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Trends in Agricultural Information Management: Web 2.0 and Social Networking

Vipinkumar.V.P Nimisha.C.P and Manu V.K.
Socio Economic Evaluation & Technology Transfer Division
Central Marine Fisheries Research Institute, Kochi, Kerala
Email: vipincmfri@gmail.com

Examining the recent trends Agricultural Information Management, it can be observed that, the advances in technologies, particularly Internet technologies have changed the way information is accessed and disseminated. There is a shift towards more dynamic applications and more interactivity between users. This current shift in web technologies is commonly known currently as Web 2.0. As internet technology has evolved from Web 1.0 to Web 2.0, the manner in which information is generated, accessed, organized, and disseminated has changed. Some of the attributes of Web 2.0 include the growth of social networks, bidirectional communication and significant diversity in types of content. Web 2.0 as a term used to describe websites and services where the content is created partially or entirely by the users. The term Web 2.0 was conceptualized and introduced by Tim O'Reilly and Dale Dougherty. Tim O'Reilly defined web 2.0 as: "the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them" (O'Reilly, 2006). Wikipedia defines Web 2.0 as "a second generation of services available on the World Wide Web that let people collaborates, and share information online.." (Source: http ://en.wikipedia. org/wiki/Web2. 0.)

The Web 2.0 describes websites that use technology beyond the static pages of earlier web sites. The term was coined in 1999 by Darcy DiNucci and was popularized by Tim O'Reilly at the O'Reilly Media Web 2.0 conference in late 2004. Although Web 2.0 suggests a new version of the World Wide Web, it does not refer to an update to any technical specification, but rather to cumulative changes in the way web pages are made and used. A Web 2.0 site may allow users to interact and collaborate with each other in a social media

dialogue as creators of user-generated content in a virtual community, in contrast to websites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, folksonomies, video sharing sites, hosted services, web applications, and mashups. Whether Web 2.0 is substantively different from prior web technologies has been challenged by World Wide Web inventor Sir Tim Berners-Lee, who describes the term as jargon. His original vision of the Web was "a collaborative medium, a place where we all meet and read and write (http://en.wikipedia.org/wiki/Web 2).

Similarly the Web 2.0 also provides opportunities for interaction, collaboration, networking, and sharing. While in web 1.0, there were relatively few content creators, with web 2.0, any user can be a content creator with the number of tools made available for content creation. Web 2.0 is based on user centered applications that promote communication, user empowerment, collaboration and social networking. Web 2.0 also allows exchange of different kinds of content and makes it also possible to combine content resulting in new information products. Web 2.0 tools are increasingly being used in research and development work, to share knowledge, collaborate, discuss, plan, manage, implement etc. The use of Web 2.0 tools within the development sector is still in its infancy. Some of the examples of the use of Web 2.0 applications in the development sector include use of Internet/SMS gateways to distribute information to people with access to mobile phones but no access to internet. These users can also post through SMS to blogs and online databases. Content aggregators enable users to quickly find the information they are searching for, without having to navigate through a number of websites.

There have also been attempts to use these new web tools in the agricultural sector. An international conference on "Web2ForDev" was organized by the Consultative Group on International Agricultural Research (CGIAR), in 2007. The objective was to explore ways in which development stakeholders could take advantage of the opportunities provided by Web 2.0 methods, approaches and applications to further improve networking, information exchange and collaboration for rural and agricultural development and natural resource management (Web 2.0 for Dev, 2OO7). The term "Participatory Web 2.0 for development" or Web2forDev was first used at this conference. The conference provided an opportunity for people and organizations from around the globe to share knowledge and experiences of the use of Web 2.0 tools in and for development. The conference highlighted how these new web tools have changed traditional patterns of communication and knowledge sharing. Web2forDev is a way of using the web, to improve information sharing and collaborative production of content in the context of development work.

The Web 2.0 services are more user-centered, with focus on collaboration and interactivity. Users can respond to what they read, and contribute content, thus adding more information. A Web 2.0 Website may include a number of Services viz., Blogs, RSS feeds, Wikis, Podcast, Tags etc. Web 2.0, allows the Content to be reused and remixed in different ways by different services. It is possible to select and subscribe to the knowledge of others and then recombine this knowledge into other services. The same content may be shared through different devices viz., PC, mobile phone, PDA or iPod- Using Web 2.0 applications one can be a content creator through blogs; collaborate on wikis, share images through flickr, recommend sites through tagging or connect on my space and more. A

number of organizations have begun using the web to create, exchange, share knowledge and information and to communicate, collaborate and disseminate development content.

Web 2.O Tools

The Web 2.0 tools include Blogs, RSS, Wikis, Flickr, social networking tools etc. Some web 2.0 tools are briefly profiled here with examples of application in agriculture, by organizations around the world.

Blogs

One of the major tools of Web 2.O is a blog. Blog which is short for "web 1og," is a site where contributors can post news, thoughts, comments, reflections etc. Wikipedia defines a blog as "a Web site, usually maintained by an individual with regular entries of Commentary, descriptions of events, or other material such as graphics or video." It is an online journal or web site on which articles are posted and displayed in chronological order. Subject resources, book reviews, library news, discussion groups etc.
Blogging software:

- http://wordpress.com
- http://www.livejournal.com
- http://www.blogger.com

A blog is a discussion or informational site published on the World Wide Web and consisting of discrete entries ("posts") typically displayed in reverse chronological order (the most recent post appears first). Until 2009, blogs were usually the work of a single individual, occasionally of a small group, and often covered a single subject. More recently "multi-author blogs" (MABs) have developed, with posts written by large numbers of authors and professionally edited. MABs from newspapers, other media outlets, universities, think tanks, interest groups and similar institutions account for an increasing quantity of blog traffic. The rise of Twitter and other "micro blogging" systems helps integrate MABs and single-author blogs into societal new streams. Blog can also be used as a verb, meaning to maintain or add content to a blog.

The entries in a blog are commonly displayed in reverse-chronological order. Many blogs provide commentary or news on a particular subject; others are personal online diaries. A typical blog combines text, images, and links to other blogs, web pages, and other media related to its topic' A key feature is that it allows people to post comments to another person's blog. People can subscribe to each others' sites, and easily link to individual comments on a page. Apart from this, through a mechanism called trackbacks, they can see when anyone else links to their pages, and can respond, either with reciprocal links, or by adding comments. One can also subscribe to new posts in a blog using RSS. (O'Reilly, 2008). The potential of Blogs has been recognized by a number of development organizations including, Technical Centre for Agricultural and Rural Cooperation (CTA), AFD, Overseas Development Institute (ODI), World Bank, etc. CTA has a number of blogs at http://announcements.ctq'int to publish news and announcements; interact with CTA communities at http://neun.cta.int; publish and disseminate reports. http://brusselsbriefings.net, and one related to policy developments http://brussels.cta.int. ICRISAT's blog at http://blog'icrisat.org/kmsblog/ alerts to contents pages of journals,

articles, and other news. The Virtual Academy for the Semi Arid Tropics (VASAT) has a blog at http://vasatblog.icrisat.org/ which posts new developments and news from VASAT. The International Food Policy research institute (IFPRI) has set up a number of blogs: some of which include Blog World Hunger, which is an open global food and nutrition security diary that aims to identify and analyze alternative national and international strategies and policies for meeting world food needs. (www.ifpriblog.org).

Kisan Blog, an audio blog in Hindi at http://opaals.iitk.ac.in:9000/kisanblog /index.php is an initiative by Deal India, conceived by IIT Kanpur and funded by Media Lab Asia' Users can post their entries and comments through an audio device. Farmers can submit questions via voice mail, and experts' answers are published on the website as audio files. All communication is in Hindi, the local language of the farmers. The user can record his question or comment in an electronic device or directly through a microphone attached to a computer linked to the Internet. The user has to log on into the page for posting a query. Each participating Agricultural Science Centre has been allotted a separate login identity to validate their identity. Once a user logs in to the page he can post his/her query directly or upload a file already recorded on an electronic device. After the recording is done, the user can check the same for quality, clarity etc. It is automatically stored at the server of DEAL. Administrator validation is required for the message to be on air. The filtering is usually done by the agricultural experts of DEAL to ensure validity of the questions asked and the answers provided. (GTZ, 2008).

Once on air, the query appears on the blog site with a title, identity and the audio. Users interested in answering the query can click on the option "number of suggestions". The same recording method is followed to answer a query. The names of the most recent users who provide suggestions along with associated information related to their designation, expertise, etc' are categorized and appear at the top of the Kisan Blog. This ensures authenticity of the suggestion as well as gives recognition to the person. Apart from institutions many individuals have also set up blogs to exchange knowledge. The web site www.technorati.com/search/agriculture gives access to blog on agriculture. It is very easy to set up a blog, customize and update quickly. Some of the providers may be accessed at www.blogspot.com and www.wordpress.com.

RSS

RSS is the acronym used to describe the de facto standard for the *syndication of Web content*. RSS is an XML-based format and while it can be used in different ways for content distribution, its most widespread usage is in distributing news headlines on the Web. A Web site that wants to allow other sites to publish some of its content creates an RSS document and registers the document with an RSS publisher. A user that can read RSS-distributed content can use the content on a different site. Syndicated content can include data such as news feeds, events listings, news stories, headlines, project updates, and excerpts from discussion forums or even corporate information. Because there are different versions of RSS, the term RSS is most frequently used as a name to mean the *syndication of Web content,* rather than as an acronym for its founding technology. When using the name RSS the speaker may be referring to any of the following versions of Web content syndication:

RDF Site Summary (RSS 0.9, RSS 1.0)

Rich Site Summary (RSS 0.91, RSS 1.0)
Really Simple Syndication (RSS 2.0)

When using the term RSS, most will use it in reference to *Rich Site Summary* or the previous version called RDF *Site Summary*. When referring to *Really Simple Syndication*, it will usually be called RSS 2.0, not RSS. There are several versions of RSS available, with the most commonly implemented version being RSS 0.91. The most current version, however, is RSS 2.0 and it is backward-compatible with RSS 0.91. RSS was originally developed by Netscape. The RSS 2.0 specification was authored by Dave Winer (Source: www.webopedia.com).

News readers or news aggregators help. These are software programs which help bring information from sites of interest to the user. These news aggregators check each site to see if they contain RSS (Rich Site Summary) tags. RSS is a method of summarizing the latest news and information from a website in a form that can be easily read by news readers or news aggregators. The idea is to give users the ability to quickly obtain the latest news and updates from a site in a headline or news digest format.

RSS (Rich Site Summary); originally RDF Site Summary; often dubbed *Really Simple Syndication*, uses a family of standard web feed formats to publish frequently updated information: blog entries, news headlines, audio, video. An RSS document (called "feed", "web feed" or "channel") includes full or summarized text, and metadata, like publishing date and author's name. RSS feeds enable publishers to syndicate data automatically. A standard XML file format ensures compatibility with many different machines/programs. RSS feeds also benefit users who want to receive timely updates from favorite websites or to aggregate data from many sites. Once users subscribe to a website RSS removes the need for them to manually check it. Instead, their browser constantly monitors the site and informs the user of any updates. The browser can also be commanded to automatically download the new data for the user. Software termed, "RSS reader", "aggregator", or "feed reader", which can be web-based, desktop-based, or mobile-device-based, present RSS feed data to users. Users subscribe to feeds either by entering a feed's URI into the reader or by clicking on the browser's feed icon. The RSS reader checks the user's feeds regularly for new information and can automatically download it, if that function is enabled. The reader also provides a user interface. (Source: www.wikipedia.org)

Why use RSS and who should use RSS

RSS was designed to show selected data. Without RSS, users will have to check your site daily for new updates. This may be too time-consuming for many users. With an RSS feed (RSS is often called a News feed or RSS feed) they can check your site faster using an RSS aggregator (a site or program that gathers and sorts out RSS feeds). Since RSS data is small and fast-loading, it can easily be used with services like cell phones or PDA's. Web-rings with similar information can easily share data on their web sites to make them better and more useful. Webmasters who seldom update their web sites do not need RSS! RSS is useful for web sites that are updated frequently, like:

- News sites - Lists news with title, date and descriptions
- Companies - Lists news and new products
- Calendars - Lists upcoming events and important days
- Site changes - Lists changed pages or new pages(www.w3schools.com)

In simpler terms, RSS stands for Really Simple Syndication or Rich Site summary. It is an XML-based format for syndicating Web content that helps viewers decide whether they want to follow the link. Syndicated content may include news feeds, listing of events, news stories, headlines, project updates, excerpts from discussion, forums etc.: Webopedia. RSS feed contains headlines, summaries and links to full news stories and allows users to link not just to a page, but to subscribe to it to be updated with a notification every time that page changes. Thus subscribers can receive automatic updates (on the web or by email) whenever the particular content is updated. Thus, instead of a user having to repeatedly visit favorite websites to check for new content, RSS notifies about updates. As the number of RSS feeds, making it difficult to identify and select relevant feeds, RSS Aggregators help by aggregating RSS feeds and allow the user to scan headlines from a number of news sources in a central location. Aggregators combine RSS feeds into new feeds, for e.g. all agriculture related news from several news feeds can be combined and a new feed provided. While some RSS aggregators, such as Bloglines, are web-based, others are desktop clients, and others allow users of portable devices to subscribe to updated content. Web-based feed readers and news aggregators require no software installation and make the user's "feeds" available on any computer with Web access. Some RSS readers are Bloglines http://bloglines.com/; Newz Crawler www.newzcrawler.Com; Feed Reader www.feedreader.com; RSS Reader http:www.rssreader.cod; Net Newswire http://ranchero.com./netnewswire/ etc. Lists of RSS readers can also be accessed at Google and Yahoo. RSS is now being used to push data updates, including market prices, weather information, etc. Many websites now offer RSS feeds. The Global Forum on Agricultural Research (GFAR) offers news feeds at www.egfar.org/egfar/websitelnew/ from several other sources. CTA has launched a 'news4dev' aggregator at www.newsfordev.org that takes content from different collections and repositories and enable readers subscribe to different RSS feeds. FAO, GFAR, IAALD and others have also set up an aggregator at www.agrifeeds.org where feed publishers can submit their feeds, and readers can sign up for feeds that interest them. ODI's Update news feed at http://www.odi.org.uk/news/feeds.asp gives the latest Information from ODI, alerting whenever new content is added to the ODI website.

WIKIS

Let's now see what is Wiki? It is the *simplest online database that could possibly work.* Wiki is a piece of server software that allows users to freely create and edit Web page content using any Web browser. Wiki supports hyperlinks and has simple text syntax for creating new pages and cross links between internal pages on the fly. Wiki is unusual among group communication mechanisms in that it allows the organization of contributions to be edited in addition to the content itself. Like many simple concepts, "open editing" has some profound and subtle effects on Wiki usage. Allowing everyday users to create and edit

any page in a Web site is exciting in that it encourages democratic use of the Web and promotes content composition by nontechnical users. (Source: wiki.org)

Wikis are Web pages or sites that can be edited and maintained by several people. One of the best examples is Wikipedia. at http//en.wikipedia.org/wiki. Wiki is "a page or collection of Web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language" - Wikipedia. Wikis are also used to create collaborative websites. This Wiki is an interactive and collaborative website. Registered users can add tools and methods, content, edit existing pages, insert comments and anecdotes. Documents can be written collaboratively, in a simple markup language using a Web browser. A single page in a wiki website is referred to as a "wiki page" whiles the entire collection of pages, which are usually well interconnected by hyperlinks, is "the wiki".(Wikipedia). Many wikis are open to alteration by the general public without registering. Some wikis however need user authentication for adding content, editing or even reading pages. A wiki can be used for project management and can allow people in several Organizations to update progress.

15 Productive Uses for a Wiki

1) To-do list. Once you've learned the simple wiki markup language, creating a list is easy. And the most productive list, of course, is the to-do list. In fact, if you're into GTD, you can set up multiple context lists for a simple GTD system-try GTD Tiddlywiki, dcubed, or Monkey GTD for more integrated wiki solutions.

2) Project management. A wiki can be a great way to plan and manage a project, from conception to completion. Assign tasks, make a timeline, and add notes, paste images and other media— whatever you need for a project, there's no simpler way to organize it all.

3) Operations manuals. If you've got a company full of web workers, it doesn't make sense to have a hardcopy or server-hosted version of a manual — put it online, so that it can be updated when things change, so that anyone can view the updated version at any time. Things changes so quickly these days that a printed version of a manual is outdated as soon as it's printed and distributed.

4) Checklists. Have a process that's repeated often? If so, create a checklist so you never forget anything, and it's done right every time. Put it on your wiki, and never forget where it is.

5) Plan an event. Conferences, weddings, off-site meetings, parties and events of all kinds have been planned with wikis, because they're perfect. Multiple people can access the plans, you can create different sections for different planning areas, create checklists, add notes, ideas, images, contact info, and much more.

6) Log client work. If you do a lot of freelancing, like I do, you know that you need a system of logging your work: either hours spent on a project or number of projects completed (articles written, in my case), along with dates, rates and other notes. There are many tools for doing this, but one of the simplest is adding it to your personal wiki. You could have all your client logs on one page, or create a separate page for each client —the flexibility of a wiki is why it works so well.

7) Track invoices. Similarly, you also need to track your invoices to each client: the work done, dates, rates, etc., along with when the invoices were submitted, when they're due, and

when they were paid. Again, there are other services for this, but if you are already putting your logs on your wiki, why not add your invoice tracking in the same place?
8) Notes and snippets. Web workers take notes, pull snippets from pages, save images all the time and yet it can be hard to keep track of all of them. Keep them all in one place on a wiki for easy access when you need them.
9) Goals. This can be a work thing or a personal thing, or both, but one of the problems with our goals is that we might write them down, but we might also then forget about them. If you make your personal wiki your place to go for everything, be sure to put your goals here: along with action steps, deadlines, progress reports, notes, etc. Get your life in gear on your wiki.
10) Contacts. Still haven't found a great online solution for your contacts? If you use your wiki a lot, it can be an easy and quick way to add contacts and find them any time and any place you need them.
11) Workspace. If you use multiple computers, and need a place to do your work that you can access from anywhere, a wiki isn't a bad choice. Besides being a place to keep your notes and snippets and images together, you can write articles, reports, etc. and keep everything together. You don't need to do the actual writing here, if that's not your preference, but it can be where you keep the writing or other work and related items.
12) FAQs. If you get a lot of questions about your work, or product, or just about yourself personally, you can keep an ever-growing FAQ to prevent having to repeat your answers too many times. Then just point people to your FAQ url.
13) Collaboration. There are more fancy, complicated or expensive options for collaborating on something with people in spread out locations, but probably not many things as simple and easy as a wiki. Again, you can work on a project or even just one document with another person or group of people the entire Internet, in fact, if you want to get global. Changes are made and tracked, and you can revert to previous versions if necessary.
14) Reference. Got a list, document, codes, instructions, etc. that you need to refer to regularly? Keep it here on your wiki, so you never have to go looking again.
15) One place for everything. One of the best reasons to have a wiki is because it can do all of the above, and more. It's versatile: more so than most other tools on the web: which means that whatever you need to do, the wiki can accommodate. And that allows you to keep everything in one place: which is the key to staying organized. Otherwise, you'll have things all over the place, and you'll have to remember where they are, or you'll forget about them. Keeping things all in one place is a great way to keep productive.

The CGIAR has put up a wiki with training materials for the tools and methods being taught for its course on knowledge sharing in agricultural research at (http://kstoolkit.wikis.cgiar.org). The Virtual Academy of Semi Arid Tropics (VASAT) Wiki is an attempt to build a Repository of Re-usable Information objects in Agricultural Education and Extension and is being used for educating and supporting rural women and men across vast geographical areas by informing them about good agricultural practices to drought and desertification. (VASAT, 2006).

Similarly, agropedia is an online agricultural knowledge repository that makes agricultural information available to specialists, researchers, extension personnel and the agricultural community, and allows them to search and make contributions to the vast

knowledge base. The key elements of the system are knowledge models and objects in the form of text, image, audio and video. Knowledge is disseminated in several languages to users who have been categorized as anonymous, authentic users and editors. This agropedia incorporates Web 2.0 elements such as agro-wiki, agro-blog and commentary spaces for interaction and has more than 7,400 registered users. The content in agropedia is aggregated and organized through the use of knowledge models. Knowledge models have been standardized for nine crops. This article covers the role of agropedia for agricultural knowledge transfer and extension services. (Source: agropedia: An ICT Application for Agricultural Knowledge Transfer and Extension, Ankur Kukreja SRF, IARI, New Delhi ankur.kukreja85@gmail.com)

Agropedia, an agricultural Wikipedia at http://agropedia.iitk.ac.in/ has been launched in January 2009 by scientists in India as an online repository of agricultural information in the country. This is envisaged as a platform where specialists in agricultural research and education and students and those interested in agriculture can contribute to the knowledge base. Specialists can also participate in the agrowiki, agro-blog, agro-forum and agro-chat. The objective is to disseminate crop and region specific information to researchers, agricultural extension workers, students and farmers. The website currently has information on nine crops. The project is being implemented under the National Agricultural Innovation Project (NAIP) and is funded by the World Bank and the Government of India. (Agropedia' 2009)

Sharing Images

Agricultural researchers and extension managers often depend on photographs to document plants, pests, diseases, etc. Web 2.0 tools like Flickr can help organize and share photos and images easier. Flickr at www.flicker.com and Picasa at www, picasa.com allow photos and images to be shared. Flickr is a social photo sharing site where users can upload their photos and share them as well as receive comments from other users. Users can tag their photos to locations, people or events. IRRI uses Flickr to upload and share its photos.(www.flickr.com/photos/ricephotoslsets). A user can also subscribe to another user's photo stream via RSS.

Common photo sharing tools

Flickr (stylized as flickr and pronounced "flicker") is an image hosting and hosting website, and web services suite that was created by Ludicorp in 2004 and acquired by Yahoo! in 2005. In addition to being a popular website for users to share and embed personal photographs, and effectively an online community, the service is widely used by photo researchers and by bloggers to host images that they embed in blogs and social media. (Terdiman, Daniel (2004-12-09). "Photo Site a Hit With Bloggers". Wired. Retrieved 2008-08-28.)

Picasa is an image organizer and image viewer for organizing and editing digital photos, plus an integrated photo-sharing website, originally created by a company named Life scape (which at that time may have resided at Idea lab) in 2002 and owned by Google since 2004. "Picasa" is a blend of the name of Spanish painter Pablo Picasso, the phrase *mi casa* (Spanish for "my house") and "pic" for pictures (personalized art). In July 2004, Google

acquired Picasa from its original author and began offering it as freeware. (Lifescape's Picasa aims to be your digital "shoebox". By Michael R. Tomkins, the Imaging Resource (Monday, November 18, 2002 - 15:49 EST). Published on imaging-resource.com under "Comdex Fall 2002 Show")

Smug Mug

The Smug Mug is a premium photo sharing web site with an emphasis on professional photography. That's not to say that the site's not also perfect for the weekend photographer, as its attractive and user-friendly interface is tempting for any level of photographs. The biggest hurdle for new Smug Mug users is that the site has no free account (though there is a 14 day free trial), and the minimum price for an account is $40/year. However, Smug Mug users: many of whom are former Flickr die-hards (there's even an import tool called Smugglr): seem very pleased with their choice.

Photobucket

Once upon a time, Photobucket was a favorite among internet users looking to quickly host an image and share it online at sites like eBay and MySpace or on blogs and message boards. While that's still true, Photobucket has added several features to keep users coming back to the site for managing photo albums and videos. (lifehacker.com)

Sharing Videos

You Tube is a video-sharing website, created by three former PayPal employees in February 2005 and owned by Google since late 2006, on which users can upload, view and share videos. The company is based in San Bruno, California, and uses Adobe and HTML5 technology to display a wide variety of user-generated video content, including movie clips, TV clips, and music videos, as well as amateur content such as video blogging, short original videos, and educational videos.

Most of the content on YouTube has been uploaded by individuals, although media corporations including CBS, the BBC, Vevo, Hulu, and other organizations offer some of their material via the site, as part of the YouTube partnership program. Unregistered users can watch videos, while registered users can upload an unlimited number of videos. (Source: Hopkins, Jim (October 11, 2006). "Surprise! There's a third YouTube co-founder". *USA Today*. Retrieved November 29, 2008.) For sharing videos, one can access YouTube www.youtube.com, www.blip.tv and http://video.google.com/. YouTube is a social networking site where users can upload and share videos. This may include instructional videos, extension materials and other agriculture related videos. The videos can be edited and uploaded easily. These services also allow comments, feedback and sometimes rankings from visitors. They provide RSS feeds and automatic subscription options so that a visitor can be updated when new content of their interest is published.

Marketing information on Mobile

Reuters Market Light (RML):

Reuters Market Light (RML) was launched in October 2007 by Thomson Reuters group. It was intended to provide farmers with agricultural market price information, weather as well as crop advisory information via the mobile phone. The service launch was preceded by an 18 month market research, concept tests and market trials. The information available via their service is localized, Thus each subscriber gets information pertinent to his location and/ or subscription parameters. Hence a subscriber will get market prices from the mandis he has subscribed for and for the commodities that are of interest to him. RML currently tracks prices for 250 commodities across 1,000 mandis (with 195 in Maharashtra). ln addition, weather and crop advisory information is also location specific. They provide weather forecast for nearly 2,500 locations. The mode of delivery is via SMS. Provided that their handsets allow it, it is possible to get the SMS in the local language. For example, users in Maharashtra can get their SMS alerts in either English or Marathi. RML, a business incubated by Thomson Reuters, is a pioneering mobile phone-based agri information service provider. The service is designed to provide farmers with personalised timely and actionable agricultural information from pre-sowing to post-harvest stages through SMS on their mobile phones in their local language. About 1 million Indian farmers from an estimated 50,000 villages have used this service across 17 states. Through sharing among farmers, it is estimated to have reached 5 million farmers. At present, RML is available in 13 states in India, covering over 450 crop and crop varieties and more than 1300 markets. With this service, individual farmers gained up to INR 2,00,000 ($ 4000) of additional profits, and savings of nearly INR 4,00,000 ($8000), marking a significant return on their investment. (Source: Winners of 2010 World Business and Developemt Awards". International Chamber of Commerce.www.google.in)

S.No	Name of Service Provider/VAS Provider	State (District)
1	Tata Tele Services Limited	Uttar Pradesh (Gautam Buddha Nagar)
2	Sasken Communication Technologies Limited	Tamil Nadu (Kanyakumari and Coimbatore), Kerala (Thrissur)
3	Reuters Market Light	Maharashtra (Pune)
4	Reuters Market Light	Uttarakhand (Almora, Bageshwar, Tehri, Uttarkashi and Chamoli)
5	Unitech Wireless (Tamil Nadu) Private Limited	Tamil Nadu (Vellore and Thiruvannamalai)
6	Videocon Telecommunications Limited	Tamil Nadu (Cuddolore, Thanjavur, Puddukotai, and Dindigul) and Puduchchery (Puduchchery)
7	Vodafone Essar South Limited	Andhra Pradesh (Warangal and Rangareddy)

8	Bharti Hexacom Limited	Rajasthan (Ajmer)
9	Reuters Market Light	Maharashtra (Amravati)

(Source: Ministry of Communication and Information Technology Department of Telecommunication Universal Service Obligation Fund www.usof.gov.in)

RML's operation spans 8 states with most of the offices engaged only in content collection, production and aggregation. The service itself is available in Haryana, Punjab and Himachal Pradesh in addition to Maharashtra and Goa. They have had to employ their own dedicated price collectors for the mandis that they cover. However, weather, crop advisory information as well as local news are generally obtained via agreements and partnerships with third party sources, which are both private as well as state level institutions. Currently RML operates on a direct-selling approach whereby users buy scratch card which enable them to register for the service for a specific amount of time. Currently this service is network agnostic in all the states where RML operates and they utilize a bulk SMS service provider to push messages to users, irrespective of the telecommunication network they are subscribed to. However as it expands to other states, it has left open the possibility of other delivery mechanisms. Users who subscribe for this service have 4 possible packages that they can choose from, dependent on the timeframe for which they subscribe. When the service first debuted in 2007, users in Maharashtra could only buy a one month subscription for INR 60. This was quickly expanded to include packages for 3 months (INR 175), 6 months (lNR 350) and 12 months (lNR 650). They have also explore different price points and in Haryana and Punjab (which are predominately agricultural states), the 3, 6 and 12 month packages cost INR 250; INR 550 and lNR 850 respectively. According to RML, the initial trend was towards purchasing 3 month subscriptions. But over time 6 and 12 month subscriptions are the most popular. RML currently reports the average subscription to be about 5.5 months.

IFFCO Kisan Sanchar Ltd.

The Mobile operator Bharti Airtel partnered with IFFCO to form a joint venture company in 2008, to provide 5 free daily voice updates on mandi prices, farming techniques (including dairy as well as animal husbandry), weather forecasts, rural health initiatives and fertilizer availability, etc. mainly targeting the 55 million farmers who are members of IFFCO. As of the date of this report they are now active in the states of Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Rajasthan, Uttaranchal, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu and West Bengal. Airtel currently reports having signed-on l.5million subscribers for this service from these 18 states. The service is marketed as part of specialized mobile tariff package only on Airtel's network with an IFFCO Kisan branded SIM card. IFFCO is a co-operative institution having more than 40,000 co-operative societies as its members and base of 60 millions farmers. The farmers are owners of IFFCO through the share contribution of their respective societies and also the consumer as they use fertilizers produced by IFFCO's various plants to grow the food grains. apart from distributing the quality fertilizers to the farmers though their respective cooperative societies, IFFCO is also educating the farmers by organizing different promotional activities so that farmers are acquainted with the latest

technology in agriculture and also are able to use the best of the agriculture inputs to grow more food for the country, as well as, get a better income from farming.

Aim / Vision / Mission

- To empower farmers and people living in rural India with pertinent and high quality information and services, through affordable communication network, in a sustainable manner.
- To work concertedly to develop content and services which will improve informed decision making by people living in Indian villages.

Mandi on Mobile

The BSNL, the national state owned Telecommunications Company and On Mobile a Private-sector VAS provider partnered with the Uttar Pradesh Agricultural Marketing Board (Mandi Parishad) in late 2008 to start a service called "Mandi on Mobile." The service allowed BSNL subscribers to calf a number and receive current market prices of about 108 commodities, from all the 247 mandis in the state. The completely voice-based solution (which even accepted voice commands) solution, allowed farmers to just enter the commodity and the district and would get current taluka-wise mandi rates for the chosen commodity in the specified district. The project was started out as pilot and to-date hasn't expanded beyond the state, even though Bharti has since then partnered with others to start a similar pilot in other states. (Lokananthan, Sriganesh & de Silva, Harsha (2010). Leveraging Mobile 2.0 in lndia for Agricultural Market Access, March 2010,I DRC and DFID.)

Some ICT initiatives

aAQUA (Almost All Question Answered)

'Almost All Questions Answered' or aAQUA is a Farmer Knowledge Exchange available at aaqua.org answering questions from progressive farmers in 4 languages in any one of 420 districts in India and some places abroad. aAQUA, is an online question answering website providing farm and veterinary advisory services to farmers over phone or internet. A panel of experts assesses the problem through a set of images or text posted by the affected farmer, work out feasible solutions and send back recommended solutions through the online forum. Phone help-lines augment the online service. Any farmer, agriculturist or hobbyist can register and post questions and a panel of Agriculture Experts answers questions based on the problem description and photos if any. Contextual Information such as geographical location, weather, and season are retrieved automatically and made available to experts. Apart from agriculture, aAQUA is a forum for questions regarding education, healthcare and other issues important to a developing population. Currently questions may be asked in one of four languages- Hindi, Marathi, Kannada and English.

Having originally developed at the Developmental Informatics Lab, aAQUA uses relational database management systems and information retrieval techniques with query optimization, intermittent synchronization and multilingual support. An excellent technical introduction is available in the Internet Computing Article (1, Sahni, Saurabh; Krithi Ramamritham (2007). "Delay tolerant applications for low bandwidth and intermittently connected users: the aAQUA experience". ACM New York, NY, USA. 2, Ramamritham, Krithi; Anil Bahuman, Saurabh Sahni, Malathy Baru, Chaitra Bahuman, Arun Chandran, Manjiri Joshi (2008). "The aAQUA Approach: Innovative Web 2.0 Tools for Developing Countries". IEEE Educational Activities Department.)

An online, archived, web based discussion forum, which allows users to create, view and manage content. It provides retrieval of contextual information, documents and images using various keyword search strategies with the help of query expansion and indexing techniques. Using this, a farmer can ask a question on aAqua from a kiosk; experts view the question and answer back, providing solutions to the problem. aAQUA has been deployed at many kiosks in Pabal and Rajguru, Shirur, and Haveli taluka region in Maharashtra. It is available in English, Hindi, and Marathi. Being Unicode compliant system, it can support other languages also. It has been developed at Media Lab Asia research hub at IIT, Mumbai. (Source: Link: http://www.aaqua.org)

AGMARKNET

Agricultural Marketing Information Network (AGMARKNET) was launched in March 2000 by the Union Ministry of Agriculture. The Directorate of Marketing and Inspection (DMI), under the Ministry, link around 7,000 agricultural wholesale markets in India with the State Agricultural Marketing Boards and Directorates for effective information exchange. This e-governance portal AGMARKNET, implemented by National Informatics Centre (NIC), facilitates generation and transmission of prices, commodity arrival information from agricultural produce markets, and web-based dissemination to producers, consumers, traders, and policy makers transparently and quickly. The AGMARKNET website (http://www.agmarknet.nic.in) is a G2C e-governance portal that caters to the needs of various stakeholders such as farmers, industry, policymakers and academic institutions by providing agricultural marketing related information from a single window. The portal has helped to reach farmers who do not have sufficient resources to get adequate market information. It facilitates web-based information flow, of the daily arrivals and prices of commodities in the agricultural produce markets spread across the country. The data transmitted from all the markets is available on the AGMARKNET portal in 8 regional languages and English. It displays Commodity-wise, Variety-wise daily prices and arrivals information from all wholesale markets. Various types of reports can be viewed including trend reports for prices and arrivals for important commodities. Currently, about 1,800 markets are connected and work is in progress for another 700 markets. The AGMARKNET portal now has a database of about 300 commodities and 2,000 varieties.(Source:http://agmarknet.nic.in/index.html, http://www.Agricoop.nic.in)

Actually, as a step towards globalization of agriculture, the Directorate of Marketing & Inspection (OMI) in India has embarked upon this ICT project: "NICNET

based Agricultural Marketing Information System Network (AGMARKNET)" for linking all important APMCS (Agricultural Produce Market Committees), State Agricultural marketing Boards / Directorates and OMI regional offices located Throughout the country, for effective information exchange on market prices NIC implements this project on a turn-key basis. (Source; Link:www.agmarknet.nic.in, Subject: Market information, wholesale markets).

Chalao Ho Gaon Me

Community Radio Program '*Chalao Ho Gaon Mein'* initiated by Alternative for India Development in the regions of Palamau, Garhwa and Latehar districts of Jharkhand completed its 500th episode on 18th May 2007. The programme was first aired on 5th August 2001 from AIR Daltonganj. Since then it has accomplished a milestone in the annals of community radio broadcasting in India. A single community based sponsored program in India from any AIR station has completed its remarkable 500 episodes without any external or internal disturbance. Its greatest achievement have been the participation of grassroots communities in making their own radio program by giving voice to local governance and social issues through local dialects.

As community radio program '*Chalao Ho Gaon Mein*' was initiated by Alternative for India Development in the above 3 districts of Jharkhand, it was a weekly community radio program aired on AIR. Two local NGOs 'Alternatives for India Development(AID)' and 'Manthan Yuva Sangathan' joined hands to launch *Chalao Ho Gaon Mein,* a half- hour community broadcast on All India Radio. An NGO, AID, and journalists lend technical support to the programme Manthan. The National Foundation for India (NFI), strategically and financially backs the initiative. Every Sunday at 7.20 p.m. AIR Daltonganj broadcasts the sponsored program Chala Ho Goan Mein (30 min.). The local dialect of Maghi is used in the program to the maximum extent. A range of Issues of local importance are broadcast on the radio every week which has brought in value addition. The villagers are involved in designing and devising the concepts and themes for the program. Programme development, message gathering and analysis and pre-editing listening session are carried out every month during a creative workshop. The content is decided after equal participation of all. For the first time, villagers from this area are participating in a community initiative and are getting to hear their own voices on the radio. (Source: Alternative for India Development, 2008).

DACNET

DACNET also possesses significant attention in ICT initiative. It is a scheme for bringing E-Governance in the Directorates and Field Units of Department of Agriculture & Cooperation (DAC). The project is being executed by National Informatics Centre (NIC) to facilitate Agriculture-on-line. The goal of NIC is to deliver coherent and integrated solutions (best practices, experiences and global solutions) that enable the Department to establish online Agricultural Information to farmers using ICT. In order to bring e-governance and to establish an Intranet for all the offices of DAC, NIC will facilitate the Directorates and it's field units to be connected and have access to information. NIC's focus is on increasing value in the Department of Agriculture and Cooperation (DAC) and enhancing its

relationships with its minimum agenda of e-governance: Integration of Government Functions (G2G), Integrating Agri-Business Partners (B2B), Connecting Farmers (C2C), Empowering Employees, Enhancing Government productivity and value and financial services.

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DACNET will include

- Establishing e-Business infrastructure
- To implement various e-Governance solutions and make it as showcase for
- other Government Departments to follow
- Achieving the minimum agenda of e-Governance
- Developing e-Governance application packages
- Integration of Government functions (G2G)
- Enhancing Government productivity
- Portal (http://dacnet.nic.in) to facilitate dissemination of information
- Decision support for planners
- IT Empowerment of the officials of the Directorates/Attached/Subordinate and the Field Units
- Usher in e-Governance which could even eventually facilitate Agriculture-on-line
- (www.datasmarts.com) Link: www.dacnet.nic.in, Subject: e-governance, online agriculture

Digital Green

Digital Green combines technology and social organization to improve the cost-effectiveness and broaden the community participation of existing agricultural extension systems. By building on existing social linkages and using technology, Digital Green seeks to amplify the impact of agriculture extension workers who help farmers become more productive.

Digital Green records live demonstrations of agricultural practices by experts, transmit them to a large database and distribute them on DVDs to local organizations for dissemination among small and marginal farmers. Digital Green uses low-cost and portable technology viz. camcorders, TVs and Pico projectors for the production and dissemination of videos. Videos are based on content identified by the community, feature local farmers, are created in local dialects, and are duly checked for accuracy by agricultural experts. These screenings are mediated by an expert to help farmers adopt the practices as well as monitor their status after adoption. Digital Green partners with local organizations which are already working

on agricultural extension programmes. Currently, it is operating in 5 states and partners with 7 organizations. With more than 1650 videos in its database and a reach over 58,000 farmers, Digital Green today is ten times more effective, per dollar spent, in converting farmers to better farming practices than traditional approaches to agricultural extension.

In nut shell, *Digital Green is an* agricultural training and advising system that seeks to benefit rural farmers by disseminating targeted information through digital videos and phones. Pilot experiments in the field began in September 2006 through an NGO, called Green Foundation, which promotes sustainable farming practices in southeastern Karnataka. They are compiling a repository of videos that includes testimonials of progressive farmers, field demonstrations led by agri-scientists, interactions amongst farmers, and Market-based opportunities. (Source: indiagovernance.gov.in/best practices. Link : http : //www. digitalgreen. org/ Subject: Digital video, cell phone, sustainable farming, content delivery)

Digital Mandi

Digital Mandi by Media Lab Asia is an electronic trading platform for agro commodities. The idea is to connect dispersed village level primary mandis (spread across the country), and mills through a nationwide web based Interactive marketing platform. This can facilitate speedy and efficient information dissemination for better price discovery and risk management to actualize vision of National Commodity Exchange. (Link : http : //www.digitalmandi. net, Subject: Web-based, electronic market, information dissemination)

e-krishi

The 'e-Krishi' is a Market Driven Agricultural Initiative through IT enabled Agri Business Centres in Kerala State implemented by Kerala State IT Mission (KSITM) & Indian Institute of Information Technology & Management Kerala (IIITM-K) in collaboration with Department of Agriculture. The vision of the project is to establish a connected farmers' community throughout Kerala who have access to information on Market Demand, Prices, Good Agricultural practices, Quality Agricultural Inputs supported by a technology Enabled robust transaction platform that facilitates all their offline activities. The need to integrate activities from policy making to grass root implementation requires a platform incorporating various Government Departments and other stakeholders. The key output from the initiative shall be the facilitation and integration of economic activities of all member stakeholders involved in Agriculture thus enabling conversion of under-Performing and non- performing agricultural farms into high yielding farms of quality products in demand.

Objectives of the initiative

(i) Aggregation of responsive farmer community of about 1,00,000 with a cumulative farm land of 1,00,000 hectares cultivating priority crops as determined by the market demand

(ii) Enrolment of buyers in key markets including manufacturers
(iii) Enrolment of agricultural input providers : seeds, plantlets, fertilizers, pesticides, technology/methodology providers/consultants, test laboratories and so on.
(iv) Warehousing facility providers
(v) Enrolment of Logistics services support providers
(vi) Enrolment of banks & insurers
(vii) Legal, accounting, documentation support
(viii) Enrolment of establishment of a robust IT enabled platform where the members can seek information, transact and make or receive electronic payments. (Source: Link: www.e-krishi.org, Subject: Information services, markets, rural community)

E-Krishi, the market driven agricultural initiative through IT enabled agri-business center in Kerala state addresses the existing gap in agriculture information flow and transaction management. The vision of the project is to establish a well connected farmer's community throughout Kerala who have access to information on market demand, price, good agricultural practices, quality agricultural inputs supported by a technology enabled robust transaction platform that facilitates all their offline activities. The project is piggy backed on the existing resources of Akshaya e-kendras for providing the services. The project was piloted in Malappuram district in 2006 and was funded by UNDP/NISG. Now it is operational in Kasaragod, Kannur, Kozhikode and Kollam districts with the help of Department of Agriculture and Local Self Government Institutions.

Benefits to Member Farmers

- Access to markets with prevailing price information and ensuring correct price for their products
- Access to schemes, subsidies, modern agricultural methods, best practices, soil testing, seeds, plantlets, fertilizers and pest control
- Facilities for grading agricultural produces
- Logistics support and cost sharing possibilities
- Access to micro credits
- Agri-insurance support/faster claim processing
- Access to accounting practices and documentation support (e-krishi.org)

e-Krishi Vipanan

The e-Krishi Vipanan (EKVI) project, the e-Agriculture Marketing project of Government of Madhya Pradesh, India, is conceived and executed by Madhya Pradesh Agricultural Marketing Board (Mandi Board) and Madhya Pradesh Agency for Promotion of Information Technology (MAP-IT), on Build, Own, and Operate basis with a Consortium of vendors where in the vendors on Public -Private -Participation model to make operations effective and transparent by collecting and disseminating real time information, on-line and

help the concerned stakeholders in effective decision making, which will eventually lead to grainless mandis. Vendors are paid a percentage of fees collected by the Agricultural Marketing Yards. EKVI Project involves use of ICT for automation of Mandi Board Head Office, 7 Regional Offices, and 231 Mandis and their associated Sub-market yards and Nakas (Interstate barriers), across the State of Madhya Pradesh. Most of the Mandis and Sub Mandis are located in villages having 6 million Farmers with 70,000 licensed traders.(Source: Link: e-Krishi Vipanan, Subject: Market information, decision making, rural, Madhya Pradesh, India).

Regulated agricultural markets or 'mandis' in Madhya Pradesh, India are set to revolutionize the very system of agricultural marketing. Gone are the days when a farmer used to come to the mandi and was forced to sell his crop even when he knew that the crop was not being valued correctly. Now a farmer is empowered with the information that enables him to make informed decisions as to when and where to sell. In other words, now he can decide on the mandi where he wants to sell his crop, even demand more prices in the same mandi, or refuse to sell at all if not given the right price. All this has been made possible by the unique initiative called e-Agricultural marketing or e-krishi Vipanan (EKVI), which arms the farmer with the information of prevalent rates in mandis. And this is just the beginning. The project has a sweep of benefits for all stakeholders: farmers, traders, mandis, and the government. The EKVI Project involves automation of the Mandi Board Head Office, seven regional offices, 229 mandis and their associated sub-market yards and Inter-state border check posts i.e. 'nakas' across Madhya Pradesh in India. The data generated at mandis with regard to agricultural produce, sale, etc. is captured 'online' through Smart Card terminals, transferred to computers in mandis, and transmitted on a communication network to the associated Regional Office and Head Office via VSAT. This information is then accessible at specified nakas (and a few other points) for verification of documents on a 24/7 basis.

Benefits to the Farmers

- Availability of latest information on rates, arrivals etc. in various state mandis.
- Choice to decide when and where to sell
- Facilitate contract farming
- Sell the produce from doorstep through e-trading
- Reduction in losses due to transportation & handling

Benefits to the Traders

- Transparent procedures
- Single window disposal
- Reconciliation of daily sales, accounts, transit permit
- Availability of rates in various mandis would help in offering better rates to farmers
- Transportation losses reduced due to e-agricultural marketing

Benefits to the mandis

- Instant reconciliation of accounts, transit permits, receivables and payables.
- Effective monitoring of activities
- Facilitates implementation of contract farming

- Ensures transparency in operations

Benefits to the Government

- Speedy collection, analysis and dissemination of information
- Improved tax revenue collection by collation of valuable data.
- Instantaneous access even to remote locations through VSAT connectivity.

(Source: http://egov.eletsonline.com/)

e-Sagu: IT based Personalized Agricultural Extension System

The e-Sagu also has a considerable relevance. The project 'Building a Cost Effective and Personalized e-Sagu' aims to develop e-Agri CIinic models for providing personalized agricultural advice to farmers for the major crops such as paddy, cotton, maize, chilli, castor, redgram, ground nut and aquaculture. The project is providing personalized advice to about 5000 farmers in more than 30 villages in Andhra Pradesh. A revenue model is also being implemented in the project. Value added services viz. making available appropriate pesticides and fertilizers, credit facilities, storage and marketing etc. are being integrated. This has been taken up by IIIT, Hyderabad. Ministry of Agriculture, NGOs, industry, and farmers are participating in this project. (Source: Link': http: //www. esagu.in/esagu/Subject: Farmer education, personalized advice, revenue model)

An IT based personalized agricultural information dissemination system has been developed by the International Institute of Information Technology, Hyderabad to deliver agricultural expert's advice afresh in a personalized manner to each individual farmer at his door steps. In contrast to the existing method of agricultural expert visiting the crop to diagnose and deliver an effective advice, the crop environment comes to an expert team of agricultural scientists in the form of digital photographs and associated text images to the central office at Hyderabad. The expert team which includes scientists of all relevant disciplines analyzes the crop situation with respect to soil, weather and related parameters to formulate an effective advice. The advice thus developed will be immediately available on the internet along with name and ID number of the farmer and farm respectively. But the advice reaches the door steps of the resource poor farmers with the help of a co-coordinator specially trained for this purpose at the village computer centre. The system as a prototype has successfully been tested at Oorugonda, Gudeppad and Oglapur villages in Atmakur mandal of Warangal district in Andhra Pradesh state during Kharif season, 2004 on cotton crop. The system contains four components viz. farmers, coordinators, agricultural experts and an information & communication system that operate asynchronously. (Source:ijedict.dec.uwi.edu).

i-Shakti

The Project Shakti is an initiative of Hindustan Unilever Limited (HUL) to usher prosperity and uplift the standard of living in rural India. The objectives are to create, income-generating capabilities for underprivileged rural women by providing a small-scale enterprise opportunity, and to improve rural living standards through health and hygiene awareness. A key factor that has inhibited: the development of rural India has been lack of access to critical information and services. Given India's large geography and weak

Infrastructure, it is often difficult to reach out to the rural areas. In order to Impact both livelihood opportunities and living standards of rural Communities 'i-Shakti' -an lT-based rural information service has been developed to provide information and services to meet rural needs in agriculture, education, vocational training, health and hygiene. The premise of the 'i-Shakti' model is to provide need based demand driven information and services across a large variety of sectors that impact the daily livelihood opportunities and living standards of the village community. To catalyze overall rural development, HUL hopes to collaborate with mainstream institutions (both corporate and not-for-profit organizations) that are experts in agriculture, health, insurance, financial services and education.

The service is now available in Nalgonda, Vishakapatnam, West Godavari and East Godavari districts. By the end of the year, HUL hopes to cover 1000 i-Shakti kiosks across the state. In brief, the i-Shakti service is an extension of HUL's Project Shakti, which creates income-generating capabilities for underprivileged rural women by providing a sustainable micro enterprise opportunity, and to improve rural living standards through health and hygiene awareness. Started in Andhra Pradesh in 2001, Project Shakti has already been extended to about 20,000 villages in 196 districts in Andhra Pradesh, Karnataka, Gujarat, Madhya Pradesh, Tamil Nadu, Chattisgarh, Uttar Pradesh, Orissa, Punjab, Rajasthan, and Maharashtra. HUL's vision for Project Shakti is to scale it up across the country by 2005, creating about 25000 Shakti entrepreneurs, covering 100,000 villages, and touching the lives of 100 million rural consumers. (Source: http://www.hul.co.in Subject: Information service, rural communities, enterprise development)

Kisan Call Centers

The Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Kisan Call Centers on January 21, 2004 across the country to deliver extension services to the farming community. A farmer can call a toll free number 1551 or 1800-180-1551 and get instant access to information. The purpose of these call centers is to respond to issues raised by farmers, instantly, in the local language. There are call centers for every state which are expected to handle traffic from any part of the country. Queries related to agriculture and allied sectors are being addressed through these call centers. The Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Kisan Call Centers on January 21, 2004 across the country to deliver extension services to the farming community. The purpose of these call centers is to respond to issues raised by farmers, instantly, in the local language. There are call centers for every state which are expected to handle traffic from any part of the country. Queries related to agriculture and allied sectors are being addressed through these call centers.

A farmer from any part of the State can contact the Kisan Call Centre by dialing the toll free Telephone No. and present their problems/queries related to farming. The operator at the Kisan Call centre will attempt to answer the problems/queries of the farmers immediately. In case the operator at the Call Centre is not able to address the farmer's query immediately, the call will be forwarded to identified agricultural specialists. For Meghalaya, the Agriculture Information Officer and the Horticulture Officer, Department of Agriculture are currently the designated specialists
(Source: Link: http: //www.manage.gov.in/kcc.htm, Subject: Extension delivery, call center. http://megagriculture.gov.in)

KISSAN- Kerala Project

Karshaka Information Systems Services and Networking (KISSAN) is an Innovative project by the Department of Agriculture, Government of Kerala. This project for agriculture is a pilot implementation of application of IT through relevant Information Systems and networking to aggregate, share and disseminates information of importance and interest to the farmers, agriculture workers and officials in ways that enhance the total agriculture development and farmers' welfare in the state. The objective is to provide an effective knowledge management and smart information dissemination system that provides linkage among farmers, public research institutions, administrative and private entrepreneurs to share the information and knowledge.

KISSAN is an integrated, multi-modal delivery of agricultural information system, which provides several dynamic and useful information and advisory services for the farming community across Kerala. It is one of the leading citizen centric e-governance projects of the Department of Agriculture, Govt. of Kerala. The project was conceived, developed and managed by the Indian Institute of Information Technology and Management- Kerala for the Department of Agriculture, Govt. of Kerala. The basic objective of this project is to provide "Right Information to the Right Person(s) at the Right Time in the Right Place(s) and in the Right Context" dynamically using a combination of advanced technology like Web Technology, Television based mass media programs, Telephone based advisory, Mobile SMS based advisory and broadcast service, dedicated online Agri video channel provides video on demand service etc, which, involves effective collaboration of experts from key organizations for effective information delivery and knowledge empowerment on demand seamlessly to all farmers across Kerala. (Source: Link: http : /www. kissankerala. net/home.jsp, Subject: Information technology, communication technology, development, communication, community building)

Kunjal Pachaee Kutch Ji community radio project by Kutch Mahila Vikas Sanghathan (KMVS)

This is a partnership between Kutch Mahila Vikas Sanghathan and the Dhrishti Media Collective. Place is Kutch district of Gujarat and target Group is Women in Kutch villages, which essentially focuses on empowerment of women for panchayat functions through the Media: AIR MW station at Bhuj.

Namma Dhwani - Karnataka

In Budikote a village 100 km from Bangalore, on the Karnataka and Andhra Pradesh border, Namma Dhwani is India's first cable community radio station. It is the result of a partnership between the rural communities in Boodikote; MYRADA, an NGO; VOICES, a development-oriented Communications organization and UNESCO. The infrastructure was provided by MYRADA, the technical expertise from VOICES and the funding was from UNESCO' Representatives of Self Help Groups form the Namma Dhwani Management committee (NDMC) and are the chief planners and implementers of the service, and the coordination is by staff from MYRADA and VOICES. Community radio was perceived as a source for timely and useful local information and for sharing their experiences and

problems with other community members. The community used their radio station to complain about non-functioning water services and the problem was addressed by the authorities.

It has benefitted individual villagers as well. Programmes have been made on a variety of topics including sericulture, organic farming and health. This not only improved the knowledge base but also involved the members more closely in the development of their community. In order to reach the local community the community radio staff started narrow casting at self help meetings. Resource people were drawn from the community to talk about selected topics and interviews were recorded on tape. Programmes were played at community meetings, in schools, at youth groups, during training programmes and at the local market. The network was extended to 60 Self Help Groups consisting mainly of women from poor families who had little access to information, in 35 villages around Boodikote. This became a group activity, providing ample scope for discussion.

Pastapur Community Media Centre in Zaheerabad, Medak district

This is a partnership between the Deccan Development Society (DDS), an NGO in Pastapur**.** Owners and audience are women's groups (sangams) in 75 villages of Medak district. The initiative is managed by women who record programmes by interviewing local experts, editing and making the content ready for broadcasting. The station works on the audio cassette technology. The programme content seeks to meet the information, education, and cultural needs of the region. Programmes relate to information specific to agricultural needs of semi-arid regions, education and literacy, health and hygiene, environmental issues, food security, indigenous knowledge systems, issues related to women empowerment local cultures, with emphasis on the narrative traditions of song and drama. The content includes agricultural practices, animal husbandry, horticulture, medicinal plants, seed preservation systems and methods, government schemes, revival of customs and traditions. Format is both spoken and musical: interviews in the studio or on the field with local experts, discussions (in the form of questions and answers), interviews, plays, storytelling, burra kathas, rela patalu (agricultural practices). (Source: DDS, 2008).

TARAhaat

TARAhaat is a Development Alternatives, a sustainable development enterprise established in 1983 as a not for profit research, development and action organization. TARAhaat's vision is to empower people to achieve their aspirations by using Information and Communication Technology (ICT). (source: Link: www.tarahaat.com, Subject: Enterprise development, information services)

Tata Kisan Sansars

Tata Kisan Sansars are one-stop resource centres that offer cultivators a wide range of services and solutions from the stage of sowing of seeds to post-harvest management and marketing of agricultural produce. The Tata Kisan Sansar network reflects the Tata Group's belief that technology can and must be harnessed to solve India's social and economic

problems. The concept of precision farming being implemented by the TKS has the potential to catapult rural India from the bullock-craft age into the new era of satellites and IT. At the helm of this endeavor is Tata Chemicals Limited (TCL), the Standout chemicals and fertilizers company in the Tata Group. TCL's extension services, brought to farmers through the TKS, use remote-sensing technology to analyse soil, inform about crop health, pest attacks and coverage of various crops predicting the final output. This helps farmers adapt quickly to changing conditions. The result: healthier crops, higher yields and enhanced incomes for farmers. Staff members at each sansar are equipped to find solutions to every agriculture-related problem. A well stocked library of journals and magazines helps farmers keep abreast of news and the latest global developments. In addition, the sansars mail regular bulletins on farm-related news to subscribers. The training halls at the TKS are used for workshops and the screening of films related to agriculture. (Source: Link: www.tatatkk.com, Subject: Precision agriculture, information technology, extension delivery)

VASAT Project

Virtual Academy for the Semi-Arid Tropics (VASAT) is a coalition for Information, communication and capacity building, operating in South Asia (SA) and West and Central Africa (WCA) in partnership with the Desert Margins Program (DMP). VASAT links and mobilizes stakeholders for drought mitigation in the semi-arid tropics (SAT). It is an innovative and cost effective medium to educate and support a critical mass of rural women and men spread across vast geographical areas by informing them about drought and desertification. It is a response to the need of the United Nations Convention to Combat Desertification to implement a communication strategy for combating drought and desertification. VASAT disseminates knowledge on agriculture best practices from the rain fed areas of India and others. They do this through the innovative interface of ICT and distance learning, with a particular focus on the use of community radio. Initial work in this site included setting up a basic connectivity and computing infrastructure and extensive training to federation nominees (all women) in contemporary information management methods. The quality of information services offered by this federation is today recognized by the district administration, who has granted them the status of a rural e-seva or e-governance center, one of the first such rural centers in the State of AP. The site also serves as the test bed for evaluating a number of agricultural and livestock information products.

VASAT is involved in developing Micro-level drought vulnerability prediction maps and local long range forecast for rainfall of Adakkal Mandal from last three years. It is a partnership coalition that aims to mobilize communities **and** rural service providers in the dry tropics by sharing information, knowledge and skills related to climate literacy, drought preparedness, best practices in dry land agriculture, and other relevant issues. This is achieved through the innovative interface of ICT and distance learning. (Source: Link: http: //www. icrisat. org/vasat/index. Htm, Subject: Drought mitigation, communication strategy, distance learning, http://www.e-agriculture.org)

Solution Exchange

Solution Exchange, an initiative of the United Nations Agencies in India, is harnessing the power of Communities of Practice to help attain national development goals and the Millennium Development Goals (MDGs), leveraging the knowledge, experience and energies of development Practitioners towards the common objective of problem-solving. While "expert" knowledge is often well documented, valuable tacit knowledge gained through practitioner experience is typically lost or ignored. Furthermore, practitioners cannot always access knowledge they need, such as whether a particular idea was tried before or where to turn when facing a bottleneck. To harness this knowledge pool and help development practitioners avoid reinventing the wheel, the United Nations offices in India created Solution Exchange: a free, impartial space where professionals are welcome to share their knowledge and experience. Members represent a wide range of perspectives from government, NGOs, donors, private sector and academia. They are organized into communities of practice built around the framework of the Millennium Development goals. Through moderated e-mail groups, members interact on an ongoing basis, building familiarity and trust, gaining in knowledge that helps them contribute more effectively-individually and collectively to the nation's development challenge. Launched in 2005, Solution Exchange (SE) is a unique initiative by the United Nations in India that provides an impartial platform for exchange of knowledge and ideas among 33,000 (and growing!) development practitioners across 13 thematic areas (Communities of Practice COPs).(http://www.undp.org).

To put it briefly, Solution Exchange is a United Nations common initiative that leverages the power and potential of managed Communities of Practice (CoPs) to effectively address development priorities and the MDGs; tapping into the knowledge, experience and energies of members for collective problem-solving. Since first being introduced in India in 2005, Solution Exchange's proven methodology has benefited over 25,000 professionals from government, United Nations, NGOs, research and academic institutions, donors and the private sector, addressing over 1,100 wide-ranging policy, programme and implementation concerns. Currently eighteen Solution Exchange Communities of Practice are active in India, Bhutan, Bangladesh, the Pacific, and Russia.

With Solution Exchange, development practitioners can attain better results for

- Informed decision making - knowledge at your fingertips
- Faster feedback on issues - speeding up plan-to-action
- Building local capacities while reducing costs - better value for money
- Enhanced development effectiveness

(Source: http: //www. solutionexchange- un.net.in/en/index.php & MANAGE.2012.Information and Communication Technologies in Agricultural Information Management and Networking, Training module.)

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