

ICT INITIATIVES AND AGRICULTURAL COMMUNICATION IN INDIA

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Communication not only promotes the benefits of good agricultural practices but it also keeps the policy makers informed about the hardships faced and compels them to take strong measures and initiatives to support agriculture in these areas. With the growth and development of agricultural communication, there has been a shift from traditional method of communication to technology led communication or ICT enabled agricultural information. The government of India has also given special attention to ICT and agriculture through various schemes and programmes. Apart from Government's initiatives, thousands of civil society organizations have also contributed in strengthening the ICT and agricultural development in form of community radio centres, e-Suchana Kendra (e- information centres) etc. However, there is a felt need to understand how these ICT initiatives perform at different levels of society and are contributing for the development of agriculture. The major objective of this paper is to understand the performance of different ICTs in different parts of the country and come out with strategic analysis to strengthen these initiatives. Under the study information related to 26 ICT initiatives used for dissemination of agriculture related information viz. mobile phone, telephone, call centre, kiosk, Internet, and community radio from different part of the country were analysed. The primary data was collected with extensive field visits and by interacting with different stakeholders of ICT initiatives. The views of the beneficiary farmers were taken using qualitative and quantitative methods. Thus, it is based on a pan India study of the agriculture communication initiatives. It also recommends the steps to strengthen different facets of agriculture communication – technology, content, process, and the communication utilization support.

Key words: ICT, agricultural communication, e-Suchana Kendra, e- information centres, kiosk and Internet.

Agriculture has always been the prime mover of civilization. Prehistoric account on agriculture indicates that when the group of people in ancient times moved out of their tando (nomadic camps), they moved out in search for food. The search for food and later on for control over food resources lead to assured agriculture production and food production support for the population. This easy way of getting food resources than hunting and food gathering was a greater boost to agriculture. Domestication of plants and animals view agriculture as an evolutionary adaptation. Starting with domestication by protection of wild plants, it led to specialization of location and then full-fledged domestication. Gradually it led to selection and refinement of edible plant species. Be it domestication of plant or animals or preservation of seeds or patterns of cultivations, knowledge always transferred from generations to generation and societies to society. The process of knowledge transformation in nomadic period and transfer of knowledge and technology in modern times through different mediums of communication is the key for all kinds of development. Likewise in case of agricultural development communication only helps in spreading knowledge and technology but also plays the pivotal role in development of agricultre. Like any other

communication, agriculture communication has a long history in India. Even before India became independent, the people and the rulers of India had realized the importance of communication in increasing the productivity of land resources. To give a boost to Indian agriculture, a number of programmes were launched after independence, number of agriculture universities with strong departments of agriculture extension were opened, agriculture research institutes were set up. Special emphasis was also given for improving the agricultural communication, in Pant Nagar Agriculture University; a separate Department of Agriculture Communication was established.

I.Review of Literature

Communication does not only promotes the benefits of good agricultural practices but it also keeps the policy makers informed about the imminent hardship and compels

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them to take strong measures and initiatives to support agriculture in these areas. As Lamberti writes, a successful farmer must learn modern professional communication to survive in a world of corporate farming, globalization and government over-regulation. With the growth and development of agricultural communication, there has been a shift from traditional method of communication to technology led communication or ICT. Initiatives like e-vani (Radio), television, mobile technology and Internet etc. have been adopted by various departments and development agencies for successful communication and agrarian development. Number of initiatives have been taken, some of them have turned to be the most successful medium of communication and also replicated in different parts of the country. The government of India has also given special emphasis to ICT and agriculture communication through various schemes and programmes. Apart from government's initiatives a large number of civil society organizations have also contributed to strengthen the ICT and agricultural development in the form of community radio centres, Krishidarshan, e-Suchana Kendra (e- information centres) etc. However, there is a felt need to understand how these ICT initiatives are performing at different levels in society and contributing for the development of agriculture.

India is predominantly an agricultural economy. For majority of its household, almost 70 percent of them who live in rural areas, agriculture is the main source of livelihood. India ranks second worldwide in farm output. Agriculture and allied sectors like forestry and fishing account for 15.7 percent of the GDP in 2009–10, employed 52.1 percent of the total workforce, and despite a steady decline of its share in the GDP, is still the largest economic sector and a significant piece of the overall socio-economic development of India¹. Although, agriculture remains the main occupation for rural India and 58.4 percent of India's population depends on agriculture, the contribution of agriculture to the GDP of India was only about 20 percent in 2009 and since 1949, in the past several decades the sector has grown very slowly. Reserve Bank of India (2008) reports that since 1949 agricultural productivity has grown at the rate of less than two percent and currently its growth rate has come down to the range of 0.5–1.2 percent. This is quite low in comparison of other developing countries, particularly China, where it has grown at six percent per annum

Other reasons such as increasing cost of agriculture inputs – seeds, agricultural equipments, electricity for watering, fertilizer, pesticides, and human power required to manage agriculture operation, tiny land holdings, difficult

topography, much dependence on rain water, and use of poor and uneconomic agricultural practices because of low level of awareness about modern agriculture are other major reasons leading to loss in productivity. This makes role of communication in improving agriculture production more crucial. The Government of India and other stakeholders in agriculture are quite concerned on losing the agriculture products and have been investigating the reasons and planning the ways to improve the production. They are serious about increasing the level of awareness. In last two decades there have been efforts to make the farmers informed of the means to improve agriculture and various modern ways of agriculture have been introduced. The emphasis is on strengthening agriculture communication.

Obviously, the time has come to seriously consider and work on the crisis of agricultural stagnation. Though there is persistence crisis in this sector but still it provides livelihood to nearly 60 percent of the population and remains vital for country's food security. To ensure the holistic growth model to provide a better life for the agricultural workers and farmers, it is necessary to double the present growth rate. In line with other researches, the present study has also found that knowledge gap and lack of information is considered as one of the 9 most important factors for the low productivity and corresponding agricultural crisis in India.

The National Commission on Farmers (NCF) has drawn attention to the knowledge deficit that exists at present and explains much of the difference between yields realized in experiments and what farmers actually get. One reason for this is the virtual collapse of extension services in most of the States, with 30-40 percent of the positions remain vacant. Farmers are not fully aware of the adverse consequences of unbalanced fertilizer use or of benefits of micronutrient application and soil testing to determine optimal nutrient requirements. These are hardly practiced on a regular basis even by State Agriculture Departments. Similarly, although many new varieties of seeds and pesticides have entered the market during the last decade and farmers are using these, they do not appear to have significantly contributed to higher productivity and there are frequent complaints about quality. A problem is that input dealers, who have narrow commercial interests have emerged as the main vehicle for technology diffusion and farmers do not have access to reliable third-party advice, which an effective and knowledgeable extension service could be able to provide. Lack of credit also pushes farmers to purchase inputs from local suppliers who often provide sub-standard inputs. The major challenge has been the knowledge deficit and communication gap among farmers

is directly proportionate to the agricultural productivity in India. To overcome information gaps, it is necessary to revitalize the extension system in a manner that links universities/research institutions and best practices effectively to farmers. States need to take urgent steps in this area. Due to this lack of coordination not only the farming practices in large parts of the country are sub-optimal, our plans and programmes are failing to converge technical and development aspects even across Centrally Sponsored Schemes (CSS) of the Ministry of Agriculture (MoA), let alone converging effectively with those of other central ministries, such as on watershed development. The lack of synergy between different public efforts must be addressed urgently to multiply returns to plan expenditure.

There is a felt need that communication knowledge gap need to be addressed to overcome the agrarian crisis in India. Farmers in rural areas have to deal with failed crops and animal illness frequently and, due to limited communication facilities, solutions to their problems remain out of reach. In India, there are conflicting scenarios as the country is progressing rapidly with a GDP growth rate of 7.2 percent but only 0.2 percent growth rate for agriculture, forestry and fishing sectors. Though number of attempts have been made to improve the communication system and breeze the knowledge gap in agriculture sector of India but to some socio-economic-technological barriers either it has failed to deliver what it promised to or were not able to breeze the demand and supply side of the information. Therefore, now, there is increasing policy thrust from the 11th five year plan to arrest declining agricultural productivity thereby leading to reduction in poverty and stress on the environment.

Though communication plays a pivotal role in the development of agriculture, the issues remain complex in a diversified society like India. Major problems faced by the policy makers and agricultural scientists are land holding size, low productivity of land, traditional methods of cultivation, closed group of population and poor connection with extension services. Farmers lack basic literacy to understand new technologies and desperately need skills and support for production, processing and marketing. Traditional agriculture extension systems are weak and lack adequate manpower to effectively support farmers at their doorsteps. Agriculture experts often have low motivation to go to villages and are largely located in urban settings. Villagers find it hard to travel long distances to avail extension support due to poor transport network. Cool response of the experts is another factor. They need timely knowledge support right in their villages as per their convenience. Knowledge intermediaries (human interface)

are often required who are local and proactively articulating problems using participatory communication methods.

There are obvious barriers of languages (dialects and lingo) and cultural differences between input providers and the beneficiaries leading to top-down one-way communication failing to achieve the intended purposes of benefiting the farmers and communities at large, which can be seen as the gap in supply and demand side of the information. The problems of farmers at the individual level vary based on management practices. Therefore, requirement differs from one area to another as each ecosystem has its unique features, which is rarely addressed by the presently available information systems. Even when relevant information is available at the national and international research institutions, it remains inaccessible to small and marginal farmers because of the missing last mile accessibility on the information highway. Farmers rarely have access to consistent, reliable, and updated information that is tailored for their use. Further, no single source is able to provide the breadth of information required by the farmer through the demands of the farm cycle. ICTs can help small farmers maximize the return on agricultural inputs, provided timely and relevant information is made available to them.

II. Research Design & Methods

ICT could make the greatest contribution by telescoping distances and reducing the cost of interaction between stakeholders. The present ICT environment with reference to infrastructure and hardware facility in India is highly conducive to attain this objective. The Indian telecommunication industry is one of the fastest growing telecommunications industries in the world. Growth of wireless subscription has been phenomenal (44.5 percent) between June 2009 and June 2010 (TRAI, 2010). Overall tele-density has reached 56.83 percent. The number of telephone subscribers based in India as of June 2010 was 671.69 million. Out of this, mobile phone connections alone count for 635.71 million (95 percent). More and more people in rural India are using mobile phones. At present the rural subscriber base in India is 31 percent of the total existing subscription. The rural mobile base subscription is expected to reach 320 million by 2012. This creates an opportunity to provide useful information available more widely and to a large number of farmers in rural areas.

For selection of ICT initiatives, a number of steps were taken. Five regional workshops were conducted in five regions of India and a list of existing ICT initiatives in agriculture was prepared. A taxonomic classification was prepared using the initiatives in the list depending on their

region, technology and different factors. Based on this classification, few existing initiatives were identified region wise, modality wise for the study to find out the impact and gaps of the existing projects in the selected study areas.

- a. Technology wise classification
 - ◆ Mobile Technology - (5 Initiatives)
 - ◆ Community Radio Technology - (4 Initiatives)
 - ◆ Internet Technology - (14 Initiatives)
 - ◆ Call Centre (IVRS) - (2 Initiatives)
 - ◆ Point of sale - (1 Initiative)
- b. Operating/implementing agencies
 - ◆ Government agencies - (6 Initiatives)
 - ◆ Non-Government Organization (NGOs) - (2 Initiatives)
 - ◆ Private Agencies - (9 Initiatives)
 - ◆ Public Private Partnership (PPP) - (9 Initiatives)
- c. Classification of ICT initiatives: zone wise
 - ◆ North Zone - (4 Initiatives)
 - ◆ South Zone - (8 Initiatives)
 - ◆ East Zone - (5 Initiatives)
 - ◆ West Zone - (9 Initiatives)
- d. Classification of ICT initiatives: Mode wise
 - ◆ Push Technology – (6 Initiatives)
 - ◆ Pull Technology – (17 Initiatives)
 - ◆ Both (Push & Pull Technology) – (3 Initiatives)

The study was carried out in four regions of India i.e. North, South, East, West and North-East. The field survey was undertaken for 26 ICT initiatives in agriculture and allied sector in India, mainly conducted in 57 villages of 12 states in four geographic regions from May 2009 to December 2010. The beneficiary and non beneficiary villages³ were selected randomly out of a list of villages provided by the ICT initiators. The selection of study villages was through random sampling method to avoid biases.

Data Collection was done through structured open ended questionnaire. Four different structured schedules were used to collect data from the farmers.

1. Village Situation Analysis Questionnaire
2. Beneficiary Questionnaire
3. Non- Beneficiary Questionnaire
4. ICT Provider Questionnaire

Government, non- government organizations and corporates have initiated several innovative projects in agriculture communication. Many of them are funded and run by initiating agencies and some of them have sustained

on their own. In initiatives like Soochna se Samadhan (information is the solution) farmers pay to receive information. In mobile based initiatives they are charged for messages and also for questions asked, whereas community radio initiatives take information to the farmers free of any charges.

III. Results & Discussion

Table 1 presents number of initiatives studied with different approaches on communication. The data suggests that with the development of ICT, we are establishing more demand driven approach of information dissemination through Internet and other technology platforms. However considering the socio-educational status of rural India there is an urgency to promote both supply vs. demand driven approach as this will sensitize the group and simultaneously meet the information need of the people. Thus, there is a huge scope on how the communication gap can be addressed by integrating both supply and demand side of the information. Through understanding of 26 initiatives, major communication needs have been discussed with reference to communication and technological gaps in ICT initiatives of India were also studied. These technology driven initiatives are divided in terms of their approach of communication and how information is reached to the target audience: Community radio centres are considered as supply vs. demand driven approach as there is a scope for both way interaction. At one point of time farmers get information on different issues through number of radio programmes but at the same time there is also a scope to include queries and questions from farmers. These both way approach makes community radio as both supply vs. demand driven approach of communication. However in case of Internet and call centre facilities, information can be provided to farmers as per the demand of the concerned farmer. In this case the farmer needs to visit the information centres or approach them for information, which makes it predominantly demand driven approach of communication dissemination. In case of third and more popular technology these days, information reaches to the farmers about different initiatives, is pre-dominantly supply driven. Be it information or mandi price, farmers do get the information but without more scope of customised information as per the need of the farmers.

Radio's role in the global South continues to position it as the most important media across the planet. In particular, community radio in Africa, in Latin America, in south-east Asia and now increasingly on the Indian subcontinent, enable the discourses of the marginalized to be amplified

(Pavarala, 2007). Community radio is considered as one of the major initiative to breeze the supply and demand gap of information. This not only supplies customized information according to the need of people in specific areas, but also addresses the queries from the community members as per the requirement. Though it has its own drawbacks, there are cases where community radio works as the key information drivers for rural India. Four major community radio initiatives from different parts of the country were studied to understand how this works with a supply vs. demand approach of information dissemination and highlighted major communication needs of the people, information gaps that exist and technological gap from the areas where the community radio operates. Initiatives like Vasundhara Vahini (Maharashtra), Radio Bundelkhand (Madhyapradesh), Community Radio Station – Vidisha (Madhya Pradesh) and Chala Ho Gaon Mein, (Jharkhand) are accepted and utilized by the farmers because they are in their own language for their better understanding. The table below is an attempt to capture major information needs, information gaps and technological gaps of all four community radio initiatives.

Table 2 presents gap analysis of Supply vs. demand approach of Community radio stations. In most of the cases, though the need of the information is more specific, information provided is very general in nature. In all four cases there is a need to understand the specific need of the people that is addressed through these programmes.

In Chala Ho Gaon Mein the information provided remains incomplete and mainly programme driven. In other two cases of Vasundhara Vahini and Radio Bundel Khand, there is no proper feedback mechanism built in. Though this is considered as the most balancing way of supply vs. demand driven approach of communication, but in most of the cases there is a huge gap between the demand and supply of information. Either the feedback from the listener is ignored or not replied as per the need of the farmer. There is also need of more promotional and awareness activities through these programmes so people can take these programmes more seriously and get involved in them. Due to wide reach of radio signal, there is no need of physical presence of farmer at any particular point. They can get information anywhere within the reach of the radio signal. Radio initiatives include all agriculture related information in their various programs. There are also phone-in programs where farmers voice their opinion and can share their problems and get solutions from the experts. Any initiative of community radio must be very specific and customized in nature to address the problem of a

specific area. The content can't be generic to address the specific problems and target audience should be in focus rather than the drivers of the radio programmes than other agenda setting factors.

Mobile phone services based initiatives are increasing the reach of information in the field of agriculture. Initiatives like Reuters, Market Light, IKSL and Fisher Friend Mobile application are taking place across the country to educate and inform farmers with the objective of helping them solve their daily agriculture related problems. These services are being established to facilitate farmers with two way communication to update themselves with current activities in their desired field. Mobile phone services include SMS and mobile applications to make operation easier. It updates farmers, fishermen as and when they require any specific information. In this system fishermen can access all weather related and geographical information to enhance their abilities for the fishing. Farmers can avail information on Pest/Disease Management, Fertilizer Management and Improved Seeds as per requirement. Mobile phone makes it easy to communicate to the experts and avail required specific information.

Table 3 presents gap analysis of Supply vs. Demand approach of mobile based service delivery. This is one of the most widely used approaches to send the information to a farmer. As the number of rural mobile subscribers is increasing rapidly so this technology can be the most efficient technology to provide information. This mobile driven information dissemination has been adopted by many initiatives across the country. Four such initiatives were studied to find out how these initiatives were successfully implemented in different areas and what are the major gaps that can be addressed to make it more successful. Predominantly, the mobile led information dissemination is a supply driven approach where information is provided to the subscribers on their mobile phone. Though this is one of the best ways to reach to a farmer but the major challenge is whether the farmer is getting any kind of benefit out of the information or this piece of information remains unused. In this study it was found that in most of the cases this kind of message is also treated like any other spam message received on the mobile of target audience. There is absolutely no awareness among farmers about these kind of messages and more over the language used by the sender always remains as a barrier to the user. In one of the initiatives like Soochana se Samadhan, it was found that though information was provided to the farmers in SMS formats, nobody had any knowledge about the information and in most of the cases farmers ignore these

messages. In all four cases, it was also found that there is a need of integrating both supply and demand of information and sufficient awareness must be created by different communication tools to ensure the success of mobile driven communication approach. It was also observed that language plays a crucial role in ensuring practical use of information provided. As language factor plays a crucial role in any medium of communication, in SMS based information system this need to be taken care of for successful use of the information. All information needs to be devised as per the mobile sets used by the local farmers or else whatever information provided in terms of MMS or pictorial presentation can't be either viewed or understood by a rural farmer. These are the major gaps that need to be addressed by all service providers with integrated approach.

Spectacular growth in ICT, specifically the Internet has the potential to offer a new generation of tools for rural development. The Internet with its huge quantity and variety of content is increasingly becoming an effective delivery and exchange system for information and knowledge and works as the major driver for the demand driven approach of information in ICT. New information and communication technologies represent perhaps the greatest tool of self-education and value addition to an individual or community's own effort for development, yet poor rural communities don't have the necessary awareness or skills or facilities to contribute to their own developments by using ICTs. However, there are some initiatives that have been studied to understand how Internet can be a major driver of the demand driven approach of ICT to address the major problems faced by rural farmers. Internet based ICT initiatives reach to the farmers in different ways. There are kiosks and information centers where farmers can find relevant information. The initiatives have given large number of options of information to the farmers. Information is provided to the individual as per the demand. Internet based Common Service Centers (CSC) such as 'V-Agri' in West Godavari, and 'V-Aqua' in Krishna District, 'e-Sagu' in Nalgonda, Andhra Pradesh, 'e-Gram' in Orissa, and 'Sahaj Tathya Mitra' in West Bengal include all agricultural wings such as horticulture, animal husbandry, aqua culture, market, irrigation, fertilizers and weather information. It also helps in updating farmers about latest rural technologies for their improvement. Some initiatives not only concentrate on agricultural information but also on education and social welfare. CSCs help villagers avail different commercial and economic services as well. They provide services from railway ticket booking to printing, scanning documents and financial services.

Table 4 attempts to capture gap analysis of Supply vs. demand approach of Internet and other related ICT initiatives. These are the most advanced ways of disseminating information in most backward areas of the country. There are two things involved in use of Internet to facilitate the need of the poor rural agricultural farmers. One is the sophistication of technology and other is the simple need of the farmer. When we are using the most sophisticated technology, there is always the challenge of acceptance. A farmer in a most backward area of the country might not accept the village computer centres to get the information on which seeds should be used. So first of all awareness campaign needs to be done on a regular basis to introduce this technology to the farmers. It should make him believe that 10 minutes of time everyday of a farmer to village computer centre or giving a call to a toll free number can solve some of their critical problems. For example in each of these cases studied, the major challenge found is the use of technical terms. If a simple thing is explained to a farmer in its scientific term, a farmer cannot understand the implications and moreover s/he would not come or call again to get the information. This again brings the very psyche of inferiority complex of being ignorant and illiterate. This demand driven approach for giving information to be strategically aligned with other two approaches of community radio and mobile technology. Sufficient awareness must be created before introducing these mediums of communication through other two platforms, so that a farmer can get direct information as per the need from these Internet information centers or call centers.

All three approaches discussed above bring major communication needs and gaps in different parts of the country. Effective use of the ICT for agricultural development is heavily dependent on the integration of both supply and demand driven approach of communication.

Across various initiatives in different geographic area/States studied, there is a gap between content offered to farmers and what their needs are. A common information need that has emerged from all villages is specific information, which is local in nature against the generic information provided to them under the agriculture communication innovations. For instance, farmers in Thiruvananthapuram, Pondicherry, Bhopal, Kolhapur, Baramati, and Jharkhand who are beneficiaries of various agricultural initiatives through Internet based technology, require information about local market prices as well as/information to facilitate their farm practices. But the information provided to them through various programmes is quite generic in nature.

The same applies to weather or crop related information. The information given by experts is being found alien by the farmers as they are unable to connect to the information disseminated

The other area of gap is the lack of feedback gathered. To presume that lack of feedback system would be the forte of areas like Mobile and Internet based services would be completely correct. This research study shows that farmers, who are beneficiaries of services like community radio, a community effort in Orcha and Vidisha in Madhya Pradesh and Baramati, Maharashtra have also mentioned feedback in communication as a requirement. Since Community Radio caters to a wide range of issues right from women empowerment to corruption, to social evils, education etc., the proportion of time allotted to agriculture programmes on local radio is limited. This has come from the farmers who listen to community radio in Jharkhand, Madhya Pradesh and Maharashtra.

In Mobile and Internet based services like Sochna Se Samadhan in Barabanki, KISSAN in Kerala, FISHER FRIEND mobile application in Pondicherry, or E-Krishi, a common requirement of the farmers are for local and simple (jargon-free) language. Farmers are not able to connect with the languages used by the experts. Also knowledge of the implementing agency and content provider of information is the need of the farmers who use Mobile and Internet based services. In initiatives like V-agri, V-Aqua and e-Sagu of Andhra Pradesh there is a common problem of direct approach of the expert and lack of sufficient field coordinators.

In Corporate led initiatives like Reuters Market Light, where farmers are supposed to pay for information, the cost of using the technology surfaced as a strong impediment in getting access to information. Other requirements posed by the farmers were the need for promotional activity about the information/communication system to promote its usage, timings of agriculture programmes to facilitate listening among the farmers, updated information about government schemes, new scheme varieties etc.

IV. Conclusion

The results of the study show that the success of the initiative is dependent on the usability and acceptance of the agriculture information by the user community. The communication gaps were identified and listed. Problems like lack of feedback and understanding of language are prominently highlighted. The study shows that there has been technology gap resulting into limited reach of the

information. There are content gaps as the farmers do not get information on local market prices and the information to facilitate their farm practices. The information was generic in nature and there were time constraint in local radio. The study concludes that lack of awareness about the initiative has been one of the major factors that has led to the loss of productivity.

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Table 1: Number of initiatives studied with different approach on communication

Different Approaches	Method	Numbers of initiatives
Supply Vs. Demand	Radio	4
Demand	Internet, Call Centre, Kiosk, Telephone	18
Supply	Mobile	4

Table 2: Gap analysis of Supply vs. demand approach of Community radio stations

Initiative	Need of Information	Communication, Content and Programme Gap	Information Provided
Radio Bundelkhand	<ul style="list-style-type: none"> ➤ Weed, pest, disease & irrigation Management ➤ Improved Seeds ➤ Crops Grown with less water ➤ Bio Fertilizer/Bio Pesticides 	<ul style="list-style-type: none"> ➤ Generalized information and programmes & Short Duration ➤ Number of programmes for agriculture is less ➤ Lack of Promotional activity & proper feedback system and research 	<ul style="list-style-type: none"> ➤ Pest and Disease Management ➤ Fertilizer Management ➤ Inputs ➤ Market Information

	<ul style="list-style-type: none"> ➤ Soil Testing & Daily Weather ➤ Government Schemes 		
Vasundhara Vahini	<ul style="list-style-type: none"> ➤ Weather report ➤ Market price ➤ Post harvest Technology ➤ Soil testing & pesticide ➤ Govt. schemes ➤ Increasing weight on sugarcane ➤ Grape processing & Packaging 	<ul style="list-style-type: none"> ➤ Generalized information and programmes ➤ Lack of Promotional activity ➤ Lack of proper feedback system and research 	<ul style="list-style-type: none"> ➤ Weather Report ➤ Market Information ➤ Expert Talk -Production Technology ➤ Animal Husbandry ➤ Success stories ➤ Phone-in programmes
Community Radio Station	<ul style="list-style-type: none"> ➤ Information on govt. schemes ➤ Weather forecast ➤ Mandi rates 	<ul style="list-style-type: none"> ➤ Less number of programmes for agriculture ➤ Lack of awareness and promotional activities 	<ul style="list-style-type: none"> ➤ Agriculture ➤ Horticulture
Chala Ho Gaon Mein	<ul style="list-style-type: none"> ➤ Modern Techniques in agriculture and allied sectors ➤ Daily Local Market Information ➤ Schemes and Loan facilities ➤ High yielding varieties ➤ Specific crop information ➤ Daily local weather information 	<ul style="list-style-type: none"> ➤ Noise and shadow region of coverage be reduced ➤ Interior Villages need to studied and well targeted ➤ More agriculture content should be there in the programme ➤ No required information ➤ Information is incomplete ➤ Process should be more simple and less time taking 	<ul style="list-style-type: none"> ➤ Agriculture ➤ Horticulture ➤ Animal Husbandry ➤ Crop/vegetable, Fertilizer Pesticide prices at local market ➤ Information on govt. plans and provisions ➤ Pest and Disease management

	➤ Pest and diseases and control		
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		Farmer » Filed Coordinator » Knowledge Worker » Expert	
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Table 3: Gap analysis of Supply vs. demand approach of mobile based service delivery

Initiative	Need of Information	Communication, Content and Programme Gap	Information Provided
Fisher Friend Mobile Application (FFMA) by MSSRF	<ul style="list-style-type: none"> ➤ Full information on specific variety of fish ➤ Modern techniques ➤ Weather & market Information ➤ information on Schemes and loan 	<ul style="list-style-type: none"> ➤ Use of technical language ➤ One way information ➤ No information on beneficiary awareness ➤ Repeated messages 	<ul style="list-style-type: none"> ➤ Fisheries ➤ weather & market forecasting ➤ sea wave heights ➤ potential fishing zones ➤ Insurance & government schemes
IKSL (IFFCO Kisan Sanchar Ltd.)	<ul style="list-style-type: none"> ➤ crop specific information & registration of the farmers ➤ specific messages ➤ longitudinal information ➤ specific information on loan and insurance 	<ul style="list-style-type: none"> ➤ An application to send the image / videos through mobile phone is required ➤ A combination of push and pull based interactive system 	<ul style="list-style-type: none"> ➤ Agriculture ➤ Animal Husbandry
Reuters Market Light	<ul style="list-style-type: none"> ➤ Initiative provide specific information related to one or two crop 	<ul style="list-style-type: none"> ➤ Cost implication attached with the communication ➤ No provision to consult directly with expert 	<ul style="list-style-type: none"> ➤ Information related to entire crop cycle in Roman English
Soochana Se Samadhan	<ul style="list-style-type: none"> ➤ Demand based information 	<ul style="list-style-type: none"> ➤ Too much jargons & cost implication ➤ No visual communications ➤ Long channel of communication: 	<ul style="list-style-type: none"> ➤ Agriculture ➤ Horticulture ➤ Animal Husbandry

Table 4: Gap analysis of Supply vs. demand approach of Internet and other related ICT initiatives

Initiative	Need of Information	Communication, Content and Programme Gap	Information Provided
V-Agri	<ul style="list-style-type: none"> ➤ Rat control programme ➤ Quality seeds & pesticides & fertilizers ➤ Flood resistant varieties ➤ Irrigation management 	<ul style="list-style-type: none"> ➤ Information about particular Crops ➤ Lack of sufficient field coordinators ➤ No frequent visits of field coordinator 	<ul style="list-style-type: none"> ➤ Fertilizer, Pest and Disease Management ➤ Soil testing & Nutrient management ➤ Crop Insurance & govt. schemes
V-Aqua	<ul style="list-style-type: none"> ➤ Weather information ➤ Processing and storage facilities ➤ Protein test 	<ul style="list-style-type: none"> ➤ Lack of field coordinators ➤ No microscopes for field observations ➤ Lack of lab facility in the village 	<ul style="list-style-type: none"> ➤ Pond preparation ➤ Seed quality & stocking management ➤ Water quality ➤ Feed, disease and harvest management
e-Sagu	<ul style="list-style-type: none"> ➤ Farm implements ➤ Post harvest management ➤ Weather & Market information ➤ Govt & insurance ➤ Credit & expert facilities 	<ul style="list-style-type: none"> ➤ No direct contact with expert ➤ Less/ irregular visits ➤ Lack of technical knowledge of field coordinators. 	<ul style="list-style-type: none"> ➤ Pest and Disease Management ➤ Fertilizer Management ➤ Nutrient management

Farmers Call Centre	<ul style="list-style-type: none"> ➤ Locally available inputs ➤ Updated weather information ➤ Complete information on farm implements with subsidies ➤ Updated market information 	<ul style="list-style-type: none"> ➤ Toll free number is busy ➤ Lack of subject specific information. 	<ul style="list-style-type: none"> ➤ Field preparation ➤ Selection of good cultivars ➤ Irrigation, fertilizer, nutrient, weed, pest and disease management
aAQUA	<ul style="list-style-type: none"> ➤ Information on Crop insurance ➤ Updated information on crop insurance, market, finance and Govt. schemes. 	<ul style="list-style-type: none"> ➤ Region specific and updated weather and marketing information. 	<ul style="list-style-type: none"> ➤ Production and post harvest technology ➤ Market and insurance information
e-Chou pal	<ul style="list-style-type: none"> ➤ Modern technologies ➤ Post harvest technologies and storage ➤ Irrigation management 	<ul style="list-style-type: none"> ➤ Provision of information pertaining to particular Crops 	<ul style="list-style-type: none"> ➤ Production technology ➤ Post harvest technology ➤ Weather forecasting ➤ Market information
Billing Machine	<ul style="list-style-type: none"> ➤ Weed, pest, disease and irrigation Management ➤ Improved Seeds ➤ Government Schemes 	<ul style="list-style-type: none"> ➤ Absence of English to Gujarati translation software (for invoice) 	<ul style="list-style-type: none"> ➤ Types and price of different of Mango ➤ Collection centre and billing machine number
K i s a n S o o c h n a Kendra	<ul style="list-style-type: none"> ➤ Farmers need to go to Franchisee every time information is needed 	<ul style="list-style-type: none"> ➤ Dependent on Franchisee people. 	<ul style="list-style-type: none"> ➤ Fertilizer Management ➤ Market Information

K I S S A N Kerala	<ul style="list-style-type: none"> ➤ Pest and diseases control ➤ Market, weather, Schemes & loan Information ➤ Mechanization ➤ Labor alternatives ➤ Disaster control 	<ul style="list-style-type: none"> ➤ General information ➤ One way Communication ➤ More advertisements in programme ➤ Timings of the telecast are not convenient to the farmers 	<ul style="list-style-type: none"> ➤ Crop Information ➤ Farming Practices ➤ Material Availability ➤ Fertilizers and Pesticides ➤ Market & market Info. ➤ Schemes and Loan info. ➤ Kerala Agri. Directory
Village Resource Center (VRC) by MSSRF	<ul style="list-style-type: none"> ➤ Modern Techniques ➤ Pest and diseases control ➤ Daily Market Information ➤ Schemes and Loan facilities ➤ High yielding varieties ➤ Specific variety crop information ➤ Daily local weather information ➤ Disaster control 	<ul style="list-style-type: none"> ➤ Literacy problem in framers. ➤ Need trained staff ➤ Involved in all the developmental activities of the village makes less attention towards the agriculture 	<ul style="list-style-type: none"> ➤ details of wave height ➤ Market prices ➤ Fertilizer and pesticide stock and paddy details ➤ Information on government entitlements ➤ pest and disease management ➤ Soil Testing
e-Krishi	<ul style="list-style-type: none"> ➤ Mechanization ➤ Pest and diseases control 	<ul style="list-style-type: none"> ➤ One way communication ➤ Long communication channel 	<ul style="list-style-type: none"> ➤ Crop Information ➤ Fertilizer Recommendation

	<ul style="list-style-type: none"> ➤ Local Market Information ➤ Schemes and Loan facilities 	<ul style="list-style-type: none"> ➤ Language problem 	<ul style="list-style-type: none"> ➤ Availability of Planting Material ➤ Weather and market Information ➤ Resource Library ➤ Soil Testing
Kisan Call Centre	<ul style="list-style-type: none"> ➤ Weather forecast ➤ Market Price ➤ Production Technology ➤ Post harvest technology 	<ul style="list-style-type: none"> ➤ Farmers unaware about call number ➤ Poor database ➤ Lack of Promotion \activity and feedback 	<ul style="list-style-type: none"> ➤ Pest and Disease Management ➤ Nutrient management Inputs ➤ Market Information
AGRISNET	<ul style="list-style-type: none"> ➤ Production technology ➤ Post harvest technology ➤ Market Information ➤ Weather forecast ➤ Govt. schemes 	<ul style="list-style-type: none"> ➤ Poor information accessibility on block level centre . ➤ Lack of awareness about the project 	<ul style="list-style-type: none"> ➤ Agriculture Resources improvement ➤ Agro Advisory & Extension services
Warana Wired Village Project	<ul style="list-style-type: none"> ➤ Production technology ➤ Post harvest technology ➤ Market information ➤ Weather forecasting 	<ul style="list-style-type: none"> ➤ Poor backend technical support leading to outdated information 	<ul style="list-style-type: none"> ➤ Agriculture ➤ Horticulture ➤ Dairy ➤ Poultry
IT Mediated Agriculture Extension System in Jharkhand	<ul style="list-style-type: none"> ➤ Pest and diseases control ➤ Local Market Information 	<ul style="list-style-type: none"> ➤ Unaware about content provider ➤ Very generic Information provided 	<ul style="list-style-type: none"> ➤ Crop Information ➤ Fertilizers and Pesticides

	<ul style="list-style-type: none"> ➤ Schemes and Loan facilities ➤ crop information ➤ Local weather information ➤ Modern Irrigation Practices 	<ul style="list-style-type: none"> ➤ One way information flow ➤ Expert advice is not provided 	<ul style="list-style-type: none"> ➤ Market, weather and fertilizer Information ➤ Government schemes and Loan information
e-Gram	<ul style="list-style-type: none"> ➤ Information in local language ➤ Expert advice ➤ Schemes and Loan facilities ➤ High yielding varieties ➤ Modern Techniques ➤ Daily Local Market Information 	<ul style="list-style-type: none"> ➤ Language is a major problem for farmers, ➤ One way information 	<ul style="list-style-type: none"> ➤ Crop, irrigation and fertilizer Information ➤ Availability of Seeds and Crops ➤ Weather & market info. ➤ Government schemes