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## Interactive information dissemination system (IIDS) – An Alternative I.C.T model to meet the information needs of Indian farmers

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#### Abstract

Interactive Information Dissemination System (IIDS) has been designed after rigorous field study of 26 ICT initiatives in agriculture in India and information needs assessment of farmers across 12 states of India. This study was undertaken in a project awarded by Indian Council of Agricultural Research (ICAR) under National Agricultural Innovation Project (NAIP). The IIDS is now being up scaled in two states. The benefits realized by the farmers are personalized advices on Agriculture, Horticulture, Animal Husbandry and Fisheries. Farmer can record their queries 24x7 through Toll Free Number. Farmers are provided with Text & Voice messages in local language (Telugu). Farmers are provided emergency messages and alerts on their mobile. The impact of IIDS is seen on shift in the Source of Information and was found that the farmers who were earlier dependent for agriculture information on their friends & neighbours and Input dealers are now calling on Scientists on toll free number. The IIDS has got vast scope to cover in all State Agricultural Universities in India to enhance outreach.

**Keywords:** IIDS, information needs, ICT, State Agricultural Universities.

#### 1. Introduction

The Indian Council of Agricultural Research (ICAR), Government of India, New Delhi has awarded the project under National Agricultural Innovation Project (NAIP) to Media Lab Asia, as a Consortium Leader with Acharya N.G. Ranga Agricultural University (ANGRAU), Guntur, National Institute of Rural Development (NIRD), Hyderabad and Mudra Institute of Communication, Ahmedabad (MICA) as the partners, to develop an alternative ICT model to meet the information needs of Indian farmers. As part of that, Interactive Information Dissemination System (IIDS) was developed and successfully pilot tested in Andhra Pradesh and Telangana states of India.

The IIDS has been launched by the Secretary Government of India, Department of Electronics and Information Technology, Ministry of Communications and Information Technology (MCIT) in Acharya N G Ranga Agricultural University in 2013. After successful implementation of the IIDS model in Andhra Pradesh and Telangana states, the same model was implemented in Central Agricultural University, Imphal as m4agriNEI.

#### 2. Literature Review

Gidda Reddy *et al.*, (2011) [2-4] reported that, quality inputs availability, pest and disease management, updated weather and market information, farm mechanization, and government schemes were the major information needs of farmers Gidda Reddy *et al.*, (2011) [2-4] stated that, the ICT initiatives are moderately useful for farmers for obtaining agriculture and related information for their farms. Though, the queries of farmers were addressed as required, the expectations of the farmers are high and hence the utility and performance of the ICT initiatives need to be improved.

Gidda Reddy *et al.*, (2011) [2-4] reported that, by becoming member of the ICT initiatives, majority of the beneficiaries are being respected by the villagers and consulted them for the agricultural information.

Anurag *et al.*, (2014) [1] concluded that, the concept of IIDS is very relevant to the agricultural extension functionaries. The information dissemination through multimedia (Text, Voice, Image and Video) is very appreciable; if one mode of dissemination is failed other can reach the farmers. IIDS will be a better alternative ICT model to the farmers because; from field itself he/she can interact directly with the scientists.

### 3. Methodology

A comprehensive need assessment study was carried out to develop an understanding of the agriculture related ICT needs and problems of the farmers in using ICT, with a special focus on the small and marginal farmers in using ICT in various agro and socio-economic situations by doing primary survey using structured schedules / questionnaires, focused group discussion and Participatory Rural Appraisal. Total of 26 ICT initiatives in agriculture were studied covering 1381 Farmers in 57 selected sample villages in 12 states of India to elicit the felt need of the farmers, prioritize their perceptions and bring out the reality of the issues involved in development of ideal ICT applications for agriculture.

An impact analysis cum feedback study has been conducted with 360 farmers in 3 villages of Nalgonda district named Somaram, Mupparam and Balemla and 3 villages of Nellore

named Pedaputhedu, Vavveru and Mypadu (Each village 60 respondents) by using project evaluation questionnaire.

### 4. Results and Discussion

#### 4.1 Situation analysis

Mobile is the most popular ICT gadget among the farming community; the study shows that 72 per cent of the farmers possess mobile phones, followed by TV (61%) and Radio (42%). Radio is most popular in the area where the power availability is very poor. Farmer needs information mainly on Pest and Disease (45%), Field Preparation (44.9%), Nutrient Management (41%), Input Availability (39.5%), Market Information (32%) and Weather Information (22%). Most of the farmers believed in the information provided by their Friends and Neighbors (61.5%) followed by ICT provider (53%) and Local Input Dealer (46.4%).

#### Major Gaps / Limitations & Way Forward

Gaps Identified	Way Forward
<b>Mobile Based Initiatives</b>	
<b>Text SMS</b>	
Generic Information Delivered	Requirement for farmer's specific information
Language / Literacy Barrier	Requirement for voice & Image based information Exchange
Limited records of the farmers & their farming details	Requirement for Updated information
No direct interaction with expert (for push based services)	Requirement for personalized advisory
<b>Voice Calls</b>	
Largely Push based services and information delivery at undesired time	Requirement of right information at right time as time desired by farmer
No direct interaction with the with expert (for push based services)	Requirement for personalized advisory
<b>Call Centre / IVRS</b>	
Information provided (at both ends) on voice alone is not always complete	Requirement for other modes of information exchange for better understanding
Service available only at prescribed time (i.e office hours)	Service timing required as convenient to farmers
Limited records / database of the farmers	Requirement for complete & updated database - Farm & Farmers
No / very limited follow up of services	Requirement for Experts field Visit and other feedback mechanisms
<b>Web Based Initiatives</b>	
Accessibility & Adaptability is low	Requirement for User Friendly Interfaces
Abundant / Generic information is provided	Requirement for region & farmer Specific filtered Information
<b>Mass Media Initiatives – Community Radio Station</b>	
One way communication	Requirement for 2 way communication medium
Largely push based information	Requirement for personalized information

#### 4.2 Way Forward

The major findings of this study are crucial for choosing and designing the future strategy and system to provide **'Information to the farmers as and when they require'**. There is a requirement for an integrated approach which should cater the problems of farmers in using ICT applications in agriculture such as accessibility, acceptability, simplicity, timely & useful information (right from the choice of inputs in the farming system to marketing of the farm products) in location specific manner.

In view of the above, the following approach is envisaged in an ICT based holistic extension system:

- There is a need for aggregation & cater the farmer queries in multimedia mode i.e voice mode (i.e. in local language) along text, image and video.
- Requirement of farmer friendly and simple interfaces to access information and advisory services in effective manner preferably through smart phones
- Need is to develop a combination of push and pull based interactive system (essentially pull based) so that the communication can be possible in both ways, i.e from farmers to expert and vice versa.
- Requirement for interlinking of location specific

information from various service providers to cater the specific needs of the farmers

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- Requirement of maintaining farmer's database with their farming details, so by referring to it an expert can provide appropriate solution to concerned farmer's query.
- Requirement of expert support system which has user friendly interfaces and reference content (e.g SAU's Knowledge repository, farmer's details, FAQs from the farmers' query, etc) for fast and proactive delivery of advices. The system should also facilitate an expert to be virtually available by giving him any time anywhere access.

#### 4.3 Interactive Information Dissemination System (IIDS)

This is an integrated model based on the study and analysis of 26 major ICT Initiatives in agriculture in India. This model is largely integration of Toll free IVRS, Smart Phone Application and Web based agricultural advisory system. The major limitation in current information dissemination system i.e call center, IVRS system and mobile services are lack of

database of farmers, such as location of the farmer, type of field, crops grown, status of the farmer, need of the farmer and other demographic and agriculture profile. Thus, in the proposed system each farmer has to register himself by providing certain details which would be stored in the database and a profile and requirement (need) of each farmer would be recorded. The agricultural expert would provide the personalized solution based on the inputs provided by the farmers and his available profile. Also this system would allow farmers to send images / videos of the field along with their queries by using a smart phone. This system would be helpful in addressing farmers' information need on important aspects including agriculture technology, crops / plant protection, weather information, market prices, government schemes etc in location specific manner.

#### USP of IIDS System

- Personalized 'Agro Advisory' Based on 'Farm and Farmer Profile'.
- 'Personal Assistance' to raise 'Multimedia Query'
- Live Interaction with Scientists
- Facility to 'Refer Critical Problems' to relevant 'Crop Specialist' available virtually
- 'Round the Clock Query Registration Facility' through IVRS & Smart Phones
- 'Anywhere Anytime Access' on Past Advisories
- Facility to 'Push Emergency Message' to Farmers based on Location and Crops
- 'Network Independent' – Accessible from All Networks

#### IIDS Applications & its Features

It is an integrated system with a combination of Web, IVRS and Mobile Technologies for dissemination of farm and farmer specific advises/information at user desired mode and time. The major applications are - Mobile based application, Web based application and IVRS based application. The major features are as follows:

##### (i) Mobile application for smart phones

- Standalone Application
- Offline query aggregation capabilities.
- Data Synchronization at hot spots / areas of data connectivity (store and forward).
- Offline capability of display of last synchronized data.
- Coordinator information system (profile page, visit scheduling, list of registered farmers).
- Farmer registration and profile.

##### (ii) Web based application ([www.akps.in](http://www.akps.in))

- Colour coded iconic based logins for various type of users
- Expert support system linked with authentic content / information service providers.
- Information dissemination and aggregation system (multimodal).
- Centralized common database for web, mobile & IVRS applications.
- Reports and analytics.

##### (iii) IVRS based application (Toll free number: 1800 425 3141)

- Call incoming facility on expert's computer.
- Call forwarding and recording facility in case if the experts are not available.
- Intelligent enough to route the call to the relevant experts.

- 24x7 query registration facility for farmers

#### Services offered to the farmers through IIDS:

- Farmers are being provided personalized advice on Agriculture, Horticulture, Animal Husbandry and Fisheries from their Krishi Vigyan Kendra (KVK)/ District Agricultural Advisory and Transfer of Technology Centre (DAATTC) on Toll Free number (1800-425-3141).
- Farmer can record their queries 24x7 through Toll Free Number.
- Farmers are provided with Text & Voice messages in local language (Telugu).
- Farmers are provided emergency messages and alerts on their mobile from Krishi Vigyan Kendra (KVK)/District Agricultural Advisory and Transfer of Technology Centre (DAATTC).

The IIDS model is useful in enhancing the extension outreach through KVKs and DAATTCs. The implementation of IIDS has elevated the image of the ANGRAU extension in terms of increased direct interaction of farmers with scientists over toll free number, dissemination of farm information through mobiles (text and voice messages in telugu) and Annapurna information corners, functional linkages among the Department of Agriculture, Animal Husbandry and Fisheries and Indian Council of Agricultural Research (ICAR) institutes.

#### Farmer's feedback

- Farmers are able to talk to the Scientists directly over a mobile phone.
- Farmers are receiving the messages in local language, even with the basic phones.
- Farmers are receiving text as well as voice messages on their mobiles.
- Farmers are using the text messages as Reference and showing to the input dealers to get the right pesticide from the shop.
- Timely information helped in reducing no. of sprays/application of excessive use of fertilizers etc.
- Illiterate farmers are also comfortable in receiving messages, since information is given through voice messages.
- Messages related to production, protection, post-harvest and weather are sent to the mobiles of farmers.
- The Text and voice message facility in IIDS helped the farmers of Srikakulam, during Phailin and Hudhud cyclones.
- The weather forecasts helped the farmers, to avoid the unnecessary irrigations before rains, postponing of crop harvests etc.
- Short films are loaded in the mobiles of project farmers thereby farmers are accessible to the information with multimedia experience.
- Reduced production cost
- Increased awareness about use of ICTs in agriculture

#### 4.3 Impact analysis

While interviewing the respondents regarding the perception of IIDS, 98.0 per cent of the respondents agreed that IIDS service is giving clear information on the subjects they required 91.7 per cent of the respondents agreed that IIDS service is providing the farmers with timely information and 98.3 per cent of the respondents agreed that information provided by IIDS service is easily understandable.

- The effect of Scientist-Farmer interaction programme was appreciated by 66.2 per cent of the respondents.
- Majority of the respondents informed that usage of chemical fertilizer (88.8 % respondents) and pesticides (91 % respondents) has been reduced due to the fertilizer and pesticide management information provided by the IIDS model.
- The shift in the 'Source of Information was found among the IIDS farmers and it was noted that 92 per cent

farmers who were earlier dependent for agricultural information on their friends & neighbor is reduced to 56 per cent and 68.7 per cent farmers who were dependent on Input dealers is reduced to 35 per cent due to the provision given to the farmers to direct interact to the Krishi Vigyan Kendra (KVK) scientist on Toll Free number.

**Table 1:** Perception about the IIDS Model

Sl. No.	Statements	Agree	Undecided	Disagree
1	IIDS service is giving the clear information.	98.00	0.6	1.4
2	IIDS service providing the farmers timely information.	91.7	0.00	8.3
3	Information provided by IIDS service is complete.	90.5	1	7.3
4	The information provided by IIDS service is easily understandable.	98.3		1.7
5	The information provided is practicable / adaptable in the field conditions.	97.9	0.4	1.3
6	Scientist – Farmer interaction Programmes are useful	66.2	30.2	3.6
7	Innovative Farmer to other farmers interaction programme is useful	69.3	31.2	9.5

**Table 2:** Progress in Agriculture due to the IIDS services:

S. No.	Item	Increased	Decreased	No Change
1	Use of chemical Fertilizers	1.7	88.8	9.5
2	Use of chemical Pesticides	2.2	91.2	6.6
3	Marketing information	90.4	7.1	2.5
4	Cost of cultivation for crops	4.5	87.0	8.5

**Table 3:** Source of Farm Information before & after the initiation of the IIDS service

S. No.	Sources	Before	After
1	IIDS service		97.5
2	Friends and neighbors	92.5	56
3	Local input dealers	68.7	35.0
4	Daily News Papers	32.0	17.0
5	Monthly Farm Magazines	21.0	18.0
6	Television	21.7	15.0

### Case Studies

#### A) S. Bali Reddy, Diguvapalli Village, Tadipatri Mandal, Anantapur district

ID: 16214854, Mobile number: 9848398352, No. of calls made: 226

He has registered in IIDS through Krishi Vigyan Kendra (KVK) Reddipalli. He got the advisories on pest & disease management, fertilizer management, seed treatment chemicals, weather information etc. He has used the text messages as reference to buy the pesticide from dealers shop. I have reduced the no. of pesticide sprayings (from 3 to 2); applied recommended dose of fertilizers thereby reduced the cost of cultivation up to Rs. 3750/ha (due to reduced overdose of fertilizers and no. of sprayings) in Chickpea crop, and also got the market rate information from time to time though this IIDS, because of that, he sold his produce for better price and finally got the extra income of Rs. 13,750/- per ha in Chickpea crop.

#### B) T. Venkata Ramana, Chettupodilam Village, G. Sigadam Mandal, Srikakulam district

ID: 10113731, Mobile number: 8096394921, no. of calls made: 256

He has registered in IIDS through Krishi Vigyan Kendra (KVK) Amadalavalasa. He got the advisories on pest & disease management, fertilizer management, varieties etc. He has used the text messages as reference to buy the pesticide from dealers shop. Voice and text messages are helpful to

protect the crop time to time. Maize crop grown was severely infested with shoot borer. He followed timely advice given by scientists of KVK through IIDS and sprayed the recommended chemicals compared to other maize farmers of the village who are not registered under IIDS. He could able to reduce the cost of cultivation from Rs. 13,000/- to Rs. 11,700/- per ha and reduced sprays from 2 to 1 and got an increased yield of 5 q/ha

### 5. Conclusions and Recommendations

The IIDS is very relevant to the agricultural extension functionaries. The information dissemination through Multimedia (Text, Voice, Image and Video) is very appreciable. IIDS can be a better alternative ICT model to the farmers because; from field itself farmer can interact directly with the scientists. As the farmer get the solutions on their mobile itself in local language, even though he is illiterate, if he can't remember also, he can show the text message to the input dealers to get right inputs from the shops. The personalized advisories to the farmers are more appreciable in this model as the scientist can refer the farm profile and history before providing the solution. It will be a good monitoring tool to the scientists of KVKs to monitor the farmer's field and it will be a good knowledge management system for knowledge providers and policy makers. During the calamities, the adhoc message facility in IIDS is very useful to the farmers for regular information dissemination. At present, the IIDS model was up scaled in all the districts of Andhra Pradesh and Telangana states in India through Krishi Vigyan Kendras (KVKs) and District Agricultural Advisory and Transfer of Technology Centres (DAATTCs). 36179 farmers were registered, 21030 advisories were given and 3141 text and 1386 voice messages were sent to registered farmers in Andhra Pradesh and Telangana, in view of the vast scope of IIDS services, it is recommended to be replicated in other states of India especially by the state agricultural universities and departments of agriculture.

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