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RESEARCH ARTICLE

ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN AGRICULTURE–PERCEPTION OF THE FARMERS IN RAMANATHAPURAM DISTRICT

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ABSTRACT

Information and Communication Technologies (ICT) in agriculture is an emerging field focusing on the enhancement of agricultural and rural development in India. It involves application of innovative ways to use ICT in the rural domain. The advancements in ICT can be utilised for providing accurate, timely, relevant information and services to the farmers, thereby facilitating an environment for more remunerative agriculture. Given the development scenario in Indian Agriculture, ICT movement is still evolving. However, all the ICT initiatives are not uniform with disparities between regions in the level and quality of telecommunications, information and the effort of individuals, public and private organizations, and differentiated nature of demand of the farmers in different areas. As a result, there have been many successes, failures, lessons learned and experience gained, so far. In the agriculture sector here the farmers mostly stick on to tradition and traditional method of agriculture. Even though, science has gained importance and developed a lot, since most of the agriculturists are illiterate or some lacking in the awareness of technology and its change, there was not much influence of technology till late 1980's. But now thanks to mass media like T.V., mobile phone, radio and internet the benefits of technology in agriculture are known by the people. Hence, there is a need to study the nature of the problem. It attempts to analyze the role of ICT and its impact on production and marketing of various agriculture crops with special reference to Ramanathapuram district of Tamil Nadu. The agriculture is bound to adopt and implement ICT, as the Government of India aims to double the agricultural production, and to increase India's share of the global export. This aim can be achieved only when there is proper utilization of ICT and more investment in it. As ICT helps in information dissemination in less time with effective ways of communication, its implications cannot be ignored by the government and its scope and coverage should be extended as a whole rural areas in India.

INTRODUCTION

Information and Communication Technologies (ICT) in agriculture is an emerging field focusing on the enhancement of agricultural and rural development in India. It involves application of innovative ways to use ICT in the rural domain. The advancements in ICT can be utilised for providing accurate, timely, relevant information and services to the farmers, thereby facilitating an environment for more remunerative agriculture. Given the development scenario in Indian Agriculture, ICT movement is still evolving. However, all the ICT initiatives are not uniform with disparities between regions in the level and quality of telecommunications, information and the effort of individuals, public and private organizations, and differentiated nature of demand of the farmers in different areas. As a result, there have been many successes, failures, lessons learned and experience gained, so far. While these initiatives are intended to address the needs of the farmers through ICT, their actual usage and their ability to bring significant impact on the farm productivity and socio-economic development of the intended beneficiaries is to be understood. The National Policy for Farmers emphasizes the use of Information and Communication Technology (ICT) at village level for reaching out to the farmers with the correct advisories and requisite information. The available satellite data relating to weather news, long-term and short-term weather forecast, production information, market prices policy developments pertaining to agriculture, apart from the number of advisory services in public or private domain that disseminate information should be utilized adequately. With this background information, the paper is devoted to outline the level of awareness of the farmers on the ICT application and extent of utilisation and benefits availed through ICT application in Ramanathapuram district.

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Statement of The problem

In the agriculture sector here the farmers mostly stick on to tradition and traditional method of agriculture. Even though, science has gained importance and developed a lot, since most of the agriculturists are illiterate or some lacking in the awareness of technology and its change, there was not much influence of technology till late 1980's. But now thanks to mass media like T.V., mobile phone, radio and internet the benefits of technology in agriculture are known by the people. Hence, there is a need to study the nature of the problem. It attempts to analyze the role of ICT and its impact on production and marketing of various agriculture crops with special reference to Ramanathapuram district of Tamil Nadu.

Ramanathapuram district is one of the most important districts of Tamil Nadu where there are large number of people depend agricultural as a main occupation for their survival. The main food crop in the district is paddy, chilly and cotton. The total number of cultivators and agricultural labourers of according to the census 2001 were 1, 79,562 and 1, 24,483 respectively. The total irrigated area was 2, 08,790 hectares of which the areas irrigated by tanks and wells were 7,861 hectares and 2,307.95 hectares respectively. R.S. Mangalam block was the major area of irrigation i.e., 4,857 hectares irrigated by Tanks and 437.64 hectares irrigated by wells. The total geographical area of the district was 3,889.62 sq. km. of which cropped area accounts for about 53.68 per cent of the total area. Paddy is the major food crop of the district. About 46 per cent of the total areas sown are paddy followed by chilies, groundnut and cotton.

Paddy grown on wet lands irrigated by rivers, canals, tanks and wells. Cumbu, Cholam, Ragi, Varagu, Samai and Kudiravali are the millets produced in the district. Ragi is grown in a wide range of varying soil fertility during the periods, May-June and November-January. In East Ramanathapuram district, cotton has been introduced as an irrigated crop in summer. Large areas have been brought under improved varieties of cotton. The Ramanathapuram district is one of the chief cotton producing areas in the State, besides Coimbatore and Tirunelveli. This may be the main reason for selecting this district for the present study. Hence, the proposed research aims to study the past and present major ICT initiatives in agriculture in the study area, the utilisation, the factors influencing the level of awareness and benefits availing form ICT application in agriculture. In this context, the present study "Role of Information Communication and Technology in Agriculture – Perception of the Farmers in Ramanathapuram District" is taken up to make a close probe in to the role of ICT on agricultural development especially among the land holding classes in Ramanathapuram district.

Objectives

- The objectives of the study are
- To analyse the extent of awareness and the factors influencing the awareness of ICT application in agriculture in the study area
- To study the utilization, benefits availed and the level of satisfaction towards the role of ICT application in agriculture

METHODOLOGY

In the present study the researcher has collected and used primary data. Using an interview schedule, the primary data was collected about level of awareness, factors influencing awareness, extent of utilization; benefits availed and impact of ICT application in agriculture on socio economic conditions of the farmers of Ramanathapuram district.

Sampling design

According to statistics, Ramanathapuram District comprises seven taluks and eleven blocks with 400 revenue villages where the total cultivators were 179,562. In all the seven taluk except Rameswaram the agriculture is the major occupation in the district. Hence the convenient simple random sampling technique has been adopted for the present study with Ramanathapuram District as universe. Since the total revenue villages of the district and the total cultivators are numerous, the researcher has randomly selected only 50 villages where agriculture is major occupation and having two seasons of cropping pattern. Out of the 50 select villages, the researcher has selected 6 farmers consisting of each 2 from small, medium and large farmers thus total of 300 farmers were selected based on convenient of the researcher. However the researcher took care to ensure that the sample represented the whole area of Ramanathapuram district.

Period of the study

In order to collect the primary data regarding role of information and communication technology on production and marketing of agriculture crops in Ramanathapuram district, the survey was conducted from January 2011 to June 2011 with the help of pre designed interview schedule.

Major findings of the study

Table 1. Opinion of the farmers on the awareness of ICT in Agriculture

Sl.No		No of Respondents	Percentage
1	Yes	300	100.0
2	No	0	0.0
	Total	300	100.0

Source: Primary Data

It is evident from the Table 1 it is stated out of 300 respondents selected, all the respondents were aware of ICT application in agriculture.

Table 2. Opinion of the farmers on the sources of awareness of ICT

Sl.No	Sources	No of Respondents	Percentage
1	Govt Institutions	6	2.0
2	Friends and relatives	2	0.7
3	Officers of Agri Dept	292	97.3
	Total	300	100.0

Source: Primary Data

It is seen from the Table 2 that 97.3% (292) were aware of ICT application in agriculture by the officers of the agriculture dept whereas 2% (6) were aware of ICT application in agriculture by other Govt Institutions under study.

Table 3. Opinion of the farmers on the sources of Media by which aware of ICT

Sl.No	Media	Frequency of Usage				Total
		Frequent	Often	Rare	Never	
1	TV advertisement	129 (43.0)	167 (55.7)	4 (1.3)	0 (0.0)	300 (100.0)
2	Audio/FM Services	3 (1.0)	116 (38.7)	181 (60.3)	0 (0.0)	300 (100.0)
3	Mobile SMS	7 (2.3)	6 (2.0)	54 (18.0)	233 (77.7)	300 (100.0)
4	E-Mail	20 (6.7)	4 (1.3)	39 (13.0)	237 (79.0)	300 (100.0)
5	Internet	24 (8.0)	11 (3.7)	22 (7.3)	243 (81.0)	300 (100.0)

Source: Primary Data

On the TV media, out of 300 respondents selected, 43% (129) of them have frequently used the TV as a media for ICT application in agriculture whereas 1.3% of them have rarely used the TV media. Similarly about Radio/FM, 60.3% (181) of the farmers have rarely used this media for information related to agriculture whereas only one percent (3) of them frequently used this media. Further about the Mobile SMS, E-Mail and internet media, majority of 78% (230) respondents never used this type of media whereas only 3 to 8 percent of them used this media for getting agriculture related information under study.

Regarding the information related to weather, mandi rates, marketing of agriculture products information, majority of 94.7% (284), 63% (189) and 65% (195) of the respondents availed this type of information related to agriculture in daily basis. Similarly on the information related to soil seed and soil testing, Govt policy for Agriculture related and crop disease management, schemes and grant monitoring related information, majority of them 117 (39%), 114 (38%), 138 (46%) and 129 (43%) have availed this type of information on weekly basis. Further majority of the respondents 51.7% (155), 50% (150) and 53% (159) have availed the information related to modern tolls and equipment available, crop life cycle and fertilizer and pesticide application in a monthly basis under study. From Table 5 it is seen that on the first statement, "Availability of the online information facility" out of the 300 farmers, 241 (80.33%) have a positive attitude, while 25 (8.33%) have a negative attitude. The intensity value comes to 342 and it places the statement at the second rank. It is learnt that on the second statement, "Support of Agriculture Department" out of the 300 farmers, 7 (2.33%) are in agreement with it, while 245 (81.67%) are not. The intensity value at is -235 and it places the statement at the Nineth place. It is clear on the third statement, "Modern technological support for agriculture" out of the 300 farmers, 54 (18.00%) agreed with the statement and 119 (39.67%) did not whereas 127 (42.33%) are neutral. The intensity value comes to -71 and it places the statement at the sixth place.

Table 4. Opinion of the farmers on the types of ICT services availed by farmers and frequency of availed

Sl.No	Information about	Frequency of availed				Total
		Daily	Weekly	monthly	others	
1.	Weather	284	13	3	0	300
		(94.7)	(4.3)	(1.0)	(0.0)	(100.0)
2.	Mandi rates	189	97	10	4	300
		(63.0)	(32.3)	(3.3)	(1.3)	(100.0)
3.	Soil seed	60	117	114	9	300
		(20.0)	(39.0)	(38.0)	(3.0)	(100.0)
4.	Crop life cycle	9	105	155	31	300
		(3.0)	(35.0)	(51.7)	(10.3)	(100.0)
5.	Bank loan & Insurance	22	83	134	61	300
		(7.3)	(27.7)	(44.7)	(20.3)	(100.0)
6.	Modern Tools and Equipment	9	75	150	66	300
		(3.0)	(25.0)	(50.0)	(22.0)	(100.0)
7.	Govt Policy on Agriculture	14	114	104	68	300
		(4.7)	(38.0)	(34.7)	(22.7)	(100.0)
8.	Irrigation source and water management	98	94	76	32	300
		(32.7)	(31.3)	(25.3)	(10.7)	(100.0)
9.	Fertilizer and Pesticide application	12	109	159	20	300
		(4.0)	(36.3)	(53.0)	(6.7)	(100.0)
10.	Crop Disease management	59	138	100	3	300
		(19.7)	(46.0)	(33.3)	(1.0)	(100.0)
11.	Marketing of Agriculture product	195	39	57	9	300
		(65.0)	(13.0)	(19.0)	(3.0)	(100.0)
12.	Schemes and Grant Monitoring	87	129	58	26	300
		(29.0)	(43.0)	(19.3)	(8.7)	(100.0)

Source: Primary Data

Table 5. Opinion of the farmers on the factors influencing to aware of ICT application in Agriculture

Sl.No	Factors	Rank					Mean Scores	Rank	Intensity value
		SA	A	M	DA	SDA			
1	Availability of the online information facility	145	96	34	06	19	4.14	2	342
2	Support of Agriculture Department	3	4	48	245	0	2.22	9	-235
3	Modern technological support for agriculture	3	51	127	110	9	2.76	6	-71
4	Advertisement / announcement of the Govt for Agriculture	4	12	151	99	34	2.51	8	-147
5	Information provided by Banking and insurance network	0	92	144	38	26	3.01	4	2
6	Support of Govt by Toll free information	37	67	87	60	49	2.94	5	-17
7	Support of private video / audio cable network	139	79	30	19	33	3.91	3	272
8	Information from fellow farmers	30	6	46	36	182	1.89	10	-334
9	Information provided by fertilizer/ pesticide company	7	24	151	67	51	2.56	7	-131
10	Availability of mobile network	197	48	14	22	19	4.27	1	382

Source: Primary Data

Table 6. Opinion of the farmers on the impact of ICT application in Agriculture

Sl.No	Factors	*Rank*					Mean Scores	Rank	Intensity value
		SA	*A*	*M*	*DA*	*SDA*			
1	Rural access of ICT increases income from farm activities	48	88	59	94	11	3.23	1	68
2	Improved prices for agri products	0	0	113	122	65	2.16	13	-252
3	Wide market operation and coverage	8	29	56	81	126	2.04	15	-288
4	Most systematic business	3	15	106	67	109	2.12	14	-264
5	Dissemination of new inputs / technology	26	39	40	153	42	2.51	12	-146
6	Time savings	27	43	110	40	80	2.66	8	-103
7	Knowledge of technology	27	49	70	94	60	2.63	9	-111
8	Securing market information	6	44	112	101	37	2.60	10	-119
9	Extension of channel of distribution	6	42	131	95	26	2.69	7	-93
10	Enlarged networking	13	37	154	60	36	2.77	5	-69
11	Timely access information	22	63	75	99	41	2.75	6	-74
12	Better price integration	11	57	132	77	23	2.85	4	-44
13	Cropping mix	23	50	105	110	12	2.87	3	-38
14	Reducing transport cost	32	19	85	104	60	2.53	11	-141
15	Improving negotiation power	72	20	103	41	64	2.98	2	-5

Source: Primary Data

It is learnt that on the fourth statement, "Advertisement / announcement of the Govt for Agriculture" out of the 300 farmers, 16 (5.33%) are in agreement with it, while 133 (44.33%) are not. The intensity value at is -147 and it places the statement at the eighth place. It is observed that on the fifth statement, "Information provided by Banking and insurance network" out of the 300 farmers 92 (30.67%) have positive attitude towards the statement, while 64 (21.33%) are negative. The intensity value arrived at is 2 and it places the statement at the fourth place.

It is seen that on the sixth statement, "Support of Govt by Toll free information" out of the 300 farmers, 104 (34.67%) have a positive attitude, while 109 (36.33%) have a negative attitude. The intensity value comes to -17 and it places the statement at the fifth rank. It is learnt that on the seventh statement, "Support of private video / audio cable network" out of the 300 farmers, 218 (72.67%) are in agreement with it, while 52 (17.33%) are not. The intensity value at is 272 and it places the statement at the third place.

It is understood that on the eighth statement, "Information from fellow farmers" out of the 300 farmers, 36 (12.00%) are in agreement with it, while 218 (72.67%) are not. The intensity value at is -334 and it places the statement at the tenth place. It is observed that on the nineth statement, "Information provided by fertilizer/ pesticide company" out of the 300 farmers 31(10.33%) have positive attitude towards the statement, while 118 (39.33%) are negative. The intensity value arrived at is -131 and it places the statement at the seventh place. It is learnt that on the tenth statement, "Availability of mobile network" out of the 300 farmers, 245 (81.67%) are in agreement with it, while 41 (13.67%) are not. The intensity value at is 382 and it places the statement at the first place. It is known that among the various factors influencing of aware of ICT in agriculture, availability of mobile net work, availability of online information facility, support of private cable TV/ audio network, information provided by banking and insurance and agri department network which is imperative for asking response of the farmers under study.

From the Table 6, It is clear on the first statement, "Rural access of ICT increases income from farm activities" out of the 300 farmers, 136 (45.33%) agreed with the statement and 105 (35.00%) did not. The intensity value comes to 68 and it places the statement at the first place. It is learnt that on the second statement, "Improved prices for agri products" out of the 300 farmers, 113 (37.67%) are in neutral with it, while 187 (62.33%) are not. The intensity value at is -252 and it places the statement at the thirteenth place. It is observed that on the third statement, "Wide market operation and coverage" out of the 300 farmers 37 (12.33%) have positive attitude towards the statement, while 207 (69.00%) are negative. The intensity value arrived at is -288 and it places the statement at the fifteenth place. It is seen that on the fourth statement, "Most systematic business" out of the 300 farmers, 18 (6.00%) have a positive attitude, while 176 (58.67%) have a negative attitude. The intensity value comes to -264 and it places the statement at the fourteenth rank. It is learnt that on the fifth statement, "Dissemination of new inputs / technology" out of the 300 farmers, 65 (21.67%) are in agreement with it, while 195 (65.00%) are not. The intensity value at is -146 and it places the statement at the twelfth place. It is understood that on the sixth statement, "Time savings" out of the 300 farmers, 70 (23.33%) are in agreement with it, while 120 (40.00%) are not. The intensity value at is -103 and it places the statement at the eighth place. It is observed that on the seventh statement, "Knowledge of technology" out of the 300 farmers 76 (25.33%) have positive attitude towards the statement, while 154 (51.33%) are negative. The intensity value arrived at is -111 and it places the statement at the nineth place. It is learnt that on the eighth statement, "Securing market information" out of the 300 farmers, 50 (16.67%) are in agreement with it, while 138 (46.00%) are not. The intensity value at is -119 and it places the statement at the tenth place. It is clear on the nineth statement, "Extension of channel of distribution" out of the 300 farmers, 48 (16.00%) agreed with the statement and 121 (40.33%) did not. The intensity value comes to -93 and it places the statement at the seventh place. It is learnt that on the tenth statement, "Enlarged networking" out of the 300 farmers, 50 (16.67%) are in agreement with it, while 96 (32.00%) are not. The intensity value at is -69 and it places the statement at the fifth place. It is observed that on the eleventh statement, "Timely access information" out of the 300 farmers 85 (28.33%) have positive attitude towards the statement, while 140 (46.67%) are negative. The intensity value arrived at is -74 and it places the statement at the sixth place. It is seen that on the twelfth statement, "Better price integration" out of the 300 farmers, 68 (22.67%) have a positive attitude, while 100 (33.33%) have a negative attitude. The intensity value comes to -44 and it places the statement at the fourth rank. It is learnt that on the thirteenth statement, "Cropping mix" out of the 300 farmers, 73 (24.33%) are in agreement with it, while 122 (40.67%) are not. The intensity value at is -38 and it places the statement at the third place. It is understood that on the fourteenth statement, "Reducing transport cost" out of the 300 farmers, 51 (17.00%) are in agreement with it, while 164 (54.67%) are not. The intensity value at is -141 and it places the statement at the eleventh place. It is observed that on the fifteenth statement, "Improving negotiation power" out of the 300 farmers 92 (30.67%) have positive attitude towards the statement, while 105 (35.00%) are negative. The intensity value arrived at is -5 and it places the statement at the second place. It is known that among the various factors influencing of aware of ICT in agriculture, Rural access of ICT increases income from farm activities, Improving negotiation power, Cropping mix, Better price integration, and Enlarged networking is imperative for asking response of the farmers towards impact of ICT in agriculture under study.

RESULT OF ANOVA

The researcher analysed the relationship between age, education and experience with factors influencing the awareness of ICT application in agriculture the following hypotheses are framed. The researcher has used the ANOVA to test whether there is a significant relationship of the above hypothesis.

1. There is no relationship between age and factors influencing the level of awareness of ICT in agriculture
2. There is no relationship between education and factors influencing the level of awareness of ICT in agriculture
3. There is no relationship between experience and factors influencing the level of awareness of ICT in agriculture

The results of the ANOVA test regarding the relationship were depicted in table 3.29

As it could be observed from the above table 7 that among the 10 factors, age of the respondents influences changes in Support of Agriculture Department, Modern technological support for agriculture, Advertisement / announcement of the Govt for Agriculture, Information provided by Banking and insurance network,

Table 7. Analysis of variance on relationship between the variables such as age, education and experience and factors influencing level of awareness of ICT application in Agriculture

S.No.	Factors / Variables	Age		Education		Experience	
		F Ratio	Result	F Ratio	Result	F Ratio	Result
1	Availability of the online information facility	1.9967	Not Significant	2.4872	Significant	5.3035	Significant
2	Support of Agriculture Department	5.9407	Significant	1.0784	Not Significant	1.9841	Not Significant
3	Modern technological support for agriculture	7.2838	Significant	5.6875	Significant	1.8541	Not Significant
4	Advertisement / announcement of the Govt for Agriculture	11.7872	Significant	1.7463	Not Significant	4.3396	Significant
5	Information provided by Banking and insurance network	2.6835	Significant	2.6570	Significant	2.2033	Significant
6	Support of Govt by Toll free information	8.2842	Significant	1.3434	Not Significant	2.6732	Significant
7	Support of private video / audio cable network	5.9527	Significant	1.7959	Not Significant	0.7219	Not Significant
8	Information from fellow farmers	6.3780	Significant	1.3108	Not Significant	3.9240	Significant
9	Information provided by fertilizer/ pesticide company	5.2375	Significant	1.4145	Not Significant	3.7719	Significant
10	Availability of mobile network	1.3426	Not Significant	0.3133	Not Significant	16.1587	Significant

Support of Govt by Toll free information, Support of private video / audio cable network, Information from fellow farmers and Information provided by fertilizer/ pesticide company. For other factors age has no influence on them. Similarly on the education of the respondents which influences significant changes in Availability of the online information facility, Modern technological support for agriculture and Information provided by Banking and insurance network. For other factors education has no influence on them. Further about the experience of the respondents which influences significant changes in Availability of the online information facility, Information provided by Banking and insurance network, Advertisement / announcement of the Govt for Agriculture, Support of Govt by Toll free information, Information from fellow farmers and Information provided by fertilizer/ pesticide company and Availability of mobile network. For other factors experience has no influence on them.

Implication

Recently, the agricultural sector is confronted with the major challenges of increasing production to feed a growing population in a situation of decreasing availability of natural resources especially water shortages, declining soil fertility, effects of climate change and rapid decrease of fertile agricultural lands due to urbanisation. Some of the implication needs immediate attention. In general, majority of farmers are being illiterate, they are exploited mainly by the traders, commission agents as soon as the produce of agriculture are cultivated and the farmers are forced to sell their products for low prices as they are not aware price of their products in regional and outstation markets. Since the information is published on a website, not accessible to farmers via information centres. To reach a wider audience, information is broadcast via rural radio, TV or mobile phone, thereby creating a wide reach among the rural famers and save them from exploitation of middlemen. Similarly, since agriculture involves various risks and uncertainties, the farmers are facing many threats starting from poor soils, drought and erosion to pests affect. Hence the role of ICT can make a significant contribution in increasing the efficiency, productivity and sustainability of small scale farms. The information about pest and disease control especially early warning systems, new varieties of seeds and pesticide, new ways to optimise production and regulations for quality control is very much essential. Information on technologies is predominantly available in hardcopy form only or in stand-alone databases. Data are often incomplete or not compatible with other sources. Local knowledge on good practices and lessons learned about innovations is generally not captured. Hence the information about modern productivity agriculture should be presented in an appropriate format in order to be effectively used by majority of the rural communities. Messages through videos cable network in local languages have proved to be effective.

Conclusion

Farmers in the study area received agricultural information from a wide range of sources and channels. These include district and block level agriculture offices, daily local language news papers, agri portals, television, friends and relatives, helpline, farmers' cooperatives, radio, private input agencies and dealers and mobile phones. People often relied on more than one source/channel for information. The private input dealers especially seed, fertiliser and pesticide suppliers are major sources for information. Access to ICTs and the ability to use them does not alter the relationship between the producers and sellers in the rural context.

Farmers are often forced to accept the price quoted by the private commission mandi/traders due to the perishable nature of the produce, a lack of storage facilities, the inaccessibility of markets and other institutions. Also, in the study area, the private commission mandi/traders are major creditors for smallholder farmers in the absence of rural financial institutions. Hence in rural areas, private commission mandi/traders also act as a ready market to the farmers.

Despite the above barriers, the agriculture is bound to adopt and implement ICT, as the Government of India aims to double the agricultural production, and to increase India's share of the global export. This aim can be achieved only when there is proper utilization of ICT and more investment in it. As ICT helps in information dissemination in less time with effective ways of communication, its implications cannot be ignored by the government and its scope and coverage should be extended as a whole rural areas in India.

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