisms and tools used in the VASAT project, a research for extension development initiative of ICRISAT, to identify recommendation domains for improving the system and draw upon the insights and experiences in the project for sharing these to various interest groups working on ICT4D.

2. Objectives

The research focuses on a preliminary assessment of the mechanisms used in the VASAT project, taking into account the framework of ICT4D in agricultural information. It describes the experiences and analyzes VASAT activities, mechanisms and results.

2.2. Specific objectives

- Describe the different tools and mechanisms used.
- Assess the tools and mechanisms from the perception of rural farm households.
- Suggest areas for crafting an innovative extension education system.

3. Background

3.1. The place and the people

Addakal is a “Mandal” (country subdivision) in Andra Pradesh, one of the poorest regions in India. It covers 196 km2 and consists of 21 villages whose economy is concerned with agriculture and livestock (Sreedhar et al., 2009: 28).

The region has a population of 46 380, of which 23596 is male and 22784 is female. It faces frequent droughts, and migration increased during last 10-12 years. People look for work out of their farms during summer time, searching for better income (Sreedhar et al., 2009:28). Institutional presence through development or extension organizations is weak. However, the strongest bonds to exchange information can be observed among farmers, and between vendors and farmers (Balaji et al., 2007:5).

In 2002, ICRISAT was involved in a governmental development program in Addakal, providing seeds and extension services. A federation of female self-help microcredit groups called Adarsha Mahila Samaikya (AMS) was a strong actor with 8000 members from 21 villages. Since 2004, ICRISAT and AMS have worked together in the VASAT Project using methodologies related to the ICT approach to foster drought preparedness. A hub-and-spoke model was designed, using local language (Telugu) (Sreedhar et al., 2010:3). At the beginning, basic ICT infrastructure facilities were used: a PC-based computer network with low cost Internet access in the Village Knowledge Centers

(VKCs). Later, video and audio conferencing, and mobile phone for two-way communication to ensure local knowledge acquisition. Starting a pilot experience with three villages during 2004, it extended to eight in 2008, covering farmers in the 21 villages in Addakal (Sreedhar et al., 2009:30).

3.2. VASAT Project: Communication tools and mechanisms

The VASAT project worked with drought preparedness based on an integrated approach for improving capacity in rural communities. An interface of ICT and distance-learning methods in a short period of time is used (Lavanya et al., 2010:2). The content was defined on a farmers´ demand basis and delivered in local language[2].

Since 2004, the project has been developing access to ICT tools through the eight VKC with PCs and the AMS building with video conferencing infrastructure. ICRISAT provides technical information and financial support for data collection, and AMS provides the facilitators who convert local terminology into a scientific one and vice-versa, serving as a bridge connecting ICRISAT, AMS and farmers (Dileepkumar et al., 2005). The role is being performed by eight Village Network Assistants (VNAs) trained by ICRISAT in ICT management.

The VKCs were designed based on the hub-and-spoke dynamics. Based on demand, the session schedules are prepared and provided in advance (Lavanya et al., 2010:5). The farmers´ queries are answered; if possible with the ICRISAT expert during the video conferencing session, or referred to a senior expert and the answers communicated to the VNAs. The facilitators translate the content into the local language. After every videoconference, the content is validated in order to build repositories at the VKCs and queries are uploaded to the Internet "aAqua" Forum[3] (Sreedhar et al., 2010:3). We need to point out here that as the ICT initiatives progressed, the VNAs evolved as knowledge intermediaries.

Since 2009, a field investigator has been helping interaction between VNAs and farmers, answering questions about agricultural problems.

The project developed colored maps using water budgeting, based on rainfall information collected and measured by a group of local farmers, and GIS tools provided by technical assistants of ICRISAT. Combined together allowed the drought preparedness of the communities of the project site (Patwar et al., 2009; Rudgard et al., 2011). According to Sreedhar *et al*.(2009:29), the message of the maps are easily understood by rural people because they are able to relate the corresponding meaning of the colors in terms

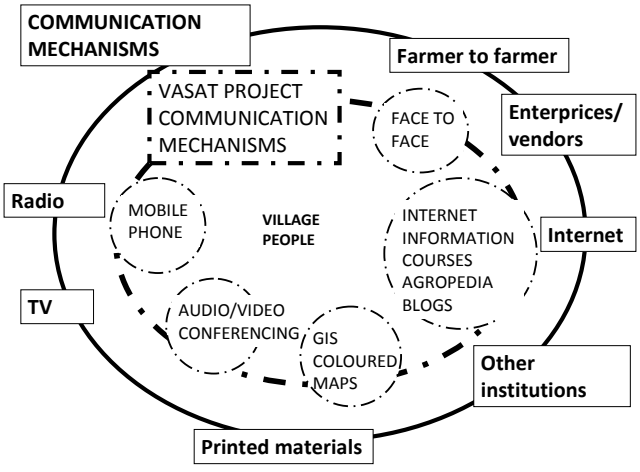

Figure 1. ICT4D mechanisms and tools used in the VASAT Project

[2] More information about the VASAT Project: http://www.icrisat.org/vasat

[3] More information about the Forum: http://www.aaqua.org

of what is the available moisture (or water) in their soil. Farmers are then assisted for their drought-related decision making by this kind of information.

Recently ICRISAT has also explored on an experimental web-mobile phone communication platform. As video conferencing requires volunteers to move to the AMS Center, the project set up audio conferencing facilities in the villages, enabling several people to interact with the experts (Lavanya *et al.,* 2010:4).

The mechanisms used in the Project are shown in Figure 1. The Internet provides access to Agropedia, VASAT´s blog, wiki, courses and activities related to the project (Kaur *et al.*, 2009:2). The Internet connection was also utilized by the rural people for other purposes such as weather, market information and education.

4. Methodology

A preliminary assessment of the VASAT Project through qualitative research is presented. The research elicited actors perception and knowledge gained during the project. Analysis and systematization of secondary data, direct observation, semi-structured interviews and group meetings were combined to obtain more reliable assessment.

Evaluation is a management tool where the analysis of activities and their corresponding effects allows for reaching conclusions considering the objectives (de Hegedüs, 1995; OIT, 1997). It is also a process to determine relevance, efficiency, effectiveness and impact of the project (Villarraga, 1998). The theoretical approach of Reflective Appraisal of Programs (RAP) (Bennett, 1992) was efficiently used in the evaluation of technology transfer projects (Albicette *et al.,* 1999; de Hegedüs *et al.,* 2000; Guerra, and Zocco, 2006), using different ICT tools. According to that model and from Bennett's hierarchy (Bennett and Rockwell, 2000) there are seven levels of evaluation; 1) inputs; 2) activities; 3) participation; 4) reactions; 5) knowledge, skills and attitudes; 6) behavior change and adoption; and 7) impact. The study was geared to the first five levels, focusing on five villages and the AMS Center (Table 1). Ninety interviews were carried out to know about relevant issues (Taylor, and Bogdan, 1986).

Table 1: Addakal Mandal: Interviews and meetings

Village	VNA	Activity	Nº Female	Nº Male
Nijalapur	Ms. Ramayswaramma	SSI & GM	5	3
AMS Center		GM	21	5
Komireddypalli	Ms. Chandrakala	SSI & GM	16	-
Janampet	Ms. Vemmalmma	SSI & GM	11	1
Vemula	Ms. Narmadamma	SSI & GM	15	11
Kandur	Ms. Lalithamma	SSI	2	-

SSI: Semi-structured interviews; GM: group meeting

The respondents were farmers, VNAs, and AMS members attending the meetings and farmers interviewed in the field (Table 1). Interview dates were fixed in advance and conducted personally with simultaneous translation from Telugu language. Meetings and interviews lasted approximately two hours. Notes and photos were taken and direct observation data were written in a booklet (Taylor and Steele, 1996).

An interview guide was used during individual interviews and focus group discussions. Questions were mostly open-ended to allow respondents' openness on the issue being explored. For more reliable conclusions, the interviews and notes were again validated not only with the local communities but even with other stakeholders like the ICRISAT staff involved in the project and even with scientists who were providing technical assistance.

Table 2 - VASAT project results in 5 villages and AMS Center - (K&U: known and used)

Components	Nijalapur Village	Komireddypalli Village	Janampet Village	Vemula Village	Kandur Village	AMS Center
Technological						
Video/Audio Conferencing	K&U	K&U	K&U	K&U.	K&U	Infrastructure
Internet	K&U.	K&U	K&U.	K&U.	K&U.	K&U.
Colored Maps	K&U. Fixed on the walls		Fixed on the walls	Fixed on the walls	On the walls	K&U
Cell Phones	K&U	For the future	For the future		K&U	K&U
Social						
Field Investigator	K&U. Good relation with farmers	K&U	K&U. Good relation with farmers	K&U		K&U
VNAs	K&U	K&U	K&U	K&U	K&U	K&U
Relationships	Farmer-to-farmer		Farmer-to-farmer			Farmer-to-farmer
	Farmer-vendors		Farmer-vendors	Farmer-vendors		Learned to negotiate
Gender issues	No gender differences			Some gender issues arose		No gender differences (Female 50%, Male 50%).
Labor		New jobs	New jobs		Men look for work	Rural employment grantee
Education and health		Internet for educational purposes				Programs: Livelihood, physical handicap, old pensioners, health insurance
Acquired knowledge	Learned a lot	Learned a lot		Learned a lot		Learned a lot
Economic						
	Aware of seed quality	Micro-financial groups	Micro-financial groups			Dairy cooperative, handloom, restaurant
	Better yields		Costs reduced			Costs reduced. Incomes increased.
Institutional						
	No extension		No extension	No extension		Focus of rural development. Relation with Bank.
Ecological						
Topics for further research	Drought, Pests Management		Water management	Nutritional crops deficiencies		Non pesticide management.

5. Results

A matrix summarizing people and AMS members´ opinions is presented in Table 2. Likewise, the overview of outcomes under technological, economic, social and institutional components, regarding the different tools and mechanisms used in the VASAT Project is also shown. The empty cells in the matrix mean that there were no comments about that item.

6. Conclusions and lessons learned

The preliminary assessment shows that the project has achieved good results as some outstanding outputs can be gleaned from the result of the interview. Responses like (1) "'We have more agricultural information especially those that relate with technical issues that results in better management of the technologies", (2) "We have learned to minimize the use of agricultural inputs and still have better yields; (3) "We have learned more knowledge due to internet connectivity, mobile phones, colored maps and other tools; (4) "We have learned to negotiate with vendors; and (5) "Because of capacity building provided by the project, some of our household members have landed in better jobs".

6.1. Tools and mechanisms used

The mechanisms and tools used for communication during the Project, which people were really acquainted with, were as follows: video/audio conferences, colored maps, Knowledge Centers with PC's, VNAs, field investigators, capacity building, and mobile phones. Our preliminary assessment shows impact of these tools, however, it is suggested that there should be more detailed assessment to determine impact not only of the tool but also of the entire project.

In line with what was expressed above, farmers used colored maps for decision- making in relation to drought preparedness. The advice given by the field investigator or the VNAs people sent through the hub-and-spoke mechanism resulted in quick response to agricultural problems.

As observed, farmers have internalized the knowledge acquired from the various tools. It would be of interest to have an in-depth study on the decision-making process of farm households.

6.2. Economic outputs

The farmers learned technical issues, which allowed them to have better farm management. To date, they have become critical to seed quality, water availability and management. Better decisions were taken like which crop to grow based on science. They are concerned about reducing their costs, so they are instructed on the benefits of precision agriculture like inputs utilization to save money without sacrificing productivity. Farm households also use the Internet for other agricultural support like accessing market and prices information and educational purposes. As a result of being better informed, farmers were in good position to deal with vendors and save resources.

6.3. Social issues

People in general learned to improve their negotiation skills. This contributed to upgrade their abilities as a result of the various capacity building activities included in the project. The Knowledge Centers also opened doors to the young members of the farm household to have better access to information and educational issues.

As a result of the implementation of the Project, women were empowered to face new challenges. We verified that VNAs learned about technological issues or got new jobs.

In very few of the villages, some gender issues emerged, leading to the question: Are there differences between women and men using agricultural information? A recommendation to this is to understand the reasons how AMS being a women's organization has been successful in a cultural domain of a patriarchal society.

6.4. Roles among the people participating in the project

It was clear that the VNAs are happy and proud of the job they are doing. It would be of interest for a future project to know about farmers' opinions about VNAs performance.

The KCs are already installed and can generate interactive information among farmers, promoting innovation. Consequently, capacity building to enable the VNAs as facilitators for development, upgrading knowledge, attitudes and aptitudes is required.

Farmers have no time to attend meetings and courses, so new ICT tools for easy access to information, as well as effective methodology to be applied by the field investigators are also needed.

A deep relationship among AMS members, VNAs, field investigators, farmers, and ICRISAT researchers was observed. In extension projects, leadership, good attitude and empathy toward local people are important. Institutions have to be aware of the importance of these, highly value them, and take into account that extension workers are part of the success of projects. A strong mechanism of coordination among actors by developing a network for faster information access is necessary.

6.5. Horizontal and vertical linkages

Dialogue and discussion at horizontal and vertical levels are important for facilitating community knowledge. ICRISAT needs to know first-hand about the farmers´ problems for a better reach of the technological information proposed.

The vertical linkages were enhanced through various capacity building activities. AMS members called ICRISAT to work together on the VASAT Project, and during the implementation, new mechanisms of communication emerged. It can be remarked/should be noted here that impact can be greater with better horizontal interactions and new ICT tools. Participatory research could be useful with pilot groups, considering the traditional farmer-to-farmer exchange of information.

7. Other recommendations

7.1. Institutional

There was no evidence of a strong linkage between farmers and institutions. Thus, it seems apparent that extension support is needed.

The VASAT Project should be continued and expanded as an example of how scientists test the relevance of their research with farmers. Special value can be added looking for a coordinated platform to develop ICT tools for extension and research. The organization of the villages with private participation can improve production and explore new markets. Financial logistics, trained professionals, innovative learning methods and materials will be required to interact with farmers.

7.2. Project advocacy

The project and its results should be known by ICRISAT and other research institutions looking for a closer relationship with small farmers. The advocacy is strongly recommended with multimedia approach: TV, radio, printed material, conferences and newsletters. Institutional policies regarding the use of mass media and communication devices would be useful to standardize strategies and activities.

7.3. For final assessment and other projects

A more comprehensive assessment considering qualitative and quantitative methods can deeply assess activities, participation and reactions, evaluating knowledge, behaviors and impact using the seven levels proposed by Bennett (1982) and Bennett and Rockwell (2000).

The ICT4D framework can be applied in an effective way, using several mechanisms and tools with small farmers, especially considering countries where extension services count on few resources. Using ICT4D new interrelations among farmers, researches, institutions, local facilitators are generated and can possibly be viewed as a model to be adapted by research and extension institutions.

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