Stage-Wise Use of Mass Media in Adoption of BRRI Dhan28 by Farmers of Munshiganj District in Bangladesh

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Abstract

Mass Media Channels (MMCs) play a significant role in technology diffusion. A major part of technology diffusion is innovation-decision, which consists of some stages. Researchers of transfer of technology have so far conducted studies only on effectiveness of MMCs. Use of MMCs at different stages of innovation–decision process was not focused in-depth. The researchers of the present study undertook research highlighting the objectives of determining and describing the stage-wise use of mass media by the farmers in adoption of BRRI dhan28 and exploring the relationship between stage-wise use of MMCs and their selected characteristics. Data were collected from 90 farmers of five villages of Gazaria Upazila under Munshiganj district of Bangladesh, by using a structured interview schedule. The results demonstrated that 95.5 per cent of the respondent farmers had low to medium use of MMCs, 83.30 per cent had medium to high use, 71.10 per cent had low use, 62.20 per cent had medium and 72.20 per cent had low use of MMCs at knowledge, persuasion, decision, implementation and confirmation stages of innovation-decision process, respectively. Television was found to be highly used in every stage of innovation-decision process followed by radio, leaflet, poster and newspaper. The findings also revealed that age, family size, farm size and annual income of the farmers had significant positive relationship with their use of MMCs at different stages of innovation-decision process. On the other hand, education, organizational participation, cosmopoliteness, innovativeness, attitude towards innovation and problems in using innovation had significant negative relationship. Conclusion could be drawn that in transfer of technology, diffusion agencies should have a clear understanding about 'preferences of stage-wise use of mass media channels of farmers at various stages of innovation-decision process emphasizing on socio-economic characteristics.'

Key words: Use of mass media, innovation-knowledge stage, persuasion stage, decision stage, implementation stage, confirmation stage.

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Introduction

A number of agricultural research organizations have their involvement in technology generation in Bangladesh. Among them the Bangladesh Rice Research Institute (BRRI) is the dominant one. Research institutes develop technologies for the farmers - the ultimate users; unless they use them properly the objectives of technology generation will go in vain. So, the technologies developed by the research institutes must be diffused among the ultimate users. Diffusion of innovation is deployed through innovation-decision process (IDP) which consists of five stages. Rogers (1983) defined IDP as "the process through which an individual (or a decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision." Research institutes seek diffusion agencies to take their technologies to the door step of farmers. Diffusion agencies receive technology through the collaboration system and seek the client system to diffuse it. In simple words it can be said that research institutes develop technologies, diffusion agencies diffuse them among the farmers for their use.

In the extension system of Bangladesh, Department of Agricultural Extension (DAE) organizes the communication system through which farmers gain knowledge about the use of technologies and gradually decide to adopt and implement it in the field. DAE has the mandate to disseminate the technological information among the farmers at the right time, that is, right technology at the right time to the right farmers in the right ways. DAE reaches the client system with technological information through MMCs and interpersonal channels (IPCs). Roy *et al*. (2006) in their study found that MMCs were medium to highly effective among 85 per cent of the farmers in adoption of rice production technology. Anisuzzaman (2003) showed that among the MMCs radio plays a vital role in communicating information. The next important media were progressive farmers, television, and result demonstration for adoption of all the practices of rice production technologies. Nuruzzaman (2003) demonstrated that television had been used more by the farmers in receiving information than any other media like radio, folk song, agricultural fair, poster, newspaper and leaflet or bulletin. In most of the cases the effectiveness of extension educational programs depends to a large extent on the proper selection and use of MMCs which show better results in creating awareness and increasing knowledge and adoption among the audience of low knowledge, attitude and practice levels (Adhikarya, 1994). In 1994, Schramm

in his study entitled 'Mass Media and National Development' points out why radio and television should be particularly useful in rural development programs. According to him, it covers a great distance and leaps all kinds of natural barriers; it is swift in reaching a listener/viewer. It is the cheapest of the major media in terms of production and reception can also be inexpensive. Mass media provides necessary information for the farmers to help them change their way of cultivation from traditional to modern. Increase of per unit production of any crop cannot be attained without a sound communication system. MMCs, namely, radio, television, magazine, newspaper, leaflet, booklet, publication and poster play an important role especially in the awareness and interest stages of IDP (Kashem and Jones, 1995). Messages through mass media can motivate, stimulate, induce and change the basic attitudes of the people across cultural and age levels.

The stage-wise use of MMCs in adoption is very important. Awareness is the first step of knowledge development. Research institutes are constantly developing technologies and MMCs are constantly spreading knowledge among the farmers. But there is no sufficient empirical research to show the extent of stage-wise use of mass media in adoption of technologies. In view of the foregoing discussion, the framework of this study stems from 'mass communication media' which is of great concern to national policy makers. Through MMCs any message can be diffused within a very short time. From the research point of view it is not possible to involve all the media in a single study for all the technologies. This research is confined to a few media, namely, radio, television, newspaper, poster, leaflet and one technology that is BRRI dhan28 developed by BRRI. It is one of the most popular as well as widely diffused Boro rice varieties in Bangladesh released in 1994. Thus, the purpose of the study is to have answers to the following research questions:

1. What are the characteristics of rice farmers who adopted BRRI dhan28?
2. To what extent MMCs are used at different stages in adoption of BRRI dhan28?
3. What are the preferences of mass media at each stage of innovation-decision process?
4. What relationship exists between the selected characteristics of the farmers and stage-wise use of mass media in adoption of BRRI dhan28 technology?

Methodology

Gazaria Upazila of Munshiganj District of Bangladesh was purposely selected as the area of the study. Gazaria Upazila has 8 unions, out of which Imampur union was selected purposively. Imampur union has 16 villages; out of these five villages were selected randomly. These five villages constituted the locale of the study. The researcher with the help of local leaders and concerned Sub Assistant Agricultural Officer prepared an updated list of all the BRRI dhan28 growers from the study villages. The total numbers of farm families in these villages was 900, which constituted the population of the study. The sample size was determined by following Moral (2011) formula, where 10 per cent margin of error was considered. Thus, the sample size became 90. The entire process of data collection took about a month - from August 25 to September 25, 2015. The methodology followed for measuring the dependent and independent variables are described below.

Measurement of Independent Variables

The selected characteristics of the Boro rice farmers such as i) age, ii) education, iii) family size, iv) organizational participation, v) innovativeness, vi) cosmopoliteness, vii) farm size, viii) annual income, ix) attitude towards BRRI dhan28 and x) problems in using BRRI dhan28 were the independent variables. Age of the respondents was determined by the number of years from their birth to the time of data collection**.** Education of a respondent was measured in terms of classes passed by him in the formal education system. Family size of a respondent was determined in terms of total number of members of each respondent family. Organizational participation score of a respondent was measured by considering the nature and duration of involvement in different organizations. Cosmopoliteness of a respondent was measured by computing cosmopoliteness score on the basis of place and frequency of his visits to external / outside of his own social system. Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of the social system (Rogers, 1995). Innovativeness of a respondent was measured on the basis of adoption of six improved agricultural technologies by the respondents. Farm size was estimated in terms of full benefit to the respondent. Income of a respondent was measured by assigning one score for one thousand taka**.** Attitude towards BRRI dhan28 of a respondent referred to his feeling, belief and action tendency towards BRRI dhan28. Likert-type scale was used to determine the attitude towards BRRI dhan28. The extent of problems faced by the farmers in adoption of BRRI dhan28 was measured in relation to different aspects of the problems.

Measurement of Dependent Variables

Adoption or innovation-decision process comprised five stages *viz.,* a) knowledge stage, b) persuasion stage, c) decision stage, d) implementation stage and e) confirmation stage (Rogers, 1983). Use of mass media at each stage was the dependent variable of the study. To measure the use of MMCs at each stage, five mass media, namely, radio, television, newspaper, poster and leaflet were selected and a five point (0-4) rating scale was used. Numerical values assigned to the scale were 4, 3, 2, 1 and 0 for high, medium, low, very low use and no use of mass media, respectively.

Five mass media channels were used for different purposes at each stage. The purposes of use of MMCs and their possible range of scores for an individual at each stage are summarized below.

Stage	Purposes of use of mass media		Number of mass media channels	Rating scale	Possible range of scores
Knowledge stage	Existence of knowledge about BRRI dhan28		5	0-4	0-60
	Operational knowledge of BRRI dhan28		5	0-4	
	Beneficial knowledge of BRRI dhan28		5	0-4	
Persuasion stage	Creation of interest toward BRRI dhan28		5	0-4	0-40
	Evaluation of BRRI dhan28		5	0-4	
Decision stage	Trial of BRRI dhan28		5	0-4	0-20
Implementation stage	Full use of BRRI dhan28		5	0-4	0-40
	Solving operational problems		5	0-4	
Confirmation stage	Adoption	Continuance	5	0-4	0-80
		Discontinuance	5	0-4	
	Rejection	Replacement	5	0-4	
		Later adoption	5	0-4	

Thus, the MMCs use scores of a respondent could range at knowledge stage from 0 to 60, at persuasion stage from 0 to 40, at decision stage from 0 to 20, at implementation stage from 0 to 40 and at confirmation stage from 0-80. Zero (0) indicates no use and highest score indicates high use of mass media.

To compare the preferences of use of MMCs at each stage, Media Use Index (MUI) for each mass media for each stage was also calculated. A total of 90 respondents

gave their opinion on a five point (0-4) rating scale. Thus, the media use index of a particular media at knowledge stage could range from 0 to 1080 {90 respondents × 3 purposes × (0-4) rating scale}, at persuasion stage from 0 to 720 {90 respondents × 2 purposes × (0-4) rating scale}, at decision stage from 0 to 360 {90 respondents × 1 purpose × (0-4) rating scale}, at implementation stage from 0 to 720 {90 respondents × 2 purposes × (0-4) rating scale} and at confirmation stage from 0 to 1440 {90 respondents × 4 purposes × (0-4) rating scale}.

Results and Discussion

Selected Characteristics of the Farmers

Farmers use and finally adopt those modern technologies which are suitable for their own socio-economic setup and agro-economic settings. Moreover, farmers' individual characteristics and personal make-up play a vital role in adopting agricultural practices in the overall technology transfer process. A particular technology might prove beneficial or suitable for a farmer but s/he may not be in a position to accept it due to her/his unfavorable attitude and situational factors. The individual characteristics of the farmers may greatly vary and have a great impact on the use of MMCs, particularly radio, television and printed material. The salient features of individual characteristics of the farmers are shown in Table 1.

Table 1 indicates that an overwhelming majority (88.90 per cent) of the respondents were young to middle aged except a few (11.10 per cent) who were old. Among the respondents 90 per cent had primary to above secondary level education, far above the national average. A large proportion (93.30 per cent) of the respondents belonged to medium and small family categories. That means education and population control were emphatically accomplished. The highest proportion (92.30 per cent) of the farmers had small to medium farm size. Similarly, most (87.80 per cent) of the farmers per cent had low to medium annual income whereas only 12.20 per cent farmers had high annual income. More than three-fourths (77.70 per cent) of the respondents had low to medium organizational participation. An overwhelming majority (84.40 per cent) of the respondents belonged to medium to high cosmopolite category while only 15.60 per cent had low cosmopolite habit. Almost three- fourths (74.50 per cent) of the respondents had low to medium innovativeness while only 25.60 per cent of them had high innovativeness. More than four-fifths (81.10 per cent) of the farmers in the study area formed low to moderate favorable attitude towards BRRI dhan28 while only 18.90 per cent of them had high favorable attitude. Almost all (94.40 per cent) of the respondents faced low to medium problem in using BRRI dhan28 while only 5.60 per cent faced high problem.

Table 1. Salient Features of Individual Characteristics of Farmers

Characteristic	Range		Respondents			Mean	SD
	Observed	Possible	Category	Number	Per cent		
Age	25-60	-	Young (up to 35 yrs)	29	32.2	41.01	8.91
			Middle (36-50 yrs)	51	56.7		
			Old (51 and above)	10	11.1		
Education	0-12	-	No education (0)	9	10	6.51	3.95
			Primary education (1-5)	29	32.2		
			Secondary education (6-10)	27	30		
			Above secondary (11-16)	25	27.8		
Family size	2-14	-	Small (2-4)	44	48.9	5.00	2.29
			Medium (5-7)	40	44.4		
			Large (Above 7)	6	6.7		
Farm size	0.14-2.27		Marginal (Up to 0.2ha)	3	3.3	0.81	0.48
			Small (0.21-1 ha)	60	66.7		
			Medium (1.01-2.05 ha)	23	25.6		
			Large (>2.05 ha)	4	4.4		
Annual income	32.50-255		Low income (up to 75)	34	37.8	91.65	47.95
			Medium income (75-150)	45	50		
			High income (more than 150)	11	12.2		
Organizational participation	0-20	-	No participation (0)	19	21.1	5.26	3.77
			Low participation (up to 6)	40	44.4		
			Medium participation (7-12)	30	33.3		
			High participation (Above 12)	1	1.1		
Cosmopoliteness	4-20	0-27	Low (<7)	14	15.60	9.5	3.67
			Medium (7-13)	66	73.30		
			High (>13)	10	11.10		
Innovativeness	2-22	0-24	Low innovativeness (2-8)	32	35.6	11.78	5.00
			Medium innovativeness (9-15)	35	38.9		
			High innovativeness (Above 15)	23	25.6		
Attitude towards BRRI dhan28	17-37	10-50	Low favorable (17-23)	34	37.8	25.78	6.00
			Moderate favorable (24-30)	39	43.3		
			Highly favorable (31-37)	17	18.9		
Problems in using BRRI dhan28	3-15	0-27	Low severity (3-6)	36	40	6.42	2.60
			Medium severity (7-10)	49	54.4		
			High severity (>11)	5	5.6		

Therefore, it can be concluded that as there were no severe problems in BRRI dhan28 cultivation farmers' attitude toward it should be more positive.

Stage-wise Use of Mass Media in Adoption of BRRI dhan28

Stage-wise use of MMCs in adoption of BRRI dhan28 was the main focus of this study. The use of mass media for each respondent for each stage was calculated. Based on their mass media use scores respondents were categorized stage-wise as given below.

Table 2. Stage-wise Use of MMCs in Adoption of BRRI dhan28

Stage	Range		Respondents			Mean	SD
	Observed	Possible	Category	Number	Per cent		
Knowledge stage	4-32	0-60	Low use (4-13)	15	16.70	19.53	5.81
			Medium use (14-23)	55	61.10		
			High use (24-32)	20	22.20		
Persuasion stage	2-24	0-40	Low use (2-9)	30	33.30	11.17	4.16
			Medium use (10-17)	56	62.20		
			High use (18-25)	4	4.50		
Decision stage	2-18	0-20	Low use (2-7)	64	71.10	11.17	4.16
			Medium use (8-13)	22	24.50		
			High use (14-19)	4	4.40		
Implementation stage	1-21	0-40	Low use (1-7)	22	24.50	10.23	4.27
			Medium use (8-14)	56	62.20		
			High use (15-21)	12	13.30		
Confirmation stage	1-27	0-80	Low use (1-9)	65	72.20	8.48	5.18
			Medium use (10-18)	22	24.50		
			High use (19-27)	3	3.30		

Table 2 reveals that an overwhelming majority (83.3 per cent) of the farmers had medium to high use of mass media at knowledge stage. This is in line with the general observation that mass media has the best capacity to increase the knowledge about an innovation. On the other hand, from persuasion stage to confirmation stage, use of mass media among farmers had gradually decreased. At persuasion stage, individuals start to evaluate an innovation's attributes which requires use of interpersonal communication media. At decision stage innovation adoption relies upon many sources to make innovation-decision. At this stage they themselves give trial of the innovation on a small scale or watch the trial given by innovators and early adopters and result demonstrations supervised by extension workers. They also watch the results of technology through television. At implementation

stage farmers need operational and problem solving information. Confirmation stage is a complete stage where adopters of the innovation can either continue the innovation or discontinue it. Discontinuance can occur by replacement. Finally, later adoption can occur with rejection at decision stage. Normally, the high and medium users of mass media channels are supposed to be the early majority and low users are the late majority. The early majority uses the mass media channels at confirmation stage more than the late majority which depends upon the early majority to confirm the innovation-decision. These are the reasons behind the decreasing use of mass media at later stages of innovation-decision process.

Preferences of Use of Mass Media at Different Stages in Adoption of BRRI dhan28

To compare the preferences of use of mass media at each stage in adoption of BRRI dhan28, Media Use Index (MUI) for each stage was computed. The MUI of a particular media could range at knowledge stage from 0 to 1080, at persuasion stage from 0 to 720, at decision stage from 0 to 360, at implementation stage from 0 to 720 and at confirmation stage from 0 to 1440. The five mass media channels used at different stages in adoption of BRRI dhan28 have been arranged in rank order in Table 3 on the basis of their respective MUI.

Table 3. Rank Order of Mass Media Used by Farmers at Five Stages

Mass media	Knowledge stage		Persuasion stage		Decision stage		Implementation stage		Confirmation stage	
	Score (MUI)	Rank order	Score (MUI)	Rank order	Score (MUI)	Rank order	Score (MUI)	Rank order	Score (MUI)	Rank order
Television	897	1	534	1	289	1	454	1	373	1
Radio	563	2	346	2	198	2	273	2	215	2
Leaflet	157	3	86	3	43	3	72	3	54	3
Poster	119	4	66	4	30	4	66	4	48	4
Newspaper	64	5	38	5	16	5	25	5	35	5

Rank order of mass media channels in Table 3 reveals the preferences of use of MMCs by the respondents of this study. Clearly it is evident that in adoption of BRRI dhan28 most of the respondents preferred television, which secured first position, across five stages of innovation-decision process. It was followed by radio (2), leaflet (3), poster (4) and newspaper (5). Television's success in adopting BRRI dhan28 lies in its unique combination of sight, sound and motion. People spend more time with it than any other medium, averaging over six hours per

home per day (Carpenter, 1983). In Bangladesh almost every channel broadcasts agricultural programs with different names. These programs have been proved to be very popular among the rural people due to their audio-visual characteristics, from which the illiterate farmers gain educational benefit (Bhuiyan *et al*., 2014).

Relationships between Independent and Dependent Variables

The purpose of this section is to examine the relationship of each of the independent variables with each of the dependent variables. Pearson's product-moment correlation co-efficient 'r' was computed to determine the relationship between two concerned variables as shown in Table 4.

Table 4. Co-efficient of Correlation between Each of The Selected Characteristics of Farmers with Their Use of Mass Media at Different Stages

Independent variable	Correlation co-efficient (r) with use of mass media at				
	Knowledge stage	Persuasion stage	Decision stage	Implementation stage	Confirmation stage
Age	0.385**	0.199^{NS}	0.107^{NS}	0.355**	0.075^{NS}
Education	-0.310**	-0.116^{NS}	-0.099^{NS}	-0.222**	-0.191^{NS}
Family size	0.226*	-0.123^{NS}	0.066^{NS}	0.261*	-0.009^{NS}
Farm size	0.462**	0.294**	0.335**	0.281**	0.474**
Annual income	0.112^{NS}	0.049^{NS}	0.327**	0.139^{NS}	0.255*
Organizational participation	-0.189^{NS}	-0.116^{NS}	0.041^{NS}	-0.116^{NS}	-0.232*
Cosmopoliteness	0.197^{NS}	0.015^{NS}	0.046^{NS}	0.082^{NS}	0.209*
Innovativeness	-0.052^{NS}	-0.202^{NS}	-0.017^{NS}	-0.279**	-0.068^{NS}
Attitude towards BRRI dhan28	-0.627**	-0.340**	-0.373**	-0.476**	-0.339**
Problems in using BRRI dhan28	-0.583**	-0.333**	-0.475**	-0.600**	-0.367**

*NS Non Significant, **Significant at 0.01 level of probability, * Significant at 0.05 level of probability*

Relationship between Selected Characteristics of Farmers and Use of MMCs at Knowledge Stage

Table 4 indicates that out of 10 selected characteristics of the respondents only three, namely, age, family size and farm size of the farmers had significant positive relationship with their use of mass media at knowledge stage. The possible reason would be that with increase of age, family and farm size of the farmers their access to awareness and knowledge through MMCs had increased. On the other hand, education and attitude towards BRRI dhan28 and problems in using it had significant negative relationship with use of mass media at knowledge stage which

indicated that with increase in education and attitude towards BRRI dhan28, the farmers' use of MMCs at knowledge stage decreased. This might be due to the fact that with increase of education and attitude towards BRRI dhan28 the farmers' desire to get knowledge and operational knowledge had increased which needed more use of interpersonal communication channels than MMCs.

Relationship between Selected Characteristics of Farmers and Use of MMCs at Persuasion Stage

Out of 10 selected characteristics of the respondents only one, namely, farm size had significant positive relationship. A possible reason would be large farm size had induced and facilitated the individuals to seek innovation-evaluation information through use of MMCs at persuasion stage. Attitude towards BRRI dhan28 and problems in using it had significant negative relationship with mass media used by the farmers at persuasion stage. This indicated that with increasing form of attitude towards BRRI dhan28 and problems in using it farmers' use of MMCs at persuasion stage had decreased. This might be due to the fact that farmers' information needs through MMCs had reduced, because in the meantime they became more experienced and gathered lot of information through IPCs to confirm their evaluation about the innovation.

Relationship between Selected Characteristics of Farmers and Use of MMCs at Decision Stage

The findings show that out of 10 selected characteristics of the respondents only two, namely, farm size and annual income had significant positive relationship. A possible reason would be that large farm size and higher annual income created a favorable situation for trial of innovations which further enhanced the use of mass media at decision stage. Attitude towards BRRI dhan28 and problems in using it had significant negative relationship with mass media used by the farmers at decision stage. This indicated that with increasing form of attitude towards BRRI dhan28 and problems in using it farmers' use of MMCs at decision stage had decreased. This might be due to the fact that farmers' desire to achieve practical knowledge had increased which required more use of IPCs than mass media.

Relationship between Selected Characteristics of Farmers and Use of MMCs at Implementation Stage

As per the findings, out of 10 selected characteristics of the respondents only three, namely, age, family size and farm size had significant positive relationship. A possible reason would be old age, large family and farm size had facilitated

greater access to mass media at implementation stage. Education, innovativeness and attitude towards BRRI dhan28 and problems in using it had significant negative relationship with mass media used by the farmers at implementation stage. This indicated that with increase of education, innovativeness and attitude towards BRRI dhan28 and problems in using it farmers' use of MMCs at implementation stage decreased. This might be due to the fact that they had already become more experienced and gathered lot of information regarding innovation at this stage. Another reason could be that they needed operational information through IPCs rather than mass media channels.

Relationship between Selected Characteristics of Farmers and Use of MMCs at Confirmation Stage

Out of 10 selected characteristics of the respondents only two, namely, family size and farm size had significant positive relationship. A possible reason would be that large family and farm size had enhanced the continuation of use of MMCs at confirmation stage. Organizational participation, cosmopoliteness, attitude towards BRRI dhan28 and problems in using it had significant negative relationship with MMCs used by the farmers at confirmation stage. This indicated that with increase of organizational participation, cosmopoliteness, attitude towards BRRI dhan28 and problems in using it farmers' use of MMCs at confirmation stage decreased. This might be due to the fact that the farmers had become more experienced and gathered lot of information covering all aspects of innovation from IPCs like extension agents, early adopters, neighbours, *etc.*

Conclusion

The findings of the present study reveal that use of MMCs by the farmers was found comparatively higher at early stages of the innovation-decision process than later stages. Farmers preferred television most at all five stages of innovation decision process and it was followed by radio (2), leaflet (3), poster (4) and newspaper (5). Besides, some of the socio-economic characteristics of the farmers had their influence on the use of mass media in every stage of the innovation-decision process. With increase of age, family size, farm size and annual income of the farmers their use of MMCs at different stages of innovation-decision increased. On the other hand, with increase of education, organizational participation, cosmopoliteness, innovativeness, attitude towards innovation and problems in using innovation of the farmers their use of mass media at different stages of innovation-decision decreased.

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