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Evaluating the Adoption of Agro Advisory Services Disseminated through the Interactive Information Dissemination System in the State of Telangana, India

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Authors' contributions

This work was carried out by the Author BA under the chairmanship and guidance of authors BS and SR. Author BS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors BS and SR made the appropriate suggestions and modifications in the manuscript. All authors read and approved the final manuscript

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ABSTRACT

The study was conducted in erstwhile Nalgonda and Khammam districts of Telangana state, where pilot testing of the Interactive Information Dissemination System was conducted during year, 2013. The present study adopted Ex-post facto research design and one hundred and twenty respondents were selected by following simple random sampling method, at the rate of sixty from each identified district. From the results of the revealed that, greater majority of the registered farmers belonged to the middle age, had high school level of education with medium level of farming experience. It was also observed that, 56.67 percent of the farmers had medium level of Information acquisition behaviour, high innovativeness and registered farmers (66.67%) used to visit KVKs for agriculture information. Further, an attempt was made to find out the factors contributing for adoption of agro advisory services and it was observed that, level of education, annual income level, level of farming experience, level of socio-political participation, information acquisition behavior, use of ICT tool, innovativeness and access to KVKs were found to be the

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contributing factors for adoption of the agro advisory services by the farmers. The services of the IIDS helped farmers in getting real time and personalized agro advisory services 24X7 and also facilitated them in sharing their success stories with their fellow farmers.

Keywords: Interactive information dissemination system; adoption; agro advisories.

1. INTRODUCTION

In present day agriculture, knowledge and skills are important resources, but estimates indicates that 60 per cent of farmers does not have access to any source of information for advanced agricultural technologies resulting in huge adoption gaps. The requirement of field level extension personnel is estimated to be about 1.3 -1.5 million against the present availability of about 0.1 million personnel (Global reporting initiative 2016). The twenty-first century demands cost effective and efficient information & communication technologies to take lead in changing agricultural scenario.

In recent years, there has been a rapid growth of mobile phone networks in developing countries. Majority of the countries in the developing world have skipped fixed-line infrastructure and entered directly into mobile technology. As per the report released by Internet and Mobile Association of India (IMAI) 2018, India is in second position in the world in mobile subscribers after China. In India there are 70 mobiles per 100 citizens (Internet and Mobile Association of India 2018).

Despite of various reform initiatives in agricultural extension in the past decades, the coverage of, access to and quality of information provided to small holder farmers is still uneven and the main sources of information to farmers till today are neighbours, input dealers, radio, TV, newspaper and extension worker. In view of poor reach of extension, the ICTs can play significant role in reaching the unreached farmers. In this context one of the mobile phone applications to disseminate agriculture information to farmers is *Annapurna Krishi Prasar Seva* (AKPS). AKPS service in extension system is an innovative ICT initiative to address the needs and expectations of the farmers. Technical name of AKPS is Interactive Information Dissemination System (IIDS).

IIDS is a pull and push based ICT tool, with a mobile interface at front end and web interface at back end. Multimode information transmission through voice, text, images and videos from both ends (farmers to expert and back). It is an integrated model - integration of Toll free IVRS (1800 425 3141), Smartphone Application-AKPS (Under UMANG) and Interactive Web Portal.

Media Lab Asia, a section 8 company of the Ministry of Electronics and Information Technology, Government of India as a Consortium Leader developed the basic framework of AKPS under NAIP project awarded by Indian Council of Agricultural Research (ICAR). After successful pilot testing, Media Lab Asia along with PJTSAU has been continuing the R&D to refine and deploy the IIDS services in the state of Telangana for the benefit of the farming community. At present, AKPS services were made available to the farmers of 9 districts of Telangana through 6 KVKs (Kampasagar, Nalgonda District; Wyra, Khammam District; Palem, Mahabubnagar District; Malyal, Warangal District; Adilabad, Rudrur and Nizamabad Districts) and 3 District Agriculture Advisory and Transfer of Technology Centres (DAATTCS) (Sangareddy, Karimnagar and Rangareddy) catering the information needs of the 13000 farmers scattered in 1690 villages covering 279 mandals.

IIDS services related to agriculture and allied sectors will enhance the outreach to mentor the farmers more efficiently and scientifically in location specific manner. IIDS enabled the farmers to interact directly with local agricultural scientists in their native language. In view of the above points, the present study was designed to study the profile characteristics of the farmers and to identify the factors contributing for the adoption of the agro advisory services by the farmers.

2. RESEARCH METHODOLOGY

The present study was formulated by using an Ex-post facto research design and the pilot tested districts namely, Khammam and Nalgonda were selected purposively. By adopting the simple random sampling technique, 120 registered farmers were selected for the study from the selected districts.

Fig. 1. Map of Telangana State showing Khammam and Nalgonda districts

The Khammam district, which is a part of Telangana region, has between 16”45’ and 18”35’ of Northern Latitude and 79”47’ and 80”47’ of the Eastern Longitude. The district is bounded on the North by Chattishghar and Orissa states, on the East by East Godavari and West Godavari, on the South by Krishna and on the West by Nalgonda and Warangal. The central and eastern parts of the district are mainly hilly. The climate is comparatively equitable and although it is very hot in May with mercury rising upto 40.7c, the normal rain fall of the district is 1124.0 mm. The soils in the district are mostly sandy loams in the South of river Godavari, the black soil in Madhira mandal and the areas adjoining the river Godavari are fertile and rich like the delta lands of Godavari. The predominant soils in the district are Chalaka (43%), Dubba (28%) and Black soil (29%).

Flora & Fauna The forest wealth chiefly comprises teak, nallamaddi, chandra and bamboo. About 4% of the total Geographical area of the district is under forest cover. The total forest area in the district covers 7,59,438 hectares. The flora of the district can be broadly classified into timber, softwood, fuel, bamboo shrubs, climbers various kinds of grabber and several other minor forest produce yielding spices etc. The district is noted for fauna. The tracts lying on either side of the Godavari are the repositories of wildlife. The species of wildlife found in the district can be classified as quadrupeds, avers and reptiles and birds. (https://khammam.telangana.gov.in).

Nalgonda is a district in the southern part of Telangana. The district is spread over an area of 2,449.79 square kilometers. Telangana owes its famous title ‘Rice Bowl of India’ to Nagarjuna Sagar Dam, which plays a lead role in making the lands of the state fertile. The 124-meter high dam is the tallest masonry dam in the world. This also ranks third in the largest man-made lakes of the world and it involved around 70,000 workers to complete the project. The dam came into use in 1972 after completion in the year 1969. The marvelous architecture involved in storing massive amount of the waters of Krishna River necessitates a visit to this place. The major crops grown in the district are paddy jower, Bajra, groundnut, red gram, castor, cotton etc. Among Horticulture crops citrus and mango are widely grown. Nagarjuna sagar the major multi-purpose project built across river Krishna is a major irrigation project in the district. Other river projects are river projects on Musi, Dindi, Asifa nagar project, Pendhi parkala, Saligowraram and Bhimanapally projects (https://nalgonda.telangana.gov.in).

2.1 Profile Characteristics of the Respondents

Age, level of education, total annual income, farming experience, farm size, socio-political participation, information acquisition behavior, use of ICT tool, innovativeness and access to KVK were the ten independent variables selected for the study based on the experts’ opinion and literature available.

2.2 Extent of Adoption of Agro Advisory Services

In order to assess the extent of adoption of agro advisory services, the agro advisories disseminated by IIDS were collected and a schedule was developed comprising 20 items on various advisories disseminated in rice cultivation viz., seed related and seed treatment advisories, weather based information, nutrient management, plant protection, weed management and other related information. The responses on each item were recorded on a continuum of fully adopted, partially adopted and not adopted with 3, 2 and 1 scores for responses, respectively.

3. RESULTS AND DISCUSSION

3.1 Personal Characteristics of the Respondents

It could be inferred from the Table 1 that, majority of respondents (56.67%) were of middle age category, the probable reason might be the enthusiasm of middle age group to use mobile phones to access agriculture and allied activities information and old age farmers still not habituated to use the ICT tools. The findings were supported by Kakade and Kolar [1].

With respect to education, it was obvious from the table that, 25.83 per cent of the respondents had intermediate level of education followed by high schooling (25.00%), majority of them had medium level of annual income and this might be due to the fact that majority of respondents were small farmers and both the selected districts were with enough resources for doing farming. The result was in conformity with the findings of Patil [2].

Further, 53.34 per cent of them had medium farming experience, 34.17 per cent of them had small farm size, with medium level of socio-political participation (60.83%), medium level of Information acquisition behaviour (56.67%), this may be due to the fact that, amongst modern sources, they acquired information daily basis from T.V. & mobile applications, whereas in traditional sources daily they were acquiring information from farm literature sources, relatives and friends, neighbours and input dealers. Amongst, the formal sources, weekly once they were getting information from A.E.O's, A.O.'s and others. This finding is in supportive with Patil [2], Nakano et al. [3] and Shaibu Baanni Azumah et al. [4], who reported that, about 92% of the respondents received information on improved production techniques from colleague farmers.

It was observed from the Table 1 that, majority of the respondents (50.00%) belonged to medium category followed by high (37.50%) and low (12.50%) category of use of ICT tools. This trend is showing the very good possibility of capacity building of farmers through ICT tools at their ease level, time and pace to speed up the technology transfer skills. The result was in conformity with the findings of Madan [5] and Baruah & Mohan [6] who reported that, majority of the respondents (46%) use Mobile Phone, Camera, VCD/VCR, Radio, T.V., Cinema, Newspaper, Information Kiosk/CSC, ATM, Computer, Internet, Face book, YouTube) for a time range of 1-3 hours per day, which is an optimistic situation and can be further exploited for agricultural purposes. Lokeswari [7] also reported that, farmers use the ICT services frequently as and when they needed information. It was observed that exposure of farmers to mass media was found conducive to utilization of ICT by farmers.

The results of the study also revealed that, majority of the respondents were with high innovativeness, the probable reason may be that, majority of the respondents were mobile users and accessing information related to innovative methods in farming through mobile. The results were in conformity with that of Samatha [8] and Karuppasamy [9]. Karuppasamy [9] in his study on "Effectiveness of paddy expert system in terms of knowledge gain, skill acquisition and symbolic adoption behaviour among the paddy growers - A experimental research" stated that, 65.70 per cent of the respondents had medium level of innovativeness followed by high (17.86%) and low (7.14%) level of innovativeness.

It was also observed that, respondents' villages were within 20-40 kilometres radius from KVK, able to get information easily from KVK (45.00%) and also found that scientists were always available at KVK for helping the visiting farmers. With respect to frequency of visits to KVKs, 43.33 per cent of the respondents visited KVKs once in a week to get agriculture information (66.67%).

Table 1. Distribution of respondents based on the selected personal characteristics

Variable	Categories	Frequency (n=120)	Percentage
Age	Young age (up to 34)	37	30.83
	Middle age (34-55)	68	56.67
	Old age >55	15	12.50
Education	Illiterate	2	1.66
	Functionally literate	1	0.83
	Primary school	11	9.17
	Middle school	22	18.33
	High school	30	25.00
	Intermediate	31	25.83
	Under graduation	17	14.17
	Post graduation	6	5.00
Annual Income	Low annual income	32	26.67
	Medium annual income	58	48.34
	High annual income	30	24.99
Farming Experience	Low farming experience	40	33.34
	Medium farming experience	64	53.34
	High farming experience	16	13.32
Farm size	Marginal (0.1-1.0 ha)	20	16.67
	Small (1.1-2.0 ha)	41	34.17
	Semi medium (2.1-4.0 ha)	39	33.33
	Medium (4.1-10.0 ha)	16	13.33
	Large (10 ha and above)	3	2.50
Socio political participation	Low socio political participation	13	10.83
	Medium socio political participation	73	60.83
	High socio political participation	34	28.33
Information Acquisition Behaviour	Low information acquisition behaviour	25	20.83
	Medium information acquisition behaviour	68	56.67
	High information acquisition behaviour	27	22.50
Use of ICT tools	Low	15	12.50
	Medium	60	50.00
	High	45	37.50
Innovativeness	Low innovativeness	7	5.83
	Medium innovativeness	37	30.84
	High innovativeness	76	63.33
Access to KVK			
Distance from village to KVK	Below 20km	38	31.67
	20-40 km	42	35.00
	40-60 km	40	33.33
Access to information at KVK	Very easy	54	45.00
	Easy	48	40.00
	Difficult	18	15.00
Scientists availability at KVK	Always	56	46.67
	Sometimes	40	33.33
	Never	24	20.00
Frequency of visit to KVK	Daily once	36	30.00
	Weekly once	52	43.33
	Monthly once	32	26.67

Variable	Categories	Frequency (n=120)	Percentage
Purpose of visit to KVK	Agriculture information	80	66.67
	Information regarding training	25	20.83
	Allied sector information	15	12.5
Whether the information addressing immediate needs or not	Always	58	48.33
	Sometimes	35	29.17
	Never	27	22.50

3.2 Adoption of Agro Advisories by Respondents

It was evident from the Table 2 that, out of 120 respondents only forty four farmers were grouped under medium category of adoption, where as forty one were under high adoption category followed by low extent of adoption of agro advisories disseminated through the IIDS. The results were in conformity with the Kanavi [10] and Kumar et al. [11].

Kanavi [10] in his study on "An analysis of Kisan Mobile Advisory Service (KMAS) of *Krishi Vigyan Kendra"* stated that, 65.83 per cent of farmers adopted the messages related to pest management, followed by disease management. Kumar et al. [11] in their study on "Evaluation of a mobile phone based agro-advisory programme on sunflower (*Helianthus annuus* L.)" mentioned that, farmers in low adoption category decreased from 17.50 to 10.42 per cent in pre and post-dissemination groups, respectively and that of high adoption category increased from 15.83 to 22.08 per cent indicating the impact of mobile phone based dissemination. The mean adoption scores increased from 28.27 to 31.10 in pre and post-dissemination groups, respectively.

From the results in the Table 3 it could be concluded that, amongst the independent variables under study, total annual income, farming experience, socio-political participation, use of ICT tool and innovativeness were found to have positive and significant relationship with extent of adoption at 5 per cent level of probability. Whereas, education, information seeking behavior and access to KVK were found to have positive and significant relationship with extent of adoption at 1 per cent level of probability.

Table 2. Distribution of respondents based on extent of adoption of agro advisories (n=120)

S. no.	Category	Frequency	Percentage
1.	Low extent of adoption	35	29.17
2.	Medium extent of adoption	44	36.66
3.	High extent of adoption	41	34.17

Table 3. Relationship between the profile characteristics of the respondents with their extent of adoption of agro advisories disseminated through IIDS

S. no.	Profile characteristics	r
1.	Age	-0.396**
2.	Education	0.369**
3.	Total annual income	0.219*
4.	Farming experience	0.192*
5.	Farm size	0.040NS***
6.	Socio political participation	0.193*
7.	Information acquisition behavior	0.398**
8.	Use of ICT tool	0.216*
9.	Innovativeness	0.192*
10.	Access to KVK	0.248**

** Significant at 5 per cent level of probability (0.17934)*
*** Significant at 1 per cent level of probability (0.23430)*
****NS - Non significant*

The results of the study revealed that, the respondents belonged to middle age and use mobile for getting information related to innovative agricultural technologies this might be the reason behind the association between age and adoption. Further, the reason for observing the positive and significant relationship between independent variables and dependent variable could be attributed to formal education, which would have favored the farmers in timely accessing and timely utilization advisories disseminated through IIDS and respondents were found to be more proactive in search of required agriculture information, high innovativeness nature of them indicates their readiness to accept and adopt new advisories and adopted the IIDS advisory services. The farm size and adoption were associated non-significantly. The results were in conformity with Shankaraiah [12], Ganesan et al. [13] and Kanavi [10].

Shankaraiah [12] in his study on "Attitude of farmers and scientists towards technology dissemination through mobile message service" revealed that variables such as education, farm size and innovativeness, had positive and significant relationship with adoption of farmers at one per cent level of significance. Ganesan et al. [13] in their study on "Use of mobile multimedia agricultural advisory systems by Indian farmers: Results of a survey" found that, the age and landholding size were found to have no impact at all indicating that all the farmers, irrespective of their age and landholding size, were using Mobile Multimedia Agricultural Advisory System (MAAS) services. It was observed that education and level of innovativeness correlated negatively and significantly with the frequent use of the Mobile Multimedia Agricultural Advisory System (MAAS) services. Another interesting observation was that education was not associated at all with the frequency of using information services. Kanavi [10] in his study on "An Analysis of Kisan Mobile Advisory Service (KMAS) of *Krishi Vigyan Kendra*" stated that, the variables such as age, education, innovativeness had positive and significant relationship with utility of Kisan Mobile Advisory Service(KMAS). Farm size and annual income had no significant relationship with utility of Kisan Mobile Advisory Service (KMAS).

4. CONCLUSION

The application and use of ICTs in the field of agriculture is still in its primitive stage and introduction of ICT tools in the agriculture have many challenges both in the extension mechanism and the farmers side. As an initial step towards this, IIDS tool was developed and deployed to deliver location specific and personalized agro advisory services to the farming community. The findings presented in the preceding section lead to conclusion that advisory services of the AKPS were adopted by the respondents and the factors favoured in adoption of the advisories include, formal level of education, annual income, farming experience, socio-political participation, information acquisition behavior, use of ICT tool, innovativeness and access to KVKs. It was also observed that majority of the farmers were middle age, had high school level of education with medium level of farming experience. It was also observed that, 56.67 percent of the farmers had medium level of Information acquisition behaviour, high innovativeness and registered farmers (66.67%) used to visit KVKs for agriculture information. The services of the IIDS helped farmers in getting real time and personalized agro advisory services 24X7 and also facilitated them in sharing their success stories with their fellow farmers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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