

RESEARCH ARTICLE

Use of information and communication technologies for transfer of technology- The impact on adoption of improved agricultural technology

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SUMMARY

The number of small and marginal operational land holdings has increased marginally (1.2%) during 2015-16 with 86.21% compare to 2010-11, according to the 10th Agricultural census. The total operational land holdings in India accounts for 146.45 million and the extension personnel availability in India is 1,19,048 with average number of holding per personnel is 1156 and it is 3162 holdings per extension personnel in AP with staff of 4167 during 2015. The Vizianagaram district of AP is also witness for small and marginal holdings which accounts for 92.33% and with 4.46 lakh total operational holdings where as state average small and marginal holdings is 72.00 %. With the extension staff of 211 the average holding per extension staff is 2113. This means the extension personnel needs to reach more number of farmers with agricultural technologies where small parcels of fragmented holdings which are remote, diversified in resources, soil fertility, undulated terrains to convince them for adoption with limited available time after attending other services of the Department of Agriculture. On the other hand, the mobile penetration in to small and marginal farmers is the opportunity for the extension personnel to reach the farmers timely with less cost and the timely information leads to higher adoption of Agricultural technologies.

Key Words : Information, Communication technologies, Transfer of technology, Improved agricultural technology

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Advances in information and communication Technologies (ICTs) have also provided new opportunities to reach more farmers in short amount of time (Sulaiman *et al.*, 2011).

In their study in Niger, Aker and Mbiti (2010), observed that an average trip to a market located at 60-65 KM takes 2-4 hours round trip compared to a phone call of 2 minutes.

Among the functions of extension the dissemination of the information is the most important, knowledge gaps in turn leads to yield gaps (Morris *et al.*, 1998 and Singh *et al.*, 2001).

Hence, with this back ground to fill the knowledge gap between research systems and farmers, to reach more number of farmers the ICT and mobile application methods like text and voice messages, whats app, You tube Videos, live TV Programme, recorded TV and radio talks were implemented by the DAATTC, ANGRAU, Vizianagaram in addition to the regular mandatory programme to reach more number of farmers with agricultural technology. The programme *viz.*, Dial out conference, multi location audio conference, video conferencing with the farmers, Jio chat programme were organized in convergence with Reliance foundation. In the technology dissemination process and sending of information to the farmers worked in convergence with the extension staff of the department of agriculture and NGOs. The information was disseminated on Weed management, fertilizer management, other agronomic practices, IPM and other plant protection aspects, weather information, market information etc., The impact of these technologies was studied during 2018-19 with a sample of 60 farmers from 20 randomly selected villages of 10 mandals of Vizianagaram district.

MATERIAL AND METHODS

Different ICT tools used by the scientists of DAATTC for technology delivery.

IIDS - AKPS :

(Interactive information dissemination system – Annapurna Krishi Prasar Seva) This initiative was started by the Media lab Asia and ministry of tele-communications, GOI in collaboration with ANGRAU in Vizianagaram district since 2015. A toll free number 1800-425-3141 was provided to reach the scientists directly by the farmers form their farm and as on date there 6530 farmers were registered in the programme

from the district. Regular text and voice messages are pushed and the farmers calls were answered from this ICT initiative. A total of 598 text and voice messages sent to all the registered farmers and 1698 calls were answered since 2015-16. In addition to AKPS Calls 6225 farmers calls were answered since 2015-16.

Whats app groups :

There are 3 groups created and sending information to the officers of the Department of agriculture and grass root level extension functionaries and progressive farmers. In addition to the groups all the contact farmers also given the whats app numbers of the scientists to share their information and pictures, photos of infested crops etc.,. This made the farmers, Scientists, Officers of department of agriculture, NGOs and grass root level extension functionaries to share the information and recommendations and facilitated the two way communication among the members of the groups. A Total of 303m messages were pushed in addition to answer the farmers queries on an average 10-15 during the crop season.

Dial out conference :

This is an interaction of farmers dispersed in location on a hired line for 1.00hr and about 35-40 farmers will be on conference and clears the doubts one after another from the scientists of DAATTC, ANGRAU. The line was hired by the Reliance foundation. About 32 dial out conferences were organized by the DAATTC in convergence with the reliance foundation since last five years.

Video conference with the farmers :

This programme also organized in convergence with the Reliance foundation and a representative of the foundation seats with the farmers in village with a laptop equipped with internet and the interaction takes place between farmer– scientist for 30 minutes. All the farmers bring the specimens and clarify their doubts on management of their crops. A total of 27 such conferences with the farmers were organized since 2016-17.

Online plant health clinic :

In this programme the scientist directly interacts with the group farmers lead by foundation employee form the farmers fields. Directly they share the information from the field to lab by pictures and video messages. A

total of 5 plant health clinic programme organized since 2016-17.

Jio chat :

This is another innovative extension activity from the DAATTC and Reliance foundation since 2018-19 and conducted 6 programme during 2018-19.

TV and radio programme :

A total of 94 TV programme were delivered in E TV annadata programme since 2015-16 on the various technologies on the major crops of the district and 8 Radio talks were delivered on AIR, Visakhapatnam.

Sample and sampling procedure :

A sample with size of 60 was fixed in view of the

requirements of the study and availability of time and other resources with the extension scientist. Simple random sampling method was used for selection of the sample. The sample includes 60 farmers from 20 randomly selected villages of 10 mandals out of 34 mandals of the district. A questionnaire was prepared for the study in consultation with the scientists of the ZREAC, state in action plan and SLTP meeting conducted by the University to review the technical programme of work.

The study includes the personal and socio-economic profile of the farmers and the spread of information among the farming community and extent of adoption of the disseminated technologies. This paper included the ICT and mobile technologies adopted by the DAATTC in the district, the impact of the study on dissemination

Sr. No	ICT Method	No of information / messages delivered				Total
		2015-16	2016-17	2017-18	2018-19	
1.	AKPS messages (Text and voice)	21	46	115	416	598
2.	AKPS calls answered	238	582	382	432	1634
3.	Telephone calls	2172	1516	1057	1480	6225
4.	Whats app messages	-	68	74	161	303
5.	Dial out conferences	05	06	08	13	32
6.	Video conferences	-	08	07	12	27
7.	Online plant health clinic	-	02	02	01	05
8.	Jio chat	-	-	-	06	06
9.	TV programme	-	13	47	34	94
10.	Radio talks	02	02	02	02	08

Sr. No.	Particulars	% of text and voice messages	Farmer calls
1.	Summer ploughings	6.0	2.5
2.	Varietal selection	3.12	6.25
3.	Toll free number and extension programme	11.53	-
4.	soil testing	6.49	7.5
5.	Green manuring	5.08	6.5
6.	Weather forecast	1.45	6.2
7.	Nursery management	1.45	1.70
8.	Weed management	2.16	7.80
9.	Method of planting	3.125	2.5
10.	Water management	6.25	7.20
11.	Pest management	25.96	24.50
12.	Disease management	11.78	10.90
13.	Fertiliser management	10.57	11.50
14.	Summer pulses	5.04	04.95
	Total	598	1634

and extent of adoption of technologies *viz.*, their coverage, reach of information to the doorstep of the farmers and extent of adoption of technologies by the farmers. The data so collected from the farmers was analysed using percentage and frequencies.

RESULTS AND DISCUSSION

The profile characteristics of the farmers was studied with reference to their personal, socio-economic characteristics and mass media exposure etc.,

The results from the Table 1 indicate that very meager amount 8.33% of the farmers are young farmers this has some negative indication on agriculture in the district for technology adoption where as extension contact found to be 63.33 from medium to high and altogether 61.66% of the farmers depending on the more

than one information source.

The results from the table indicate that the dependency of farmers on Fellow farmers and input dealers reduced compared to the previous studies on the same line. It indicates that the advancement of ICT tools and techniques, availability of mobile phones enabled the farmers to contact extension staff and scientists which indicates that the farmers move towards the adoption of improved technology and discriminate adoption of the technology.

Mass media exposure :

– Most of the farmers (70%) frequently watch TV for agricultural programme in local television channels and the visuals on pest, diseases and other methods like application of fertilizer, spraying of weedicides, formation

Table 1 : The profile characteristics of farmers under study				(n=60)	
Sr. No.	Profile characteristics	Category	Frequency	Percentage	
1.	Age	Young	5	8.33	
		Middle age	22	38.33	
		Old	33	55.00	
2.	Educational status	Illiterate	28	46.67	
		Primary education	12	20.00	
		Secondary education	5	8.33	
		Higher education	15	25.00	
3.	Occupational status	Single	40	66.67	
		More than one	20	33.33	
4.	Farming experience	Low	5	8.33	
		Medium	15	25.00	
		High	40	66.67	
5.	Farm size	Small	36	60	
		Medium	20	33.33	
		Big	04	6.67	
6.	Annual income	Low	40	66.67	
		Medium	5	8.33	
		High	15	25.00	
7.	Source of information	Single source	23	38.33	
		Two sources	17	28.33	
		More than two sources	20	33.33	
8.	Family size	Small	45	75.00	
		Big	15	25.00	
9.	Social participation	No participation	47	78.33	
		Participation	13	21.67	
10.	Extension contact	Low	22	36.67	
		Medium	18	30.0	
		High	20	33.33	

of alley ways are building confidence on them to adopt the new technologies.

– Most of the farmers (58%) read magazines, newspapers for information on agriculture technologies but not regularly. It is at the frequency of fortnightly or monthly as per their opinion it is useful to confirm the research results by the articles written from the scientists.

– Among the farmers 43.0% of the farmers who possess the smart phone get information from mobile services like whats app, you tube and other services out of them 33% regularly and 66.67% occasionally receive such messages.

ANGRAU mobile apps :

– It is find out that 41.67% of the farmers know the mobile apps like Krishi vignan and Eruvaka and 13.33% of them search for information occasionally (weekly/ fortnightly)

– Mostly search for pest and disease management, fertilizer management and food for health and market information.

Text and voice messages sent through AKPS and Whats app :

All the registered farmers are receiving the messages timely from IIDS - AKPS services and Whats app groups.

– Most of the farmers (83.33%) follow AKPS regularly and it is reported that 15% of the farmers directly adopt the technology. It indicates that the credibility on the source of information and regular messages and also their previous interactions.

– Majority of the farmers (70.0%) opined that the text messages are preferred as they directly serve as reference and they take the message to the input dealer directly and get recommended chemicals only.

– As per the farmers opinion 81.67% expressed that the need based information required to be pushed frequently to enlighten the farmers regularly.

– Among the sample 63.33 % opined that the video

and audio conference programme enabled them to interact directly with the scientists by sitting in their farm / Village and hence the information received on their crop management with out much efforts.

Constraints expressed by the farmers in utilization of ICT services :

– Among the farmers 26.67% expressed that because of not possessing smart phones it is becoming difficult to receive some messages and utilization of apps

– Among the farmers 38.33% expressed that lack of awareness on use of smart phones makes difficult to read the information from mobile phone and not able to operate the apps which needs some training.

Conclusion :

The ICT and mobile applications no doubt reach the more farmers with in less time and also it made the transfer of technology more easy on the part of the extension worker by just pushing a message in the group it is able intimate the farmers about their programmes and technologies. The ICTs are enabled to reach more number of farmers who geographically dispersed over the district by simple text message from AKPS is able to reach 6530 registered farmers at a time and a whats app message is reaching 250 respondents with in few seconds. The ICT applications in turn enabled the farmers to share the photograph of diseased or pest infested plant with the extension staff and the scientists and readily receive a solution for their problem by sitting on the farm. The ICT applications enabled an extension worker or an extension scientist to reach the farmers and increased the out reach of the farmers who are remotely placed in their different villages, different terrains and made the transfer of Technology process more powerful. The ICT tools are the answer for the small and marginal farmers to reach their door steps with the different technology options by the Extension staff and to convince them for the adoption of these technologies with less time and useful to accelerate the

Table 4: Extension contact also studied in the farmers contact to different agencies

Sr. No.	Extension agency	Percentage	Frequency
1.	Agriculture department	85.00	Occasionally
2.	Scientists of ANGRAU	71.67	Occasionally
3.	Input dealers	43.33	Occasionally
4.	Fellow farmers	28.33	Occasionally
5.	Private companies and NGOs	15.00	Occasionally

process of transfer of technology.

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