

Extent of Use of Information and Communication Media in Land Preparation - A Case Study of Paddy Cultivation in Thiruvananthapuram district

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Abstract - The present investigation revealed that of the various media in ICT, extension services were more useful to farmers in land preparation of paddy cultivation: soil testing (50.50 %), farm equipment (46.50 %), ploughing (40.00 %) and irrigation (37.00 %). The perception of the usefulness of information by various ICT media in land preparation is high among relatively young, highly educated and among higher landholding farmers while it is not influenced by the geographical regions of Kerala. The perception of the usefulness of various ICT media is positively affected by the status of Impact Accelerating Factors (IAF). Though farmers access various information media for land preparation, they have more inclination towards less information technology content media.

Index Terms - Information and Communication Technology, Land preparation, Paddy

INTRODUCTION

Information and Communication Technology (ICT) includes a number of components viz., computer hardware and software, television, radio, mobile phones, personal computers, kiosks and the policies that run these media and devices (Warren, 2002). It reduces the distance among different communities by providing new approaches and areas for communicating and sharing the information (Herselman, 2003). According to Meera (2004), ICT forms a real source of information and knowledge for people particularly farmers, since it tailors solution for their different problems through the access to agriculture information. ICT also has a leading role in the agriculture development especially in the decision-making aspect of the livelihood assets of farming communities in rural areas (Taragola and Van Lierde, 2010). Thus, significant changes in the rural

community through ICT (Poonam and Singh, 2012) has resulted in an increased production (Arunachalam, 1999; Yadav et al., 2015).

Paddy, the most important food crop grown in Kerala, occupies 7.46 per cent of the total geographical cropped area in the state. There has been a continuous decline in the cultivation areas under paddy of the state which has come down from 8.82 lakh hectares in 1974-75 to 1.96 lakh hectares in 2018-19. There are various farm management practices in crop cultivation where intensive care is required to produce maximum output. These are the areas where information communication had a vital role which is catered by technology kiosks and portals for the cultivation of paddy. Thus, among the various crops, the scope and extent of use of information technology is high for the paddy cultivation. This provides the rationale for a detailed analysis on the application of ICT in paddy cultivation along with various factors which inhibit its extent of use in actual practice by the farming community. In the case of paddy cultivation, different types of information are available right from the stage of land preparation to marketing of paddy. The present analysis explore the extent to which farmers avail and use this information in paddy cultivation, particularly in the land preparation.

RESEARCH DESIGN

Selection of Geographical Area and Sample Size

The district, Thiruvananthapuram is chosen for eliciting information from farmers through primary survey. For sample purpose, one block from each geographical region were selected randomly from the district. The randomly selected Blocks were Chirayinkeezhu, Parassala, and Vamanapuram,

representing low land (or coastal plain), mid land and high land regions respectively. The total numbers of cultivators (as the Census, 2011) are 5966, 2559, and 2229 respectively for Vamanapuram, Parassala and Chirayinkeezhu Blocks. It is found that out of all cultivators, approximately ten per cent of cultivators are engaged in paddy cultivation and hence the total number of paddy cultivators for all selected Blocks is 1075. The sample size from selected Blocks is decided based on precision rule and confidence interval is 200. The proportion of paddy cultivators to total paddy cultivators of Vamanapuram, Parassala and Chirayinkeezhu are 54.50 per cent, 24.50 per cent and 21.00 per cent respectively.

Methodology, Concepts and Tools for Analysis

Land preparation is the initial stage of paddy cultivation. It is a combination of agricultural practices that places the soil in the best physical condition for plant protection and growth. Here the study focuses the extent of use of the information from different ICT media. The important aspects covered in the land preparation are: soil testing, farm equipment, ploughing and irrigation.

For the present study, ICT media which provide information about agricultural practices to farmers are divided into print media, mass media, extension services, mobile, internet and Agri. Portal. These ICT media are combined into less skill required (LSR) media and high skill required (HSR) media. The Less Skill Required to access information media includes the print, mass media and extension services while HSR media consists of mobile, internet and agri. portals. The extent of use of ICT media for land preparation from these ICT media are assessed based on preparing a usefulness score and satisfaction score. The extent of usefulness is measured by five-point Likert scale. The usefulness of media is classified into: not at all useful, less useful, neutral, useful and very useful. Each respondent gets a score for each aspects of land preparation such as soil testing, farm equipment, ploughing and irrigation. Finally, sum total of all scores received for all dimensions are combined together for getting a usefulness score for land preparation of various ICT media. The extent of usefulness of various dissemination media for land preparation based on the socio-economic factors viz., age, education and landholding of sample farmers and geographical features were examined. The influence of Impact Accelerating Factors (IAF) viz., access,

digital literacy, use and possession of various media devices on the perception of the usefulness of various media for land preparation and corresponding scores which represent the status of each IAF were estimated. The important statistical techniques used are ANOVA, F-statistics and t-test in addition to the descriptive statistics.

RESULTS AND DISCUSSION

Extent of use of ICT Media for Land Preparation

The data analysis on extent to which the information provided by various media is useful for the farmers in land preparation (Table 1.) revealed that the information through print media was useful for maximum respondents in soil testing (89.00 %) and farm equipment (41.50 %) while for the ploughing and irrigation, print media was useful for 26.50 and 21.50 per cent of the respondents respectively. In the case of mass media, maximum respondents (42.00 %) got useful information about soil testing, while the information with regards to the farm equipments, ploughing and irrigation was useful to less than 50 per cent of the respondents. A similar trend to that of the print media was observed in the case of mobile, where maximum respondents got useful information for soil testing (42.00 %) and farm equipments (44.50 %). The percentage of respondents who got useful information for land preparation through internet ranges from 15.00 to 25.00 per cent. With regard to the Agriportal, maximum respondents (50.50 %) got useful information about irrigation. Among the information provided through various media, extension services were useful to maximum respondents in soil testing (50.50 %), farm equipments (46.50%), ploughing (40.00 %) and irrigation (37.00 %).

The extent of usefulness of different media on land preparation varies across type of media. As compared to mobile, internet and agri portal, the usefulness of print, mass media and extension services are more for farmers. It also implies that the positive responses on usefulness of internet, mobile and agro portal are very less. Though farmers access various information media for land preparation, they have more inclination towards less skill required media. While studies conducted by Armstrong et al., (2012) on the respondents (farmers and key stakeholders) from Tehsil Ratnagiri district revealed that most of the farmers used TV and mobile phone to collect agricultural related information. It was also noted that

a number of factors influenced the dissemination of ICT in Ratnagiri District which resulted a gap between

the currently used technology and the technology preference.

Table 1. ICT Media and Land Preparation (Distribution of Respondents in Percent)

ICT Media	Options	Land Preparation							
		Soil testing		Farm equipment		Ploughing		Irrigation	
		No. of Respondents	percentage	No. of Respondents	percentage	No. of Respondents	percentage	No. of Respondents	percentage
Print Media	Not at all useful	43.00	21.50	43.00	21.50	43.00	21.50	44.00	22.50
	Not Useful	53.00	26.50	59.00	29.50	80.00	40.00	89.00	44.50
	Neutral	14.00	7.00	15.00	7.50	24.00	12.00	23.00	11.50
	Useful	89.00	44.50	83.00	41.50	53.00	26.50	43.00	21.50
	Very useful	1.00	0.50	0.00	0.00	0.00	0.00	0.00	00
	Total	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00
Mass media	Not at all useful	39.00	19.50	34.00	17.00	35.00	17.50	34.00	17.00
	Not Useful	67.00	33.50	83.00	41.50	90.00	45.00	100.00	50.00
	Neutral	18.00	9.00	21.00	10.50	26.00	13.00	25.00	12.50
	Useful	75.00	37.50	62.00	31.00	49.00	24.50	41.00	20.50
	Very useful	1.00	0.50	0.00	0.00	0.00	0.00	0.00	00
	Total	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00
Extension	Not at all useful	38.00	19.00	35.00	17.50	40.00	20.00	41.00	20.50
	Not Useful	39.00	19.50	51.00	25.50	55.00	27.50	64.00	32.00
	Neutral	19.00	9.50	19.00	9.50	21.00	10.50	19.00	9.50
	Useful	101.00	50.50	93.00	46.50	80.00	40.00	74.00	37.00
	Very useful	3.00	1.50	2.00	1.00	4.00	2.00	2.00	1.00
	TOTAL	200.00	100.00	200.00	100.00	200.00	100.00	200	100.00
Mobile	Not at all useful	39.00	19.50	36.00	18.00	42.00	22.50	44.00	22.00
	Not Useful	55.00	27.50	58.00	29.00	72.00	36.00	80.00	40.00
	Neutral	22.00	11.00	17.00	8.50	21.00	10.50	25.00	12.50
	Useful	84.00	42.00	89.00	44.50	64.00	32.00	51.00	25.50
	Very useful	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00
	TOTAL	200.00	100.0	200.00	100.00	200.00	100.00	200.00	100.00
Internet	Not at all useful	49.00	24.50	49.00	24.50	51.00	25.50	52.00	26.00
	Not Useful	69.00	34.50	75.00	37.50	86.00	43.00	87.00	43.50
	Neutral	32.00	16.00	30.00	15.00	32.00	16.00	31.00	15.50
	Useful	50.00	25.00	46.00	23.00	31.00	15.50	30.00	15.00
	Very useful	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00
	TOTAL	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00
Agri portal	Not at all useful	45.00	22.50	46.00	23.00	51.00	25.50	38.00	19.00
	Not Useful	80.00	40.00	88.00	44.00	86.00	43.00	39.00	19.50
	Neutral	35.00	17.50	39.00	19.50	38.00	19.00	19.00	9.50
	Useful	39.00	19.50	27.00	13.50	25.00	12.50	101.00	50.50
	Very useful	0.00	0.00	0.00	0.00	0.00	0.00	3.00	1.50
	TOTAL	200.00	100.0	200.00	100.00	200.00	100.00	200.00	100.0

Source: Primary Survey

Usefulness Score of ICT Media for Land Preparation and Age

The distribution of respondents based on their usefulness score for land preparation by the

socioeconomic factor, age group is shown in Table 2.

Among the various aspects of land preparation, the usefulness of information provided by various media is high for soil testing and farm equipment as

compared to other dimensions. A close association exists between the age of respondents and perception of usefulness evinced by farmers for land preparation. As the age increases, the perception of usefulness of information provided by various media decreases. The respondents belonging in low age group have a very high perception on the usefulness of ICT media for

land preparation. The evaluations of differences in usefulness score among various age groups for various dimensions of land preparation revealed that there was significant difference on usefulness score of respondents belonging in different age for all aspects of land preparation.

Table: 2 Distribution of Usefulness Score of ICT Media for Land Preparation by Age (in %)

Classification of Age	Land Preparation				Aggregate Usefulness score for land preparation
	Usefulness score on Soil testing	Usefulness score Farm equipment	Usefulness score Ploughing	Usefulness score Irrigation	
Below 45 years	19.38	19.72	18.00	17.28	74.38
46-55 years	18.42	17.76	16.40	15.95	68.53
56-65 years	15.62	15.31	14.31	13.77	59.01
above 65 years	9.24	9.20	9.45	9.06	36.14
Average	15.95	15.64	14.70	14.13	60.19
Test statistics	F=33.325 df =3and 196 Sig =0.000	F=35.325 df =3and 196 Sig =0.000	F=22.653 df =3 and 196 Sig =0.000	F=22.132 df =3and 196 Sig =0.000	F=32.326 df =3 and 196 Sig =0.000

Source: Primary Survey

Usefulness score of ICT media in Land Preparation and Education

Table 3. shows the extent of usefulness of ICT media for land preparation among various education groups. The general trend is that as the education level improves the perception of usefulness of ICT media

for land preparation improves among farmers. The trend of usefulness score and education status is almost same for all aspects of land preparation. The usefulness score varies across various education group and these differences are statistically significant as evident from the significant value of F-statistics.

Table: 3 Distribution of Usefulness Score of ICT Media in Land Preparation by Education

Education	Land Preparation				Aggregate Usefulness score for land preparation
	Usefulness score on Soil testing	Usefulness score Farm equipment	Usefulness score on Soil testing	Usefulness score Farm equipment	
Read and write	9.13	8.73	8.47	8.53	34.87
Primary Level	10.92	11.12	11.17	10.58	42.50
Upper primary	11.78	12.04	11.83	11.22	46.87
High school	16.29	15.71	14.49	13.89	60.38
Higher Secondary	17.04	16.64	15.76	15.44	64.88
Degree/diploma	21.41	20.81	18.63	17.94	78.78
Professional Degree/PG	22.25	22.43	21.25	20.63	86.56
Average	15.95	15.64	14.70	14.13	60.19
Test statistics	F=32284 df =6and 193 Sig =0.000	F=32.188 df =6and 193 Sig =0.000	F=22.914 df =6and 193 Sig =0.000	F=20.820 df =6and 193 Sig =0.000	F=30.154 df =6and 193 Sig =0.000

Source: Primary Survey

Usefulness score of ICT media in Land Preparation and Landholding

The extent of the perception on usefulness of information media on land preparation is also influenced by the economic status of farmers, land

holding size. Table 4. highlights relationship between perception on usefulness of ICT Media for land preparation and land holding size. In general, there is a positive relationship between the perception of usefulness of various media and size of land holding

by farmers. As the land holding size increases, the farmers view on usefulness of information media also increases. Significant differences was recorded in

perception of usefulness of various media on land preparation among various landholding groups.

Table: 4 Distribution Usefulness Score of ICT Media in Land Preparation by Landholdings

Classification of landholding under paddy (cents)	Land Preparation				Aggregate usefulness for land preparation
	Soil testing usefulness score	Farm equipment usefulness score	Ploughing usefulness score	Irrigation usefulness score	
Below 100	11.60	11.63	10.78	10.30	43.53
100 and 160	17.07	16.91	16.01	15.38	65.37
160 and 240	15.90	15.68	14.49	13.73	59.80
Above 240	18.21	17.40	16.35	16.15	68.10
Average	15.95	15.64	14.70	14.13	60.19
Values	F =13.201 df = 3and 196 Sig.0.000	F =11.539 df = 3and 196 Sig.0.000	F =12.452 df = 3 and 196 Sig.0.000	F =13.264 df = 3and 196 Sig.0.000	F =14.532 df = 3and 196 Sig.0.000

Source: Primary Survey

Usefulness score of ICT Media in Land Preparation and Block

The geographical features also influence the perception on usefulness various media in agriculture practices. Table 5. shows the perception of usefulness of various media on different aspects of land preparation in selected sample Blocks.

The usefulness score of various aspects of land preparation and the aggregate score of respondents belonging in Parassala Block is highest as compared to other selected Blocks. There are differences in perception of usefulness of various media in different Blocks. However, these differences between Blocks are not statistically significant.

Table: 5 Distribution of Use Score of ICT Media in Land Preparation by Blocks

Block	Land Preparation				Aggregate extent of use score for land preparation
	Soil testing extent of use score	Farm equipment extent of use score	Ploughing extent of use score	Irrigation extent of use score	
Parassala	17.04	16.90	15.20	14.59	63.73
Vamanapuram	15.82	15.46	14.82	14.12	59.81
Chirayinkeezhu	15.00	14.64	13.79	13.62	57.05
Average	15.94	15.64	14.70	14.13	60.19
Test statistics	F = 1.950 df = 2 and 197 Sig.o.235	F=1.950 df =2 and197 Sig=o,145	F=0.887 df = 2 and197 Sig= 0.414	F = .382 df = 2 and197 Sig=0.683	F =1.132 df = 2 and197 Sig = .325

Source: Primary Survey

Field survey conducted by Mehta (2013) to explore the socioeconomic impact of mobile phone usage in rural areas of the two Indian States (Punjab and Bihar) revealed that mobile phones have reduced the cost of accessing information and has helped to gather timely information related with agricultural and non-agricultural purposes.

Thus, the above analysis reveals that the perception of usefulness of various media on land preparation is highly influenced by the changes in education, age and

land holding size. However, the perception on usefulness of various media is not influenced by geographical regions of Kerala.

Usefulness Score of ICT Media for Land Preparation and IAF

Respondent’s awareness, digital literacy, use and possession of various ICT media devices are represented by the respective scores as mentioned earlier. These scores are divided into two groups:

below average and above average group. The perception on usefulness of various ICT media on land preparation for respondents belonging to these two groups is given in Table 6. The extent of usefulness of ICT media for various dimensions of land preparation such as soil testing, selection of farm equipment, ploughing and irrigation are greater among those respondents belonging in the above average group. It

implies that perception of usefulness of ICT media on land preparation increases with increase in awareness, digital literacy, use of devices and possession of these devices. Also, the extent of usefulness as expressed by respondent belonging to these two groups is significantly different.

Table: 6 Distributions of the Usefulness Score of ICT Media in Land Preparation Between Different Levels of IAF

IAF	Classification of IAF	Land Preparation				Aggregate Usefulness score for land preparation
		Usefulness score on Soil testing	Usefulness score Farm equipment	Usefulness score on Soil testing	Usefulness score Farm equipment	
Classification of Awareness score	Below average group	11.45	11.07	11.04	10.61	43.72
	Above average group	18.67	18.38	16.83	16.24	70.07
	Difference	7.22	7.31	5.79	5.63	26.35
	Test statistics	F =109.789 df = 1and 198 Sig.= 0.000	F =130.083 df = 1and 198 Sig.= 0.000	F =77.504 df = 1and 198 Sig.= 0.000	F =72.364 df = 1and 198 Sig.=0.000	Sig. F =1.950 df = 1and 198 Sig.= 0.000
Classification of Use score	Below average group	12.51	12.37	11.77	11.25	47.58
	Above average group	20.37	19.89	18.44	17.88	76.56
	Difference	7.86	7.52	6.67	6.63	28.98
	Test statistics	F =162.398 df = 1and 198 Sig.= 0.000	F =154.538 df = 1and 198 Sig.= 0.000	F =129.570 df = 1and 198 Sig.= 0.000	F =126.163 df = 1and 198 Sig.= 0.000	F =160.740 df = 1and 198 Sig.= 0.000
Classification of Digital Literacy score	Below average group	13.14	12.88	12.36	11.87	49.95
	Above average group	20.90	20.56	18.79	18.15	78.40
	Difference	7.76	7.68	6.43	6.28	28.45
	Test statistics	F =139.457 df = 1and 198 Sig.= 0.000	F =149.019 df = 1and 198 Sig.= 0.000	F =104.536 df = 1and 198 Sig.= 0.000	F =96.795 df = 1and 198 Sig.= 0.000	F =134.802 df = 1and 198 Sig.= 0.000
Classification of possession score	Below average group	13.04	12.89	12.41	11.91	49.96
	Above average group	20.76	20.21	18.44	17.82	77.24
	Difference	7.72	7.32	6.03	5.91	27.28
	Test statistics	F =140.951 df = 1and 198 Sig.= 0.000	F =130.083 df = 1and 198 Sig.= 0.000	F =88.118 df = 1and 198 Sig.= 0.000	F =83.152 df = 1and 198 Sig.= 0.000	F =120.660 df = 1and 198 Sig.= 0.000

Source: Primary Survey

Use Score of ICT Media for Land Preparation between LSR and HSR Media

As defined earlier, ICT media are categorized into less skill required media (LSRM) and high skill required media (HSRM) to access agricultural information. Table 7. shows the variation in the extent of use score

of respondents differentiated by LSRM and HSRM, where the use score of respondents is higher for LSRM than the HSRM. It implies that farmers are more inclined towards using less skill required technology media for getting information about land preparation. The skill level of farmers in accessing information

from various media greatly influence the extent of use media derived from these media. The extent of use as represented by respective score is significantly different between LSRM and HSRM; these findings imply that the existing skill levels of farmers are not in tune with the available media through which farming information are provided.

Table: 7 Aggregate Extent of use of LSRM and HSRM for Land Preparation

Category	Types of media	Mean score	Dependent t-test
Aggregate extent of use score	LSR media	31.47	t-value= 5.40 df = 199 Sig =0 .000
	HSR media	28.81	

Source: Primary Survey

CONCLUSION

The foregoing analysis explored the impact of various Information and communication technology media on the life and living conditions of farmers in the study area. The intrusion of ICT into the land preparation for paddy cultivation is greatly influenced by their status on impact accelerating factors such as awareness, digital literacy, use and possession of media devices. Distributions of these factors are not skewed among various socio-economic groups. Though a large proportion of farmers use this information provided by various media, the issue on asymmetry in the use of these information media is still an unaddressed issue. Farming community is yet to tap the potential of high skill required media in their agriculture practices. The interaction of farming community with those organized institutions which are entitled to provide farming related information is yet to take off. The extent of use of these ICT for the agricultural practices cannot be ensured unless the access of information media is guaranteed.

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