Problem faced by the Farmers in Using ICT Tools for receiving Rice Production Information

Abstract

The facilitation of technology transfer to farmers plays a crucial role in enhancing agricultural productivity within the context of Bangladesh. In relation to this matter, a study was undertaken to evaluate the extent of problems faced by the farmers in utilizing ICT technologies for accessing rice production information. Data were collected from randomly selected 340 ICT tool using rice farmers of four selected districts of Bangladesh. The results indicated that majority (66.2%) of the rice farmers faced severe problem, compared to 27.9% and 5.9% of them faced moderate and low problem respectively in using ICT tools for receiving rice production technologies. Based on Standardized Problem Faced Index, top five severe problems were lack of ICT knowledge of farmers, high cost of internet packages, lack of training in using of ICT tools, high cost of ICT toolsand required more time to learn using ICT tools. These problems may be minimized by providing necessary training to the farmers on using ICT tools for receiving rice production information, cost reduction of internet package and ICT tools, providing better internet connectivity, uninterrupted power supply as perceived by the farmers.

Keywords: Barriers, ICT, Rice growers, Agricultural information

1. Introduction

The agriculture sector has a glorious history in the socio-economic development of Bangladesh. The contribution of this sector continues to uplift of the country's economy. Agriculture belongs to the third position next to employment and industry about the GDP contribution [1]. Despite a comparatively low contribution to the national income, the agriculture sector plays a vital role in the context of employment generation and poverty reduction[2]. From the scenario of the last two decades of crop production, from observation, food production has been increased significantly [1]. Recently the government has declared self-sufficiency in food production, especially in rice production. The agricultural scientist, extension system and the farmers are the prime credit owner for this success.

The extension personnel of the Department of Agriculture Extension (DAE) in Bangladesh disseminate the agricultural technology to the farmers [3].In most cases, they used manual approaches to disseminate agricultural information. This approach has not been able to meet the requirements of majority of farmers who are spread across the whole country. The farmers play a vital role in the society and the economy of the country. Nowadays, more and more new advanced technologies are used for agricultural development such as satellites, the internet, mobile phone and social media [4-7].

ICT may be defined as those technologies used in collecting, processing, storing, retrieving, disseminating, and implementing data and information using microelectronics, optics, telecommunications, and computers. ICT has been considered as a tool that can be used to achieve development goals in developing countries. These technologies may help to fight against illiteracy, disease, unemployment, poverty, agriculture and other development problems [8-10]. The use of the technologies divides in both developed and developing nations. It can be used to improve agricultural information and farming methods with transformational development.

Information and Communications Technology (ICTs) are seen as a partial solution to rapidly disseminating information to the increasing number of farming families. ICTs have the potential to enable farmers to receive up-to-date knowledge and information about agricultural technologies, best practices, markets, price trends, consumer preferences, weather, and soil moisture conditions. ICTs-based information is crucial for the adoption of different technologies related to crops for improving the yield and income of smallholder farmers [11-13].

The developments in ICTs and the internet in particular have revolutionized the entire Agriculture field, generating new markets, changing the structure of the agriculture distribution channels, and re-engineering all processes. Agricultural extension which depends to a large extent on information exchange between and among farmers on the one hand and a broad range of other actors on the other, has been identified as one area in which ICTs can play a significant role" [14]. Farmers also reported that mobile phones proved to be useful during health

emergencies; information services on the availability of inputs, quality of inputs, and pest and disease management of crops were also used by the farmers through ICTs [15].

According to [16], "most rice farmers lack agricultural information mostly on farming practices and market prices; hence farmers end up using their experience and traditional ways of farming practices. That results in low yields since they hardly change ways of farming and incur low prices because of less information about market prices. In African counties most farmers lack access to day-to-day agricultural information, which is needed to assist farmers in making decisions regards farming practices and market prices [17].

The use of ICT is an essential pillar of agricultural extension and in this present scenario of a rapidly changing world, it has been also recognized as an essential mechanism for delivering knowledge (advice) and information as an input for decision-making [18], in this case, for modern farming". ICTs can create new opportunities to bridge the gap between information haves and information have-nots in developing countries. The delivery of ICT-based information delivery has the potential to be timelier and directly reach more farmers [19]. Realizing this problem, a study was undertaken to know the constraints faced by farmers in utilization of ICT toolswith the following specific objectives:

i) To determine the problems faced by the farmers in using ICT tools for receiving rice production information;

ii) To compare the severity of problems faced by rice farmers in using ICT tools and

iii) To draw some suggestions to minimize the problems as perceived by the farmers.

2. METHODOLOGY

2.1 Study Location

Initially, four (4) districts of Bangladesh,namelyTangai, Gazipur, Manikganj and Munshiganj were selected purposively. Then four sub-districts (Upazilas), namely Sakhipur, Kaliakoir, Manikganjsadar and Gajaria were selected randomly by taking one from one district respectively as the locale of the study.

2.2 Sampling Design

With assistance from the Sub-Assistant Agriculture Officer (SAAO) of the Upazila Agriculture Office (UAO), the researcher compiled a list of rice farmers in the four selected upazilas who have utilized ICT tools for rice production information for a considerable amount of time. The list comprised a total of 2988 rice famers which constituted the population of the study. From this population, sample size was determined as 340 by using Sample Size Calculator developed by Creative Research System [20] by taking 95% confidence level and 5 as confidence interval. Sample farmers were selected by proportionate random sample from the four upazilas.

2.3 Collection of Data

Data were collected from the respondent farmers with help of a pre-tested interview schedule during period from March 25th to June 24th, 2023. Both open and close form questions were put in the interview schedule. The pre-test happened with 20 rice growers excluded from the sample list. Necessary corrections were made based on the output of the pre-test[21].

2.4 Measurement of problem faced in using ICT tools for Receiving Rice Production Information

After thorough consultation with the relevant experts and review of relevant literatures, 16 problems related to the challenges encountered in utilizing ICT tools to receive rice production information were considered for the study. Respondent farmers were asked to indicate the magnitude of each problem against four alternative responses as ‘severe problem’, ‘moderate problem’, ‘low problem’ and ‘no problem’ with assigned scores as ‘3’, ‘2’, ‘1’, and ‘0’ respectively. Thus, the score of problem faced in using ICT tools for receiving rice production information could ranged from 0-48, where ‘0’ indicates no problem and ‘48’ indicates severe problem.

2.5 Measuring Problem faced Index:

To compare the severity among the Problems, Problem Faced Index (PFI) was determined for each problem by using the following formula[22-23]:

$$\textbf{PFI} = P_n \times 0 + P_l \times 1 + P_m \times 2 + P_s \times 3$$

Where, PFI = Problem Faced Index

P_n = Number of farmers faced no problem

P_l = Number of farmers faced low problem

P_m = Number of farmers faced moderate problem

P_s = Number of farmers faced severe problem

Thus, PFI of the problems could range from 0 to 1020, where '0'indication no problem and '1020' indicating highest problem as the number of farmers were 340.

Standardized Problem Faced Index (SPFI) was the determined for each problem by using the following formula:

$$\text{SPFI} = \frac{\text{PFI of the Problem}}{\text{Highest possible PFI, (i, e, 1020)}} \times 100$$

Thus, SPFI of the problems could range from 0 to 100, where '0'indication no problem and '100' indicating highest problem.

2.6 Suggestions to minimize the problem

Suggestions were asked to the respondents against each problem to minimize the problems. One or two suggestion(s) against each problem was considered based on highest citation number of suggestions of the farmers[24].

3. RESULTS AND DISCUSSION

3.1Problems faced by the rice farmers in using ICT tools for receiving rice production information

Farmers' problem faced in using ICT tools for receiving rice production information ranged from 10-48 against the possible range of 0-48with the mean and standard deviation of 33.83 and 7.88 respectively. The respondent rice farmers were classified into three (3) groups based on their problem faced in using ICT tools in receiving rice production technologies as shown in table 1.

Table 1. Classification of Farmers according to their problems faced using ICT tools for receiving rice production information

Categories	Respondents Frequency	Respondents' percentage	Mean	S. D
Lowest problem (Up to 16)	20	5.9	33.83	7.88
Medium Problem (17 to 32)	95	27.9		
Severe Problem (>32)	225	66.2		

Majority (66.20%) of farmers faced a severe level of problem as compared to 27.90% and 5.90% of farmers faced medium and low problem in using ICT tools for receiving rice production information respectively. According to [25] found majority (70.50%) of SAAOs faced a high level of problem as compared to 27.90% and 1.60% SAAOs who faced a medium and low level of problem in technology transfer.Highest proportion of the FFS farmers (53%) had low problem in participating FFS training session, while 40% and 7% had medium and high problem, respectively [26].

3.2 Comparative severity of problems faced by rice farmers using ICT tools

In order to compare the severity of the problems faced by rice farmers in using ICT tools, standardized problem Faced Index (SPFI) was determined for each of 16 selected problems. Rank order was made on the basis of the descending order of the SPFI as shown in Table 2.

Table 2. Rank Order of the problems based on Descending order of Standardized Problem Faced Index

Standardized Problem Faced Index with Rank Order									
Sl. No	**Problem**	**Number of farmers based on extent of problems faced**					**Problem Faced Index (PFI)**	**Standardized Problem Faced Index (SPFI)**	**Rank Order (RO)**
		Severe Problem	**Moderate Problem**	**Low problem**	**No Problem**	**Total**			
1	Lack of ICT tools for rice production information	43	45	119	133	340	682	66.86	**9th**
2	Lack of internet	24	40	120	156	340	748	73.33	**7th**
3	Interrupted power supply	35	69	77	159	340	700	68.63	**8th**
4	Lack of ICT knowledge among farmers	0	13	78	249	340	916	89.80	**1st**
5	Requiring more time to learn using ICT tools	1	23	114	202	340	857	84.02	**5th**
6	Lack of market information to sell rice	55	78	131	76	340	568	55.69	**14th**
7	High cost of	3	20	97	220	340	874	85.69	**4th**

	ICT tools								
8	Lack of experts to help in using ICT tools	20	40	105	175	340	775	75.98	**6th**
9	Dependence on others is high	45	39	132	124	340	675	66.18	**10th**
10	Lack of relevant information	53	47	127	113	340	640	62.75	**11th**
11	Lack of training in using ICT tools	8	17	73	242	340	889	87.16	**3rd**
12	High cost of internet packages	2	21	61	256	340	911	89.31	**2nd**
13	Lack of information on rice pest management	71	50	134	85	340	573	56.18	**13th**
14	Lack of information on rice disease management	77	56	144	63	340	533	52.25	**16th**
15	Lack of information on irrigation	51	89	93	107	340	596	58.43	**12th**

	systems for rice cultivation								
16	Lack of post-harvest information after rice harvest	69	77	95	99	340	564	55.29	**15th**

According to the rank order, lack of ICT knowledge among farmers, high cost of internet packages, lack of training in the use of ICT tools, high cost of ICT tools, learning to use ICT tools requires more time and practice, lack of experts to help in using ICT tools ranked first tosixth respectively. According to[27-28] the insufficiency of ICT facilities and inadequate infrastructure pose significant difficulties to the deployment of ICT in the agricultural sector in developing nations. Lack of internet ranked seventh followed by,interrupted power supply, lack of ICT tools for rice production information and dependence on others is high respectively. According to[29], majority of the agricultural extension functionaries had the severe problem of interrupted power supply.[30] mentioned that ICT based organization prefer to provide farm management information than others.Lack of relevant information ranked eleventh followed by lack of information on irrigation systems for rice cultivation, lack of information on rice pest management, lack of market information to sell rice, lack of post-harvest information after rice harvest and lack of information on rice disease management respectively. Therefore, it is imperative for the government to make an effort to mitigate these issues.

ICT tools represent a novel strategy in Bangladesh for the dissemination of agricultural information to farmers. The initial phase involved the utilization of a restricted range of information and communication technology (ICT) capabilities, such as smartphone applications, internet web browsing, call centers, and social media platforms. Additionally, several technological issues were encountered during the provision of assistance to the farmers.

In addition to this, the limitation of internet bandwidth posed a significant obstacle in delivering seamless and timely information to farmers. A common mistake often made by extension agents in convincing farmers to adopt new technologies (which never works) relates to describing farmers as primitive and backward [31]. Extension officers' inability to disseminate information due to the problem of staff shortages, literacy level of the farmers and poor infrastructure in most of the rural communities result in non-adoption of improved technologies.

3.3 Suggestions to minimize the problems identified by the rice farmers using ICT tools for receiving rice production information

Suggestions against each problem are mentioned in Table 3 for mitigating the problem identified by the rice farmers using ICT tools for receiving rice production information.

Table 3. Suggestions to minimize the problems identified by the rice farmers using ICT tools

Sl. No.	Problems	Suggestions
1	Lack of ICT knowledge of the farmers	• Organizing a training program on utilizing ICT tools
2	High cost of internet packages	• Reducing the costs of internet packages
3	Lack of training in using ICT tools	• Organizing a training program on utilizing ICT tools
4	High cost of ICT tools	• Minimizing the expenses associated with ICT tools
5	Requiring more time to learn using ICT tools	• Training on easy and user-friendly procedure of using ICT tools
6	Lack of experts to help in using ICT tools	• Creating experts in ICT tools users among the farmers by appropriate training
7	Lack of internet	• Provision of better internet

		connectivity
8	Interrupted power supply	• Provision of uninterrupted power supply
9	Lack of ICT tools for rice production information	• Creation of ICT tools containing rice production information
10	Dependence on others is high	• Providing adequate and proper training to reduce dependence on others
11	Lack of relevant information	• Providing relevant information through ICT tools
12	Lack of information on irrigation systems for rice cultivation	• Providing irrigation information for rice cultivation through ICT tools
13	Lack of information on rice pest management	• Providing proper pest management information in ICT tools
14	Lack of market information to sell rice	• Providingup-to-date market information for ICT tools
15	Lack of post-harvest information after rice harvest	• Providing Post-harvest information in ICT tools to reduce rice waste after harvest
16	Lack of information on rice disease management	• Providing rice disease forecasting information in to ICT tools

Based on the above suggestions it can be said that problems of using ICT tools for receiving rice production information might be reduced by providing easy and user-friendly training, reducing the costs of internet packages, better internet connectivity, uninterrupted power supply, creation of ICT tools containing rice production information, providing information on; relevant information, irrigation, pest-management, up-to-date market information, post-harvest and disease forecasting information.

4. Conclusion

The government of Bangladesh is disseminating agricultural information using ICT tools since long time. The current investigation revealed that farmers still encountered numerous limitations, including a deficiency in information and communication technology (ICT) skills among farmers, as well as inadequate access to internet packages. In order to overcome these limitations, it is recommended that the government implement subsidies for the acquisition of information and communication technology (ICT) services, with a special focus on rural farmers who may have financial restraints. Additionally, reducing the fees associated with ICT tools would also be beneficial. Enhancing the adoption of technological tools, such as smartphone applications, internet surfing, call centers, and social media, among farmers, will result in an increased utilization of these resources. According to recommendations put forth by farmers, it is advisable for extension professionals to deliver training sessions focused on the utilization of information and communication technology (ICT) tools for farmers. The lack of complete integration of contemporary information and communication technology (ICT) capabilities within the Department of Agricultural Extension (DAE) may impede the distribution, utilization, and implementation of scientific agricultural knowledge, thus leading to a lack of progress. Farmers have acknowledged the superior potential of ICT instruments in facilitating and enhancing their agricultural endeavors. Therefore, the implementation of ICT training is necessary in order to mitigate the challenges encountered by rice farmers in accessing rice production information through ICT instruments. Government should increase budget to make ICT tools available and mitigate technical problems as identified by farmers. At the same time, area coverage by ICT tool usage should be increased for the betterment of farmers.

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