

Converging Frontline SMS, Freedom Fone and Radio for Mobilizing Knowledge for Sustainable Agriculture in Sri Lanka

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Abstract

Information and communications technologies (ICTs) have great potential for sustainable agriculture, especially when broadcast radio is combined with mobile and open source software technologies referred to here as Radio+. This paper examines the Radio+ experiences of six organizations in a community of practice for ICT-enabled farm media convergence in Sri Lanka including Rangiri Radio, Department of Export Agriculture, Wayamba University and LIRNEAsia with researchers at the University of Alberta and University of Guelph in Canada. Our work demonstrates how a “tried and true” technology such as rural radio can expand its reach with FOSS applications. Specifically, collaboration with Rangiri Radio since 2014 has involved testing open source software (Freedom Fone and Frontline SMS) and mobile technologies. Farmers are positive about radio programming that use interactive options including “call-in” audience response programs, multiple text messaging and voice recorded messages. The paper concludes that Radio+ has good potential to strengthen participatory communication for development through a multi-media connection that networks broadcasters, agricultural experts and farmers.

Key words *Information and communications technologies (ICTs), sustainable agriculture, knowledge mobilization, open source software technologies, broadcast radio, Radio+.*

Introduction

The modern era of new information, communication and media technologies has made a big impact on individuals, organizations, networks and even nations. There can be little doubt that new digital media such as the Internet have influenced the lives of individuals across the globe including those people who depend on traditional means of livelihood such as smallholder agriculture and fishing (Hambly Odame 2005). Agriculture is considered a major driver for economic growth in developing countries. In many developing countries the majority of the population often depends on agriculture and agri-food business for their livelihoods. Yields from agriculture are very low when comparing agriculture between developing and developed countries (FAO 2015). A major cause for this is the lack of information and knowledge about farming for smallholder producers. Inadequate knowledge about improved crop production, processing and post-harvest storage, markets and adaptation to changing climates can adversely affect the livelihoods of smallholder farmers and have negative repercussions across their communities and countries (Akter 2010). It is argued that the use of ICTs can play a key role in mobilizing knowledge, connecting farmers to information to enable more effective resource use, stimulate agricultural innovation and create resiliency within agri-food systems (World Bank 2011).

Mobilization of knowledge that comes from farmers and experts such as agricultural extension workers and scientists has been considered a priority for sustainable agriculture in South Asia (Sylvester 2013). ICTs such as mobile phones are considered to have already made a positive change in the agriculture sector (Chhachhar 2013). There is now further media convergence in the use of ICTs in agri-food systems. Some media are relatively new (e.g. Internet and social media) and others are not (e.g. broadcast radio). Mobile phones, multifunctional digital voice recorders and Interactive Voice Response (IVR) systems are just a few examples of the ICTs that have been used in various countries to enhance agriculture and rural development. The convergence of emerging ICTs and broadcast radio is referred to as Radio+ as illustrated in Figure 1.

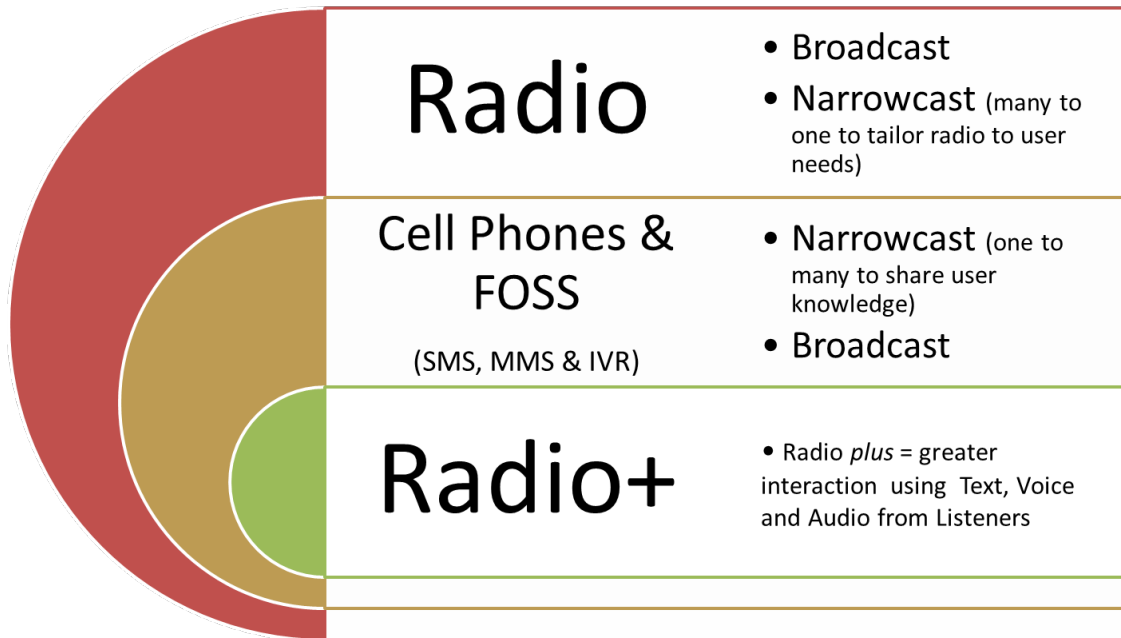


Figure 1: From Radio to Radio+

Radio+ has a participatory component that puts people's needs for and use of the technology first. Examination of the use of ICT in strategies of poverty alleviation in Sri Lanka suggests that people need to be able to adapt, select and use the technology that suits them according to their own discretion (Dasanayaka 2003). Technology should only be introduced after analyzing the specific needs of communities, the level of acceptability on the part of the community to use technology and by targeting it specifically towards the pro-poor population in order to eliminate poverty (Dasanayaka 2003). Nevertheless, ICTs can leverage the knowledge resources of experts such as public sector agricultural extension workers or scientists. This is important because in recent years these advisory services have been drastically reduced and outside the reach of resource-poor farmers (Sulaiman and Davis 2012). Extension workers can use Radio+ and emerging ICTs to reach out to farmers more often and even provide dedicated information channels as the need arises, for example, by sending MMS bulletins during major climate events, etc. (Sharifhahed, Abdollahzadeh and Mohnoosh 2008).

Although ICTs are more widely used in agriculture and rural development activities, they still face numerous challenges. The public sector agricultural extension system has to adapt to the use of these technologies and both government users and farmers may still experience relatively high costs for the purchase and subscription plans of ICTs such as mobile phones (Gow, et al. 2015).

Radio combined with emerging ICTs is a topic popularized in international development related websites, sourcebooks and project descriptions but there are few empirical studies related to this topic (Hambly Odame 2013). This paper seeks to contribute to the growing literature on Radio+, and specifically, consider its use in Sri Lanka. The paper also discusses the methodology of a community-university partnership development project which has made it possible to promote the use of low-cost information and communication technologies for knowledge mobilization among agricultural communities in Sri Lanka. The first topic examined in the paper is the concept and practice of Radio+. We then discuss the role and objectives of the partnership development project. The third section of the paper considers the case of Rangiri Radio in Sri Lanka and its

experiences with Radio+. The fourth section concludes the paper with a final summary of the opportunities and obstacles for future use of emerging ICTs in broadcast radio.

Methodology

Data in this study was collected by faculty researchers and graduate students in University of Guelph and Wayamba University from primary and secondary sources. Primary sources included visits to seven radio stations in Sri Lanka on several occasions between 2012 to 2015. Five radio staff interviews within Rangiri Radio were conducted with visits to farmer radio listening clubs in 2015. We held discussions with radio stations on their radio program scheduling and experiences. As well, we asked farmers about their information needs and interacted with agricultural extension experts. The case of Rangiri Radio was purposively selected because of its willingness to test open source software promoted in this partnership development project. Rangiri Radio also met the criteria for this case study on Radio+ because it was an early adopter of using mobile phones within radio broadcasting in order to interact with their listeners who are often organized as radio listening clubs. Secondary data used in this analysis included project publications, blog and social media posts from the project and its partners, and information about Radio+ available in related websites.

Context of the Study: The Partnership Development Project

The Social Sciences and Humanities Research Council of Canada (SSHRC) funded for the partnership development of this project whereby the Canadian partners at University of Alberta and University of Guelph team up with Sri Lankan partners in Wayamba University and the Department of Export Agriculture, as well as the regional non-governmental organization for ICTs and development, LIRNEAsia. Together these organizations have been strengthening technology stewardship for using ICTs to mobilize knowledge for sustainable agriculture in Sri Lanka¹. The project was executed in three phases from 2012 and until 2015. The first phase of the project work was intended to establish a working relationship with various stakeholders of the project. This allowed the project to develop a realistic work plan that supports its second and third phases of the project. In the second phase, the project identified a set of case studies which provided the basis for an Integrated Action Research Strategy (IARS) based on a community of a practice framework. This includes the case study discussed here on Radio+ involving Rangiri Radio. The project held workshops to discuss with partners in government and non-governmental organizations involved in agricultural development on how low-cost ICTs can be introduced to enhance and mobilize expert and local knowledge. Using the rapid prototyping method to test and enhance the use of ICTs, a number of campaigns or mini projects were undertaken. Results from the campaigns have provided the basis for further discussions on the impact of ICTs on the social practices of knowledge mobilization within the communities and possibilities for strengthening local information networking. The final and third phase of the project looked into the findings from the Integrated Action Research Study (IARS) and reflected on the findings with constructive criticism (Gow, et al. 2015).

In 2016, project partners are continuing their collaboration to propose and develop a model for ICT-enhanced knowledge mobilization which will integrate local communities of practice with partnerships from various governments (local, state), University of Wayamba and private sector organisations in Sri Lanka. In Fall 2016, a comprehensive training mechanism will be

¹ <http://mobilizingknowledge.blogspot.ca/2013/01/about-project.html>

implemented to enhance and transfer capacities to local communities to enable the rapid adoption of ICT based services by farmers and transfer acquired knowledge for local agricultural communities of practice. This work will further support partnership development and expand knowledge mobilization between partners through design of a longer term research project.

The campaign approach used in the project is well documented in the literature relevant to ICT stewardship, participatory communication and networked communities of practice (Wenger, et al. 2009). The strategy of technology stewardship involves identifying leaders in the community or within organizations working closely with communities to promote inclusive innovation through the use of ICTs. As Table 1 indicates, the agricultural content mobilized in this project using the technology stewardship approach has included commodity specific topics such as ginger, but also, general information on market prices for agricultural inputs (Waidyanatha, et al. 2015). The experiences of Radio+ by Rangiri Radio are discussed in this paper. To begin, we provide some background to the powerful medium of rural radio and its convergence with new media.

Table 1: Type of Campaigns in the Partnership Project

Sponsor	Community	Farming Families	Community Practices	Campaigning activity
Janathakshan	Vergal	+150	Vegetable, legume, and rice farmers with some live stock.	Crop prices Elephant Control Flash flood alerts
	Kathirvelli	+300	Vegetable, legume, and rice farmers with some live stock.	Crop prices Elephant Control Flash flood alerts
DOEA Kurunegala	North: Damahera, Madahapola, Omaragolla, Panliyaddha	300	Ginger and Pepper farmers	General messaging and announcements: Land and seeds subsidies, training, disease control
	South: Paragoda, Hewanpola, Madithiyawa	220	Pepper and Pineapple farmers	General messaging and announcements: Land and seeds subsidies, training, disease control
Rangiri Radio	Island-wide	No estimate available	~80 Radio Listener groups	Request and dedicated songs. Messaging to rural/farmer listeners

Source: Waidanyatha et al 2013

Rural Radio+

Broadcast radio has long been regarded as a force for positive social change and development in rural areas (Manyozo 2011). As an auditory medium, radio allows multi-tasking and passive listening that is independent of written literacy. Radio has been shown to be the most trusted and enjoyable medium when it embraces traditions associated with oral culture, local vernaculars and entertainment. The educational value of radio is well-established in many countries and radio plays a key role for raising the voice of local communities and sharing their knowledge with outside communities and experts (Hambly Odame 2005). The new era of Radio+ demonstrates the convergence of broadcast radio with a wide range of emerging, often mobile ICTs. As such, traditional AM and FM radio have become Radio+ that offers different digital interfaces to listeners and Internet-enabled services that include searchable archives of information, feedback or comments through social media and automated messaging for reminding listeners of upcoming programs. Radio+ is often consistent with what Koradia, et al. (2010) recommend: that ICT interventions for radio should meet the requirements of seamless integration of technologies into the stations operations; low cost; flexibility in deployment; and local management and maintenance.

Hughes (2003) argues that introducing new media into communities works best when they draw on traditional channels of communication and information. As such, broadcast radio, and especially radio stations located in rural areas, have been recognized as having the characteristics of “proximity, trust and knowledge (including the ability to combine ‘tech knowledge’ about ICT with ‘context knowledge’ about the environment in which it is used)” (Girard 2003). For similar reasons Souter et al. (2005), suggest that the high value attached to radio makes it particularly suited for the role of a locally trusted knowledge intermediary when broadcasting uses local vernacular, popular formats (e.g. drama, local expert features, etc.). Past research suggests that farm women and young adult farmers may be influential in the adoption of information heard on the radio (De Silva and Ratnadiwakara 2008). It is important to recognize that the use of new technologies in radio (Radio+) ensures that the characteristics of proximity, trust and knowledge need to be preserved in mobile and online environments.

Experiences at Rangiri Radio

Sri Lanka has a long history of broadcast radio. Sri Lanka Broadcasting Corporation (SLBC) in Colombo was the first ever radio station in Asia. In Sri Lanka, the Ministry of Agriculture has long supported efforts in farm radio including the establishment of listening clubs, and more recently cyber-extension services (Dasanayaka 2003). Radio is a proven technology for helping farmers to get information on a range of topics from early warning systems (notably during Sri Lanka’s devastating 2004 Tsunami) to crops including current market prices and consumer demands. Market information helps to reduce price speculations and curbs the ‘middle man factor’ that typically disadvantages smallholder farmers within the market. In Sri Lanka, public radio is also used widely in agricultural extension programs; primarily for farmer education on various topics, sometimes “narrowcasting” so that programs reach specific audiences of farmers or in specific local languages. Even with island-wide Internet availability, radio is still a preferred ICT in Sri Lanka because it has the ability to reach areas where other information sources may be limited to resource-poor users. Radio stations will also have Internet connections and therefore, offer an

opportunity to make Internet-based resources more available to rural users in languages they understand. In turn, local content can be shared with a wider network of listeners through radio networks such as SLBC.

Rangiri Radio is a private radio station located in Dambulla, It is one of the most widely known radio stations in Sri Lanka broadcasting across the island. It is also known as the First Buddhist Radio Channel in Sri Lanka and is popular among the Sinhala community of Sri Lanka. Dambulla is a major agricultural center in Sri Lanka and the agricultural and food related broadcast programs produced by Rangiri reflect the importance of this topic to its listener base within the local community. Rangiri Radio broadcasts three farm programs regularly. One program is a short message format on current agricultural issues. Another is a live interview program with a specific guest who is invited to discuss his/her present or traditional knowledge and experiences on a specific agricultural topic. The third format is a call-in program that invites public agricultural extension or subject-matter specialists to the radio station for question and answer type discussion with farmers.

Rangiri has been testing Radio+ that involves the use of Free Open Source Software (FOSS). Their initial use of FOSS was for song dedications and requests. Once familiar with the method, Rangiri Radio uses FOSS to send/receive texts or invite listeners to ask questions and possibly participate live with the radio broadcast program. Frontline SMS allows broadcasters to send via a mobile device or standard email account text messages to large groups of listeners and receive replies. Frontline SMS can include more complex MMS that send and receive text, images, video and audio but these functions are not yet widely used by Rangiri Radio. Freedom Fone is a voice response system that pre-records information for listeners to access at their convenience. Such IVR content can also be shared across mobile and radio networks. Freedom Fone is not currently used at Rangiri Radio although the technology stewards at the station have received training and downloaded the software.

Our observations and interviews with Rangiri Radio and farmer listeners suggest that ICTs have made radio programs more popular among farmer listeners. In our interviews with Rangiri Radio staff, they mentioned that after using FOSS in their farm program (specifically Frontline SMS), resulted in responses from farmer listeners increasing dramatically. The technologies are especially useful because when listeners send their problems or questions through SMS, the programs try to answer those issues live on-air with guest experts or through sourcing information from a specialist. Follow-up is also enabled through Radio+. The broadcasters suggest that for more information listeners can also contact agriculture specialists directly by providing the expert's mobile phone number or social media account information during the program.

Field visits to farmer listening groups and interviews with Rangiri Radio staff suggest that the radio station has been especially effective in delivering current market related information to farmers. Dambulla is one of the so-called Dedicated Economic Centers (DEC) of the country and as such information about current agriculture prices is collected by the DEC and shared through the radio. As well, the content facilitated by Rangiri Radio is both current and of perceived higher quality because many agricultural specialists come to Dambulla as a major agricultural marketplace. As well, farmers come to Dambulla from all over the country to source agricultural inputs. Radio staff at Rangiri believe that this has created the opportunity where they can rapidly collect information from farmers about current agricultural issues and respond to the needs of the listeners by giving agricultural specialists a platform for sharing their expert knowledge. Rangiri Radio broadcasters report using ICTs, and mobile phones in particular, to connect with specialists and farmers in order to research and produce feature programs. The station also uses social media such as Facebook to reach out to their listeners and solicit comments on the programs. Rangiri posts their

program schedule online and announces it through social media. They remind listeners to message the station with their ideas for future programs or post comments regarding issues that the station is broadcasting.

Radio+ is evident in the case of Rangiri Radio located in one of the busiest agricultural areas of Sri Lanka. Rangiri Radio is a media broadcasting center but it is simultaneously narrowcasts or fits content to users' needs through interactions with listeners through social media and mobile phones. Some of these interactions do not have to be handled by the technology stewards at Rangiri Radio. Instead, farmers can be networked directly to agricultural experts. The ubiquitous use of cell phones in Sri Lanka, including Internet-enabled Smart Phones, appears to be changing earlier notions of narrowcasting and broadcasting. For example, listeners can record something in their cell phone and then send it to Rangiri Radio while at the same time, that person can forward the information to their social network via social media or text messaging. Rangiri Radio is stewarding technology in such a way to encourage "one to many", "many to one" and "many to many" and in one or more networked directions. Additionally, Rangiri has such technical expertise and extremely well-equipped facilities that it can converge media by linking Radio+ with other media it operates such as its television station and streamed video. This is certainly not representative of other rural radio stations in Sri Lanka. Nevertheless, the visual aspect of multimedia made possible with Radio+ provides a new type of interactive communication between the radio listeners and the station. The importance of this finding for understanding Radio+, and technology stewardship more generally, is that strong information and communication function implicates a multi-media connection between agricultural experts and farmers. That farmers can get their problems solved quickly and easily by accessing important information from agricultural experts when they ask questions using FOSS is key.

Farmer listener's participation and Radio+

The experience of Rangiri Radio suggests that stewardship converges technologies such as Frontline SMS and broadcast radio to create an opportunity for farmers as listeners (and inquirers) to get involved in radio programs and to bring their local knowledge of agriculture to development activities to a higher level of the public sphere. Observations during field visits to the farmer listening clubs suggested that the use of ICTs by Rangiri Radio and its multimedia farm programs creates excitement and motivates farmers to join knowledge mobilization activities. Young people within the community were identified as being interested in agricultural topics covered by Rangiri's Radio+ activities and that youth are now gradually more interested in agriculture work because they hear about it on the radio/mobile phones.

The use of ICTs was also recognized as allowing farmers to communicate easily with agricultural extension officers via radio and receive accurate and timely information regarding agriculture issues. Rangiri Radio station works with approximately 80 listening clubs in Sri Lanka. Each listening club is identified by the name of the village and their leader's name. Typically the group leader arranges the radio listening club meeting at his/her own farm residence. Farmers mentioned that sometimes Rangiri Radio will also invite them to the radio station for group discussions and meetings about upcoming programs.

Farmers related their sense of positive contributions from Rangiri's program and use of ICTs. They appreciated not only listening to FM radio programs on their mobile devices but also participating through mobile interactions with the station, especially the opportunity to send feedback and ask questions to radio station about agriculture problems. Most of the farmers reported listening to Rangiri's farm programs every day. All of the listeners we met had their own

mobile phone with a FM receiver to listen to the radio programs and the majority of these listeners reported that they had sent feedback to the radio station. Their feedback indicated that the instructions provided by Rangiri on using the FOSS (Frontline SMS) was very easy to use. The farmers who have no idea about sending SMS through mobile phone but want to do so indicated that they ask for help from others within the farm community, including youth. One listener farmer in his interview mentioned that, "I take help from my daughter when I need to send SMS to the Radio Station for farm program."

Farmer listeners expressed that they have less knowledge about the Internet and its resources. When they need to share information about an agricultural problem, such as an insect infestation they take pictures using their phone and share the pictures with the listening club leader. The leader acts as a more local technology steward uploading those pictures to the Internet and sending a link to the agricultural expert or Rangiri Radio on the farmer's behalf. This suggests that the listening club leader is an influential contact within the community as members are encouraged to bring issues to the leader to communicate with agricultural experts or radio station. Furthermore, this suggests that the "many to one" process of Radio+ communication can be a "many to one" and then transferred until it reaches the farmer (one to one). This raises some implications on how to ensure that messages sent back to the radio station are transferred correctly but also, there may be some information efficiencies gained in the messaging as several commentaries are collected and communicated as one. Radio+ would benefit from further theorizing to understand these types of knowledge transfer processes.

Conclusion

The Radio+ concept is a comparatively new strategy in Sri Lanka. This case study was designed to explore how converging emerging ICTs such as Frontline SMS and Freedom Fone with broadcast radio can help to mobilize knowledge for sustainable agriculture. The case study achieved its objective through field visits, discussions with farmer listeners and radio staff interviews. We conclude that further study of Rangiri Radio's technology stewardship and community-based knowledge transfer processes would be useful as the project progresses. It would be ideal to have an opportunity to assess the number of call-in messages received for each farm radio program and track the usefulness of the knowledge shared through Radio+.

In a preliminary manner, and acknowledging that the analysis of Radio+ is a recent activity, this case study has identified that a partnership development project can help to strengthen agricultural communities of practice through the innovative use of low cost, widely accessible mobile and Internet technologies. The convergence of new media with traditional broadcast radio offers important opportunities for agricultural knowledge mobilization in Sri Lanka. Most relevant to this project is that through mobile SMS based services, ICT can provide farmers with current information about crops, weather or markets while ensuring that there is a response from an agricultural expert or a connection to further information using social media, Internet resources and cell phone contacts. The project has also built capacity among technology stewards from Rangiri Radio and provided an opportunity to experiment with FOSS. The station also reported that it is trying FOSS not only in its agricultural programs but also in their other news and entertainment programs.

The future of Radio+ will ultimately lie in building capacity not only of technology stewards but also of the next generation of farmers who easily use and understand ICT tools, make them relevant to their needs and oral culture. More farmer and farmer-leader training activities are needed and this should be institutionalized within the Ministry of Export Agriculture and with the

partnership of local universities and training institutions involving the largest possible number of agricultural specialists. Emerging ICTs combined with “tried and true” media such as radio are supporting smallholder farming around the world, and not just in Sri Lanka. Partnership projects can be a useful example for other countries on how to use ICTs effectively to mobilize local and expert knowledge for sustainable agriculture.

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