Impact of Mobile Phone Based Services on Rice Crop Management

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ABSTRACT

The present study was conducted in Bundi district of Rajasthan to study the impact of Mobile phone services on rice crop management. In this study the impact of mobile phone services on agriculture is concluded as significant difference between knowledge of mobile phone users and non-users about all management practices related to rice crop, means mobile phone users had high knowledge about rice crop management, High average yield, less average loss by insect pests and diseases and low cost of acquisition of information for mobile phone users than mobile phone non-users.

Key words: *ICT; Mobile phone technology; Mobile phone users; Mobile phone non-users;*

In 21st century agriculture continues to be the key sector to provide foundation for sustainability of millions of Indian farmers' families. For development of agriculture it is require to transfer up-to-date, latest and appropriate agricultural technology to the farmers, for that reformation of agricultural extension system is necessary, in present which is under-funded, highly compartmentalized and has several inherent weaknesses. The use of ICT (Information and Communication Technology) is the only way to bypass several stages and sequences in the process of agricultural development. Mobile phone that is a tool of ICT is widely recognized as a potentially transformative technology platform for developing nations. Nowadays mobile phone technology has provided producers with information and knowledge of correct market price, quantities, availability of a particular product and technical advice (*Mittal, et al 2009*). Access to appropriate knowledge and information is an overriding factor for successful natural resource management (NRM) planning, implementation and evaluation processes and it is known to be one of the most important determinants of agricultural productivity (*Masuki, 2010*). Mobile phones have provided new approach to farmers to market related decisions much more easily than before. By getting innovative information, the farmers' community initiated a powerful social discourse and dialogue to evaluate the applicability and relevance of the new information by use of mobile phone and other technology (*Chhachhar, 2013*). Mobile phone emerging as very important tool for development of agricultural extension, agriculture, rural livelihood upliftment, poverty reduction, health improvement, education improvement and disasters management (*Ahmed, R.T.* and *Laurent, E. 2009*).

METHODOLOGY

The present study was conducted in Bundi district of Rajasthan purposively. Bundi district consists five tehsils, out of these; two tehsils Hindoli and Nainwa were selected. From each selected tehsil, two gram panchayats and two villages from each of gram panchayats were selected by simple random sampling technique. For the study a sample of 120 respondents (80 mobile phone user and 40 mobile phone non-user respondents) was selected. The impact of mobile phone services was worked out by comparing the knowledge level of mobile phone users and non-users about rice crop management on the average basis.To measure the knowledge level of all respondents, the knowledge test developed by *Chaturvedi (2000)* was adopted with slight modification. The responses obtained from the

respondents were counted and converted into mean per cent score. The knowledge index for each respondent was calculated by using following formula.

$$KI = \frac{K}{P} \times 100$$

KI = Knowledge index
K = Knowledge score obtained
P = Possible maximum score

Mean and S.D. (standard deviation) value of all the respondents' knowledge score were computed and difference between the mean and S.D. of knowledge score of mobile phone services user and non-user were used for calculating Z-value.

The Z-values of knowledge level about all rice crop production practices were calculated for measuring the impact of mobile phone services on rice crop production. Z-values for knowledge level were calculated by following formula-

$$z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

n_1 and n_2 = Number of samples
$\sigma_1$and σ_2= Standard deviation (S.D.)
$\bar{x}_1$ and$_2$= Mean of samples

Finally the impact of mobile phone services on rice crop management was calculated by making comparison between mobile phone services users and non-users on the basis of knowledge level about rice crop management, yield of rice crop, loss in rice crop production due to pest and diseases and cost of acquisition of information of rice crop management.

RESULT AND DISCUSSION

The data in Table 1 reveal that 33.75 per cent user and 17.5 per cent non-user respondents possessed high level of knowledge, 46.25 per cent user and 52.50 per cent non-user respondents possessed medium level of knowledge and 20 per cent user and 30 per cent non-user respondents possessed low level of knowledge about rice crop management in the study area.

On the basis of above data it could be inferred that majority of the mobile phone users and non-users possessed medium level of knowledge regarding rice crop management, results are supported by research of *Verma, et al.(2013)*.

Table 1. Distribution of respondents according to their level of knowledge about rice crop management

Level of knowledge	Mobile phone service users	non-users
High	33.75 %	17.50 %
Medium	46.25 %	52.50 %
Low	20 %	30 %
Total	100	100

Mobile phone services users $\bar{x}$ = 39.60,
Non-users $\bar{x}$ = 27.95, σ_1= 11.06, σ_2= 4.60

Furthermore, the knowledge about rice crop management was also compared separately. The relative knowledge of mobile phone users and non-uses about all the eleven practices of rice crop management was highlighted by ranking their knowledge level on the basis of mean per cent scores (MPS) of knowledge about each practice and data has been presented in Table 2.

Table 2. Significance of difference of knowledge of mobile phone service users and non-user respondents about rice crop management practices

Crop management practices	Mobile phone service users		non-users	
	MPS	Rank	MPS	Rank
Field preparation	61.79	VII	49.64	VI
HYV selection	79.75	II	62	III
Seed treatment	60.00	VIII	25	VIII
Sowing and Transplanting	76.50	III	66.50	I
Nutrient management	54.13	IX	42	VII
Irrigation management	20.21	XI	17.50	IX
Weed management	75.63	IV	53.75	IV
Plant protection measures	85.00	I	64.38	II
Harvesting and Storage	67.92	VI	51.67	V
Marketing activities	70.00	V	11.25	XI
Miscellaneous	24.82	X	13.57	X
Average	61.43		41.57	

The data in Table 2 reveal that mobile phone users possess maximum knowledge about plant protection measures with MPS 85.00 that ranked first. This means majority of respondents had complete idea about major pests like plant hoppers, thrips, jassids and diseases like leaf blast, neck blast etc. of rice crop and they had good awareness about methods and popular chemicals used for control of those pests and diseases. Knowledge about plant protection measures of mobile phone non-users ranked second with MPS 64.38 that showed that the mobile phone non-users had less knowledge and awareness about the plant protection measures than the mobile phone users. The knowledge about HYV of rice crop of mobile phone users ranked second with MPS

79.75 that means majority of mobile phone users knew about selection and benefits of HYV, while knowledge of mobile phone non-users about HYV ranked third with MPS 62 that showed that non-users had less knowledge about benefits and selection of HYV. Regarding knowledge about seed sowing and transplanting practices, it was observed that mobile phone users possessed 76.50 MPS which means they had knowledge about right time of sowing, age of seedlings for transplanting, spacing, depth of sowing etc. and ranked third, while mobile phone non-users scored 66.50 MPS and ranked first. The Knowledge about weed management of mobile phone users ranked fourth with MPS 75.63 that means majority of mobile phone users knew the names and using method of herbicides, the knowledge of mobile phone non-users also ranked fourth, but 53.75 MPS showed that non-users had less knowledge about herbicides and they depended on traditional methods of weed control i.e. weeding by hands and simple implements. Regarding knowledge about marketing activities related to rice crop of mobile phone users they had high knowledge than non-users with MPS 70 and rank fifth, MPS 11.25 and rank eleventh, respectively. That shows that mobile phone users had more knowledge about marketing channel for rice crop produce, minimum selling price (MSP) of Govt., market price of rice crop produce etc., the results are supported by the conclusion of *Aker (2008)* that cell phone make user known about price and availability in different market that increase users knowledge about marketing aspects. In case of harvest and storage, mobile phone users had more knowledge about methods and precautions during harvesting, post-harvest activities (milling) of rice crop product, method of storage and storage facilities provided by Govt. or Private sector etc. with MPS 67.92 and ranked sixth. For knowledge about harvest and storage, mobile phone non-users possessed MPS 51.67 and ranked fifth. Regarding knowledge about field preparation for rice crop production, mobile phone users possessed more knowledge than the non-users with MPS 61.79 and 49.64, respectively. That shows that users had more knowledge about area required for nursery, seed rate, soil and water testing, collection of soil and water sample, soil treatment, etc. Regarding knowledge about seed treatment, mobile phone users and non-users possessed MPS 60 and 25 respectively and both ranked eighth, the data of MPS showed that the mobile phone users had more knowledge than non-users about importance of seed treatment, methods and chemicals used for seed treatment. The knowledge of mobile phone users and non-users regarding nutrient management was poor than other practices with 54.13 and 42.00 MPS, rank ninth and seventh, respectively. The data revealed that majority of farmers did not know about recommended dose of fertilizers for the rice crop, they tried to use more and more fertilizers as far as possible. Mobile phone services users knew about use of micro nutrient, and organic manure more than non-users. The knowledge about miscellaneous information related to rice crop management like contract farming, crop insurance, programmes and subsidies from the Govt., meteorological information and information about epidemics and foreign pest etc., the mobile phone services users had more knowledge about miscellaneous information than non-users with MPS 24.82 and 13.57, respectively and both ranked tenth. The data in the Table indicated that the knowledge of cell phone users and non-users about irrigation management was 20.21 and 17.5 MPS, respectively. It was also observed that mobile phone users had some idea about the critical stages of irrigation in the rice crop; while non-users had no idea about the same. Thus from the above discussion, It could be concluded that the mobile phone user respondents had more knowledge than non-users of mobile phone about rice crop management because mobile phone users had more contacts with agriculture scientists and other advanced farmers through mobile phone.

Aspect wise comparison of knowledge among respondents: In addition to the comparison of crop management practice wise knowledge of respondents, it was also felt necessary to find out the difference in the knowledge of mobile phone user and non-user respondents by applying 'Z' test.

The calculated 'Z' value was found to be greater than tabulated value at 1 per cent level of significance in all eleven rice crop management practices. This calls for rejection of null hypothesis and acceptance of alternative hypothesis. Thus it leads to the conclusion that there was significant difference between knowledge level of mobile phone users and non-users about all eleven rice crop management practices.

The mean value further indicates that mobile phone users had higher knowledge mean than non-users in all rice crop management practices.

The Table 4 indicated that mobile phone users had more average yield of rice crop than non-users i.e. 37.45

Table 3. Significance of difference between knowledge of mobile phone service user and non-user respondents about rice crop management

Crop management practices	Mobile phone service users		non-users		Z-value
	Mean	S.D.	Mean	S.D	
Field preparation	4.33	2.33	1.74	0.85	8.84**
HYV selection	3.99	0.92	1.55	0.59	17.57**
Seed treatment	2.40	0.74	1	0.96	8.10**
Sowing and Transplanting	3.83	0.98	3.33	0.53	3.62**
Nutrient	5.41	1.17	4.20	0.65	7.27**
Irrigation	1.21	0.41	1.05	0.22	2.78**
Weed	3.03	0.90	2.15	1.18	4.15**
Plant protection	6.8	1.28	5.15	1.70	5.42**
Harvesting and Storage	4.08	1.37	3.10	0.38	5.96**
Marketing activities	2.80	0.97	0.45	0.55	16.91**
Miscellaneous	1.78	0.88	0.95	0.45	6.84**

** Significant at 1 percent level of significance

quintals per hectare and 31.30 quintal per hectare, respectively. The table showed that mobile phone users had less average loss by pests and diseases in rice crop than non-users. Furthermore the information acquisition cost (in terms of money and time) of mobile phone users was less than the non-users and the results are in line with the results of *Adhiguru, et al. (2012)*.

CONCLUSION

It was found that 33.75 per cent user and 17.5 per cent non-user respondents possessed high level of knowledge, 46.25 per cent user and 52.50 per cent non-user respondents possessed medium level of knowledge and 20 per cent user and 30 per cent non-user respondents possessed low level of knowledge. The impact of mobile phone services on each of eleven rice crop management practices was observed that majority of mobile phone users possess maximum knowledge about plant protection measures with mean percent score 85.00 that ranked first whereas knowledge of non-users about plant protection measures is ranked second with MPS 64.38 as an impact of mobile phone services. It was also found that there was significant difference in knowledge about all crop management practices of mobile phone users and non-users means mobile phone users had high knowledge about all crop management practices than non-users. So it is concluded that mobile phone based agriculture advisory service has positive impact on rice crop management.

Table 4. Comparison of various components of rice crop management between mobile phone service users and non-user respondents

Components of rice crop management	Mobile phone service users	non-users
Average loss by insect pests (qt./h)	2.4	3.9
Average loss by diseases (qt./h)	2.1	3.4
Average yield (qt./h)	37.45	31.30
Cost of acquisition of information (in terms of money and time)	Low	High

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