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Impact of Information and Communication Technology Media on the Dissemination of Weather Information to the Farmers

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ABSTRACT
Studies on the influence of Information and Communication Technology (ICT) media revealed that only 16.50 per cent of the respondents are receiving weather information regularly about cultivation aspects of paddy. Mobile, print and mass media played a major role in getting the information while internet and Agri-portal facilities were not much benefitted to farmers in the information dissemination. In general, as the education status improves, the perception on usefulness of respondents also improves. A positive relationship was found existing between the landholding size and weather information provided by various media. The perception on extent of usefulness of this information also varies across the selected Blocks with the high-level usefulness score recorded from the Parassala Block. The usefulness score and satisfaction score on the weather information from media is higher from LSR media and hence the farmers are more inclined towards LSR media as compared to HSR media.

KEY WORDS: Information and communication technology, media, weather, HSR, LSR, farmer, paddy

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I. INTRODUCTION

Accurate weather information not only helps farmers to protect their crops but they can get significant leverage in crop production. Access to weather information is very poor in developing countries and they are highly vulnerable to climate change (GOI. 2018, USAD, 2019). Increasing weather change cause serious distress to farm communities around the world (Falco *et al.* 2018; Knox *et al*. 2012). Agricultural production is significantly crushed due to different changes in the weather conditions (Aggarwal *et al*. 2018). However, farmers have a variety of customized information sources and decision tools that are available through public, private and farmers associations. The information received in a timely manner would help farmers in improving the agricultural decision-making (Singh and Meena 2012; sheik *et al.* 2011; Jones *et al*., 2000; Bruno Soares *et al*., 2018). But certain challenges are prevailing in the availability of information (Austen *et al*., 2002), which will suspiciously affect the poor farmers especially smallholders (Mondal *et al*., 2015). Information and Communication technology serve as a crucial factor for the dissemination of weather information to the population engaged in agriculture. Studies have revealed that majority of the farmers have limited access, usage, knowledge and capacity for ICT-led extension services (Chowhan *et al*., 2020). Thus, Information and Communication Technology has an incredible chance to improve agricultural productivity (World Bank, 2017). Moreover, the farmers also have several restrictions in accessing ICT facilities which leads to insufficient information services and information quality for agricultural decision-making. This paper analyses the usefulness of Information and Communication Technology (ICT) media in disseminating weather information to the selected paddy farmers in Kerala including the socio-economic frame work.

METHODOLOGY, CONCEPTS AND TOOLS FOR ANALYSIS

The primary data are collected from the selected field with structured interview schedule. The district Thiruvananthapuram is chosen for eliciting information from farmers through primary survey. The impact of ICT on rural development is examined as case study of its impact on farming community. Among the various farming community, farmers engaged in paddy cultivation is taken for sample survey.

The respondents were selected from three geographical regions - highlands, midlands and lowlands. One block from each geographical region are selected randomly. The randomly selected Blocks are Chirayinkeezhu, Parassala, and Vamanapuram, representing low land (or coastal plain), mid land and high land regions respectively. The total numbers of cultivators (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. The formula used for selecting sample size is as follows.

$$n = \frac{z^2.p.q.N}{e^2(N-1) + z^2.p.q}$$

Here, 'p' represents the proportion of variability, q = (1-p). The value of 'z' represents the standardized normal value for the given level of confidence interval, 'e' is the percentage of expected error and N is equal to the total number of populations. Here, the value of 'p' is assumed as ten per cent, Z is 1.96 which is equal to the standardized value for 95 per cent confidence interval and 'e' or percentage error which is assumed to be 4 per cent. Thus, the arrived sample size is 179 and while considering the non-response on the part of the respondents, a total sample size of 200 is decided.

For the present study, ICT media which provide information to farmers about weather are divided into Less Skill Required (LSR) media and High Skill Required (HSR) media. The LSR media includes the print, mass media and extension services in agriculture while HSR media consists of mobile, internet and agri. portals. The media wise percentage distribution of respondents were estimated. The extent of use of ICT media for weather information in farm practices and the satisfaction from these ICT media are assessed based on preparing a usefulness score and satisfaction score. The usefulness score of this information and its status among various socioeconomic factors *viz*., age, education and land holding size groups are assessed. Certain factors are identified as Impact Accelerating Factors (IAF) for the extent of use of these ICT dissemination media. The important impact accelerating factors (IAF) are the access, digital literacy, use and possession of various media devices; the corresponding scores which represent the status of each IAF were also estimated. The important statistical techniques used for the data analysis are F-statistics and t-test.

II. RESULTS AND DISCUSSION

Media wise distribution of respondents on weather information

The influence of media on the dissemination of information about weather to the farmers is represented in Table 1. Only 16.50 per cent of the total respondents (200 Nos.) are receiving weather information about cultivation aspects regularly. It was found that print media, mass media and mobile played a major role in getting the information. Maximum respondents got information about weather through print media (23.50 %) followed by mobile (23.00 %) and mass media (21.00 %). While the internet and Agri-portal facilities were not found much benefitted to farmers in the information dissemination when compared to other media. Studies conducted by Gangopadhyay *et al*., (2019) at 12 hotspot districts in five states (Bihar, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh) of India revealed that the television and cell phone are the major resources of weather and agro-advisory services. They also reported that in many hotspot districts, farmer's current access to ICT-based weather information and agro-advisory services were low.

Table: 1 Percentage Distribution of Respondents on Availability of Weather by ICT Media

ICT Media	Availability	Weather
Print media	No	76.50
	Yes	23.50
	Total	100.00
Mass media	No	79.00
	Yes	21.00
	Total	100.00
Extension	No	83.50
	Yes	16.50
	Total	100.00
Mobile	No	77.00
	Yes	23.00
	Total	100.00
Internet	No	89.50
	Yes	10.50
	Total	100.00
Agri. portal	No	96.00
	Yes	4.00

	Total	100.00
ICT Media	No	83.50
	Yes	16.50
	Total	100.00

Source: *Primary Survey*

ICT Media and Extent of Usefulness on Weather

The socio-economic characteristics of farmers greatly influence the perception of usefulness of information provided by various media. It is seen that the age and perception of usefulness of information from media are negatively related. The perception of utility of these information is high among lower age groups as compared to higher age group. This is in accordance with the report by Jane and Hundal (2007) in India where they reported that majority of the phone users are within the age group of 20 to 40. Significant difference in perception of usefulness on weather information was recorded among different age groups (Table. 2).

With respect to education, the perception of usefulness of this information has a positive relation. In general, as the education status improves, the perception on usefulness of respondents also improves. The difference in usefulness score between different education groups for weather information are found statistically significant. Aldosari *et al.* (2017) also reported that lack of education and awareness hinders successful utilization of farm advisory services. Study reveals that the young and educated respondents utilizes the ICT media like mobile to the maximum extent. If these young and educated farmers help in better dissemination of information to other farmers who are not aware of new technology, this will lead to the symmetric distribution of information which in turn leads to the increased agricultural production.

In the case of landholding size also, a general positive significant relationship exists with the given information provided by various media. However, the relationship between landholding size and perception on the extent of usefulness is not linear.

The perception on extent of useful of this information also varies across the selected Blocks. Among the selected Blocks, the high level usefulness score is recorded for respondents belonging to Parassala Block. However, difference in perception on usefulness of information between selected Blocks is not significant. It implies that farmers do not find any difference in usefulness of weather provided by media in these regions.

Table: 2 Distributions of Usefulness Score of Weather Information by the Socio-economic Condition

Category	**Distribution of category**	**weather information Extent use score**
Age	Up to 45 years	15.72
	46-55 years	14.82
	56-65 years	13.70
	above 65 years	9.11
	Average	13.54
	Test statistics	F=15.672, df=3and 196 Sig=0.000
Education	Read and Write	8.33
	Primary Level	11.23
	Upper Primary	12.00
	High School	12.98
	Higher Secondary	15.24
	Degree/Diploma	16.34
	Professional Degree / PG	18.31
	Average	13.54
	Test statistics	F=12058, df=6and 193 Sig=0.000
Landholdings (Cents)	Below 100	10.5349
	100 and 160	14.85
	160 and 240	14.00
	Above 240	13.98
	Average	13.54

Block	**Test statistics**	F=8.005, df=3and 196 Sig=0.000
	Parassala	14.45
	Vamanapuram	13.11
	Chirayinkeezhu	13.59
	Average	13.54
	Test statistics	F=1.264, df=2 and 197 Sig=0.285

Source: *Primary Survey*

ICT Media and Satisfaction Level of Weather

Table 3. shows the level at which the farmers are satisfied with the different media in information dissemination about the weather details. It is seen that compared to other media, maximum number of farmers are satisfied with print and mass media for the provision of information on weather. Farmers are less satisfied with the other media such as internet and Agri-portal in getting this information. Satisfaction of farmers depend upon the agricultural output. Eventhough some of the farmers are using High Skill Required (HSR) Media, as they could not perceive the information to the fullest extent, it will be difficult to measure the level of satisfaction of farmers from such type of media.

Table: 3 Percentage Distribution of Respondents of the Level of Satisfaction of ICT Media by Weather Information

Media	**ICT Media**	**Level of Satisfaction of weather information**					
		Not at all satisfied	**Not satisfied**	**Neutral**	**Satisfied**	**Very satisfied**	**Total**
LSR Media	Print media	20.50	42.50	10.00	27.00	0.00	100.00
	Mass media	22.50	48.50	14.00	14.00	1.00	100.00
	Extension	19.50	45.50	13.00	21.00	1.00	100.00
HSR Media	Mobile	21.50	44.50	20.00	13.50	0.50	100.00
	internet	21.50	53.00	19.00	6.00	0.50	100.00
	Agri. Portals	22.00	50.50	20.50	5.50	1.50	100.00

Source: *Primary Survey*

Information on Weather and IAF

The influence of Impact Accelerating Factors (IAF) such as awareness, digital literacy, use and possession status of respondents in the perception of usefulness of weather information provided by various media are examined in Table 4. It shows that the perception on usefulness of weather information are positively affected by these Impact Accelerating Factors. As the improvement in awareness, digital literacy, use and possession score of media devices increases, the perception of farmers on usefulness of this information in their farming activities increases. It implies that only with the improvement of these accelerating factors, the ability of people to understand the usefulness of this information in their activities increases. Also the difference in usefulness score of information on weather between respondents of different groups of awareness, digital literacy, use and possession status, is significantly different. The extent of usefulness score among those people having higher digital literacy status is greater which implies that digital literacy is relatively more influencing factor compared to others.

Table:4 Distribution of Extent of Use Score of Weather information by the IAF

IAF	**Classification of IAF**	**Weather information Extent of use score**
Classification of Awareness Score	Below average group	10.79
	Above average group	15.19
	Average	13.54
	Test statistics	F=46.351, df=1and 198 Sig=0.000
Classification of use Score	Below average group	11.91
	Above average group	15.65

	Average	13.54
	Test statistics	F=33.214, df=1and 198 Sig=0.000
Classification of digital literacy Score	Below average group	12.02
	Above average group	16.25
	Average	13.54
	Test statistics	F=41.212, df=1and 198 Sig=0.000
Classification of possession Score	Below average group	12.01
	Above average group	16.09
	Average	13.54
	Test statistics	F=38.597, df=1and 198 Sig=0.000

Source: *Primary Survey*

Information on Weather and Type of Media

The impact of less skill required (LSR) media and high skill required (HSR) media on the perception on usefulness of weather is given in Table 5. The usefulness score and satisfaction score on the above-mentioned information from media is higher from LSR media as compared to HSR media. The average value of useful score and satisfaction score between LSR and HSR media on weather is significantly different and independent. The perception on usefulness and satisfaction on this information are significantly influenced by the chosen media. The existing sample respondents are more inclined towards LSR media as compared to HSR media.

Table: 5 Aggregate Extents of Usefulness and Satisfaction Score of LSR and HSR Media on Weather

Information	**Category**	**Types of media**	**Mean score**	**Dependent t-test**
weather	Aggregate usefulness score of weather information	LSR media	0.61	t- value= 4.47 Df= 199 Sig =0 .000
		HSR media	0.37	
	Aggregate satisfaction score of weather information	LSR media	7.35	t- value= 5.11 Df= 199 Sig =0 .000
		HSR media	6.50	
		HSR media	6.70	

Source: *Primary Survey*

III. CONCLUSION

It is seen that compared to other media, maximum number of farmers are satisfied with print and mass media for the provision of information on weather. In general, the young and educated respondents have more perception on usefulness of weather information. The farmers do not find any difference in usefulness of weather provided by media among the blocks. As the improvement in awareness, digital literacy, use and possession score of media devices increases, the perception of farmers on usefulness of this information in their farming activities increases. The usefulness score and satisfaction score on the above-mentioned information from media is significantly high from LSR media as compared to HSR media.

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