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Role of Opinion Leaders in Technology Transfer among the Farmers in Bangladesh

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ABSTRACT

The agriculture of Bangladesh is progressing by using new technologies for production. This can be obtained by transferring technology to the farmers. Opinion leaders (OLs) are used as role models in the adoption of technology. The purpose of the study was to determine the role of OLs played regarding technology transfer. The study was conducted at Dumuria upazila under Khulna district. The data were collected from October 20, 2021 to January 5, 2022, from randomly selected 70 farmers and purposively selected 25 opinion leaders. A Role Extent Index (REI) was used to make a comparison among the selected 25 roles of OLs and 15 roles of the farmer as recipient of the extension service provided by the OLs. A Problem Severity Index (PSI) was also incorporated to make a comparison among the problems faced by the OLs. Correlation Coefficient (r) was used to ascertain the relationship between the focus issue and personal characteristics of the respondents. The Opinion Leaders majority (60%) of the OLs play important role and the majority (72%) faced moderate problem and majority (80%) of the farmers play an important role as a recipient. Farmers also assumed that majority (87.1%) of OLs play an important role. 'Remain unbiased to share information' became the first ranked role of the OLs in technology transfer. Family income, training received and extension media contact had a positive significant relationship with the extent of role played by the opinion leaders in extension services. Opinion leaders are important determinants and their role became the bridge between farmers and technology, thus, necessary steps should be taken to involve, train and supervise the opinion leaders.

1. Introduction

Agricultural sector is the largest sector of income generation in Bangladesh and creates employment opportunities with the challenge to achieve food sufficiency and resilience. The main focus of agricultural sector is to produce food and cash crops for human being and by creating employment opportunity it reduces poverty from

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the rural areas through sustainable agricultural practices. The Government and the concerned authority have the responsibility to ensure the soundness of the agricultural practice and even distributions of benefits all over the country. It is therefore, necessary to organize and develop the agricultural production in to a commercially profitable sector. In this case the goal of the agricultural extension sector is to modernize the cultivation procedures and introduce the farmers with technology. The dissemination or transfer of technology among the farmers is the main focus. Transfer of technology depends on various factors especially in case of the farmers [1].

Agricultural research in all over the world has invented useful technology which resulted in enormous production. In our country most of the farmers are illiterate and majority of the farmers believed in conventional and traditional cultivation [2]. However, researcher reports that the farmers who are the backbone of the nation, are mostly illiterate and traditional, they are often skeptical towards new ideas and practices in agriculture, they often become frustrated with new practices in agriculture due to lack of proper understanding of the relevant factors [3]. Therefore, the prerequisite for the agricultural development is the communication of the benefit and know-hows of improved agricultural practices among the farmers so that they can get the maximum opportunities to apply those in their own field.

Scientists have reported that regardless of their source and sociometric status, farmers will adopt new technologies and modify their resource use when they believe that a proposed change is relevant to their circumstances and can help them to achieve their objectives [4]. Department of Agricultural Extension (DAE) has one Sub Assistant Agricultural Officer (SAAO) for a block (i.e., extension subdivision under union council) and he has to look after on an average 1,200 farm families. It is difficult for an extension worker alone to discharge their duties effectively among such a large number of farmers. On the other hand, there are some people in the rural areas with ample experience and lucrative leadership qualities. The model farmers, school teacher, '*imam*' of mosques [likely, '*purohit*' of *mandirs*], pesticide dealer, agent of company and the others whose opinions have effect on taking decisions of the farmers of their locality are considered as Opinion Leaders (OLs). In Bangladesh the '*imams*' and '*purohits*' are well accepted, and respected by all categories of farmers. The '*imams*' and '*purohits*' usually are engaged in agricultural productions besides their regular religious duties. The '*imams*' and '*purohits*' are often very potential and influential in motivating their followers, i.e., farmers, for accepting or rejecting any agricultural innovations. For this reason, the Department of Agricultural Extension (DAE) and few other extension service providing organizations utilize them as opinion leaders for assisting the core extensionists for transferring technologies among the farmers. Farmers go to them for opinions and advice. Agricultural extension work in the rural areas will be greatly facilitated if the extension agents can utilize the opinion leaders.

The opinion leaders' role can play a significant positive change in adoption of technology by the farmers. Opinion leaders are the members of the social system in which they exert their influence and when compared with their followers, opinion leaders are more exposed to all forms of external communication, are more cosmopolite and are more innovative. The farmers' attitude towards technology is also very important in dissemination of technology in agriculture. An opinion leader seeks out and encourages people to change their attitude toward technology adoption. Due to the less recognition and support of the Government opinion leaders face various problems to play their role in technology transfer. The communication between extension agents with the local leaders is not also strong which hinders the role of an OL. The association between extension agent and OLs, large rural areas can be covered with the shortest possible time during technology transfer.

In order to effectively utilize the opinion leaders, it is necessary to have a clear understanding about the role of opinion leader in technology transfer among the farmers. Extension workers need to know the extent of role played by the OLs. Since opinion leaders play a crucial role in the transformation of information, it is important to study their communication behavior [5]. Little research has been conducted regarding the role of opinion leaders in technology transfer among the farmer in the rural areas of Bangladesh. In view of the statement as stated above, the following specific objectives were formulated for giving proper direction to the study:

i. To describe the selected characteristics of the OLs and farmers.

ii. To measure the extent of the role of opinion leaders in technology transfer among the farmers.

iii. To explore the relationship of the selected characteristics of the opinion leaders with their extent of the role in technology transfer among the farmers.

This article will be describing the findings of the present study by organizing the relevant issues in a logical sequence. The study investigated the role of opinion leaders as perceived by the opinion leaders themselves and by the farmers in technology transfer among the farmers. In accordance with the objectives, presentation of the findings has been made in the following sequence: (i) description of the selected characteristics of the

respondents, (ii) extent of role of the opinion leaders in technology transfer among farmers, (iii) relationship between selected characteristics and extent of role of opinion leaders, and (iv) relationship between selected characteristics of the opinion leaders and problem severity.

2. Methodology

An ex-post facto explanatory cross sectional research design was used for the study. The study was quasi-experimental and tried to predict the relationship of the selected characteristics of the respondents with their knowledge and achievement of transferring technology among farmers through OLs. The study was conducted following "diagnostic and descriptive research design" [6]. Data were collected from Dumuria upazila of Khulna district through face to face interviews. It was conducted on the basis of collection of data by interviewing OLs and farmers of a following upazila. It was designed to investigate the role of opinion leader at Dumuria upazila of Khulna district by cross checking the statements of OLs and farmers. By conducting with the agricultural extension office of the following upazila and the local farmers, 25 opinion leaders were selected for the research purpose. For crosschecking the statements of the opinion leaders 70 farmers were randomly selected from the following upazila. Data were collected from October 20, 2021 to January 5, 2022. The selected characteristics of the respondents were age, educational qualification, family size, farming experience, knowledge on agriculture, farm size, monthly family income, training received, organizational participation, cosmopolitanism and extension media contact. All selected characteristics were measured following standard procedure and then categorized and arranged in simple Table for interpretation and discussion. Number, frequency, percentage, mean, standard deviation and range were used for statistical description. Pearson's Product Moment Correlation Coefficient 'r' was used to ascertain the relationship between selected characteristics of the respondents and role played. Throughout the study, five percent (0.05%) level of probability was used.

Role extent score and problem severity was computed for each respondent from his/her response to the asked question. Each respondent asked to indicate his/her response against roles on selected broad areas relate to, or somehow having influence on technology transfer. Ultimately 25 roles of OLs in providing extension service to the farmers, 10 problems faced by the OLs and 15 roles played by the farmers as a recipient of extension service provided by the OLs were incorporated. The extent of the role was measuring using 5-point rating scale as 'very important role to play', 'important role to play', 'moderately important role to play', 'little important role to play' and 'no role to play' the rating scale was assigned as 4, 3, 2, 1 and 0, respectively. The problem extent of OLs was also assigned through the same procedures as highly severe (4), severe (3), moderately severe (2), less severe (1) and not at all (0), respectively. The extent of score was determined by summing all the score of all the roles. The possible range of score was 0 to 100 for the OLs and 0 to 280 for the farmers. The extent of a role of OLs was determined based on role extent index (REI), again to measure a role of farmers was determined based on the same role extent index. The possible range of role extent index (REI) was 0 to 100 for the opinion Leaders and 0 to 280 for the farmers. The REI was determined by using the following formula.

$$REI = (N1\times4) + (N2\times3) + (N3\times2) + (N4\times1) + (N5\times0)$$

where,

N1= Number of respondents extended the role and rated as very important.

N2= Number of respondents extended the role and rated as important

N3= Number of respondents extended the role and rated as moderately important

N4= Number of respondents extended the role and rated as less / little important

N5= Number of respondents did not extend the role at all and rated as not important

For example, among 45 respondents 15, 7, 5, 8 and 10 respondents indicate the extent of role regarding role number as very important, important, moderately important, less important and no role to play respectively. Thus the REI for extension number

$$REI = (15\times4) +(7\times3) +(5\times2) +(8\times1) +(10\times0)$$
$$= 60+21+10+8 =99$$

After determination of REI, the extent of the role was determined by the following formula:

$$(\%)\ \text{Extent of the role} = \frac{\text{observed role extension score}}{\text{possible highest role extension score}}\times100$$

The severity of a problem of OLs was determined based on problem severity index (PSI). The possible range of problem severity index (PSI) was 0 to 100 for the OLs and 0 to 280 for the farmers. The PSI was determined by using the following formula (for example for 39 persons):

$$PSI = (10\times4) +(7\times3) +(4\times2) +(8\times1) + (10\times0)$$
$$= 40+21+8+8 =77$$

After determination of PSI, the severity of the problem was determined by the following formula:

$$(\%)\ \text{Severity of the problem} = \frac{\text{observed problem extension score}}{\text{possible highest problem score}}\times100$$

The rank order of the role and problems was determined based on the extent (%) of the role and the severity (%) of the problem. The role played by the OLs which obtained the highest percentage of severity got the first rank and then the second rank and so on. The rank continued from 1st to 25th in providing extension service to the farmer and 1st to 15th in case of farmer as a recipient again the problem of the OLs rank 1st to 10thto ensure relative position of every included problem.

3. Results and Discussion

This piece of research has made a good contribution to the existing knowledge pool particularly in the area of technology transfer system. Agriculture is enriched with newer technology invention. With this invention agriculture can reach its highest production with sustainable procedure. Only invention cannot make it possible to achieve the highest production rate. It also depends on transfer procedures of technology too. The adoption behavior of the farmers also plays an important role in this case. The adoption behavior of the farmers can greatly be influenced by their local opinion leaders. The role of opinion leaders has tremendous influence on transmission procedure. This research has found that the opinion leaders are very knowledgeable in agricultural perspectives and efficient in technology transfer. Opinion leaders could be involved in extension work for making the extension program successful as well as changing the poor situation of the farmers to a desired standard situation. The results and discussions of this research can serve as a source of information on the role of opinion leaders in extension work. This research is also helpful in the assessment of the role played by the opinion leaders in technology transfer among the farmers.

3.1 Selected Characteristics of the Respondents

The maximum OLs and farmers are middle aged. The middle age OLs are more optimistic about the technologies and they are eager to transmit their knowledge towards farmers than the old aged OLs. Researchers have found middle aged farmers (60.0%) were highly involved in farming followed by young aged (20.0%) and old aged farmers (20.0%) [7]. In present time many young people are involving in farming occupation. Youngest and middle aged Opinion leaders are more appreciated for disseminating information among the farmers regarding technologies. Educational qualification both in Opinion leaders and farmers were quite well. The highest portion of the respondents had secondary level of education. Scientists have found major proportion (55%) of respondents had secondary level of education while (24.2%) farmers had primary level of education, (11.7%) of respondents had higher secondary level of education [7]. In recent years educated young people are interested in farming. Educated OLs are now involving themselves to take parts in different government arranged programs, they are up to date and acknowledged about the use of apps or other technology in farming. The level of education accelerated the way of technology transfer among the respondents. The study showed us where the monthly income of the highest portion (52.9%) of the farmers was medium level, the income level of the maximum (68%) OLs were low. The maximum income of the farmers was 68,000 BDT, in case of OLs it was only 35,000 BDT. Authors have found majority (52.80%) of the respondents belonged to medium income group as compared to low (34%) and high (13.20%) income groups [8]. In this area the farmer's family income is increasing day by day. In case of OLs, they are not provided any fees or payment for their service. The local OLs always try to help their neighbors, relatives and friends regarding information without any payment. Among the respondents the percentage of respondents who received training on different agricultural technologies and practices was higher in opinion leaders than the farmers. Although the level of training received was low in both OLs and farmers. We have found 44% OLs had no training, followed by 40% had ≤2 trainings, 12% had 3-5 trainings, and only 4% had >5 trainings. We also found that 64.29% farmers had no training, followed by 34.29% had ≤2 trainings, and only 1.42% had 3-5 trainings, and none had > 5 trainings. Researchers have also found that most of the respondents (90.8%) had no training and small portion (6.7%) of the respondents had received low (<3) training and only a few portion (2.5%) of respondents had higher number (>5) of training [7]. There are very low training facilities of the respondents in both for Opinion Leaders and for Farmers. People are not aware of the advantages of taking training and sometimes nepotism works in selecting person suitable for training. The authority should have increased the training facilities for the betterment in this area. 100% opinion leaders were related to different organization in Dumuria. The farmer percentage in organizational participation was also higher (85.72%). The level of participation for both OLs and farmers was lower. Authors have found majority (68%) of respondents had participation of different organization and (32%) of respondents had no participation [9]. Majority of the OLs (52.0%) were highly cosmopolite where the majority of the farmers were low in cosmopolitanism.

The researchers have defined that, opinion leaders as

individual who receive information from media and pass it along to their peer [10]. They are individual who are knowledgeable about various topics and whose advice are taken seriously by others. In our research we have found the similar results. They often tend to be socially very active and highly interconnected within the community. Moreover, it was found that "*effective opinion leaders tend to be slightly higher than the people they influence in terms of status and educational attainment, but not so high as to be in a different social class*". This way, the leaders are still a part of their audience's reference group. Our findings are also supporting this saying.

Table 1. Selected characteristics of respondents (OLs and farmers)

Characteristics	Respondents	Categories	Number	%	Mean±SD ($\overline{X} \pm \delta$)	Range
Age (Years)	OLs N= 25	Young(≤35)	7	28.0	42.6±10.84	27-65
		Middle(36-55)	13	52.0		
		Old(>55)	5	20.0		
	Farmer N=70	Young(≤35)	27	38.6	41.54±12.47	21-75
		Middle(36-55)	35	50.0		
		Old(>55)	8	11.4		
Educational Qualification (Schooling years)	OLs N=25	Illiterate(0)	0	0	8.91±3.96	2-16
		Can sign only(0.5)	0	0		
		Primary(1-5)	5	20.0		
		Secondary(6-10)	10	40.0		
		Higher Secondary(11-12)	4	16.0		
		Undergraduate(13-16)	6	24.0		
		Postgraduate(>16)	0	0		
	Farmer N=70	Illiterate(0)	0	0	7.70±3.42	2-15
		Can sign only(0.5)	0	0		
		Primary(1-5)	26	37.2		
		Secondary(6-10)	30	42.8		
		Higher Secondary(11-12)	12	17.2		
		Undergraduate(13-16)	2	2.8		
		Postgraduate(>16)	0	0		
Family Size (ha)	OLs N=25	Small (≤4)	10	40.0	4.88±1.33	3-8
		Medium(5-6)	12	48.0		
		Large (>6)	3	12.0		
	Farmer N=70	Small (≤4)	22	31.4	4.35±1.97	2-12
		Medium (5-6)	35	50.0		
		Large (>6)	13	18.6		
Farming experience (Years)	OLs N=25	Low (≤10)	3	12.0	19.74±10.69	0.5-45
		Medium (11-20	16	64.0		
		High (>20)	6	24.0		
	Farmer N=70	Low (≤10)	20	28.6	19.22±10.72	5-55
		Medium (11-20)	29	41.4		
		Medium (11-20)	21	30		
Knowledge on agriculture (Score)	OLs N=25	Low (<3)	0	0	9.6±1.38	5-10
		Medium (4-6)	2	8.0		
		High (>6)	23	92.0		
	Farmer N=70	Low (<3)	0	0	9.1±1.83	5-10
		Medium (4-6)	11	15.7		
		High (>6)	59	84.3		

Table 1 continued

Characteristics	Respondents	Categories	Number	%	Mean±SD ($\overline{X} \pm \delta$)	Range
Farm size (ha)	OLs N=25	Landless(≤0.02)	0	0	1.22±2.11	0.02-10.71
		Marginal (0.02-0.2)	4	16.0		
		Small(0.21-1.0)	13	52.0		
		Medium(1.01-3)	6	24.0		
		Large(>3)	2	8.0		
	Farmer N=70	Landless(≤0.02)	0	0	0.47±0.57	0.02-4.04
		Marginal (0.02-0.2)	24	34.3		
		Small(0.21-1.0)	36	51.4		
		Medium(1.01-3)	8	11.4		
		Large(>3)	2	2.9		
Family Income (BDT month^{-1})	OLs N=25	Low (<15000)	17	68.0	13840±7652.23	5000-35000
		Medium (15000-25000)	6	24.0		
		High (>25000)	2	8.0		
	Farmer N=70	Low (<15000)	31	44.3	16642.9± 8789.05	4000-68000
		Medium (15000-25000)	37	52.9		
		High (>25000)	2	2.9		
Training received (Number)	OLs N=25	No (0)	11	44.0	1.06±0.63	2-4
		Low (≤2)	10	40.0		
		Medium (3-5)	3	12.0		
		High (>5)	1	4.0		
	Farmer N=70	No (0)	45	64.29	1.48± 0.58	1-3
		Low (≤2)	24	34.29		
		Medium (3-5)	1	1.42		
		High (>5)	0	0		
Organizational Participation (Score)	OLs N=25	Low (≤8)	22	88.0	4.68± 2.70	1-7
		Medium (9-16)	3	12.0		
		High (>16)	0	0		
	Farmer N=70	No (0)	10	14.28	1.83± 1.18	1-7
		Low (≤8)	60	85.72		
		Medium (9-16)	0	0		
		High (>16)	0	0		
Cosmopolitanism (Score)	OLs N=25	Low (≤5)	3	12.0	11.70±3.72	5-15
		Medium (6-10	9	36.0		
		High (>10)	13	52.0		
	Farmer N=70	Low (≤5)	27	38.6	8.52±3.50	4-15
		Medium (6-10	27	38.6		
		High (>10)	16	22.8		
Extension media contact (Score)	OLs N=25	No (0)	0	0	60.24±11.22	41-90
		Rare (1-24)	3	12.0		
		Occasional (25-48)	19	76.0		
		Often (49-72)	3	12.0		
		Regularly (>72)	0	0		
	Farmer N=70	No (0)	0	0	48.62±7.96	33-69
		Rare (1-24)	0	0		
		Occasional (25-48)	36	51.4		
		Often (49-72)	24	48.6		
		Regularly (>72)	0	0		

3.2 Role of OLs as Perceived by Respondents in Technology Transfer

Authors have found that opinion leaders can bring legitimacy to a social movement. Known as "legitimizers", these social opinion leaders are judges, politicians, business executives, clergy members, sports figures and entertainers. Such people help "legitimize" a cause in the eyes of the public by marching in demonstrations, appearing at rallies, donating money, speaking in favor of the cause, and so forth [11]. We also found the opinion leaders doing the similar things in transferring agricultural technologies among the rural farmers in our study area.

Scientists have found from their study conducted in South Africa that opinion leaders are considered by the fellow farmers as the most reliable sources for obtaining information [12].

Authors have pointed out that all persons do not exert equal amount of influence on the adoption decisions of others. These individuals who have a greater share of influence are called opinion leaders [13]. According to him, opinion leaders are these individuals from whom others seek advice and information.

From Table 2 we can draw a comparative picture of role play by the OLs in providing extension service to the farmers.

3.3 Problem Faced by the OLs in Technology Transfer among Farmer

The comparative picture of the OLs problems perceived by the respondents is presented as follows:

Less recognition by the government was the first ranked problem as per the farmers' perception; on the other hand, lack of media exposure was the first ranked problem to the OLs.

3.4 Role of Farmer as a Recipient of Extension Service

The data presented Table 4 showed the different roles of farmers as a recipient in the service provided by the OLs as perceived by the respondents. Asking solution for particular problem ranked first in the index as perceived by the OLs.

Table 2. Role of opinion leader extent Index as perceived by OLs

Sl. No.	Role of OL in technology transfer	Extent of role (%)		Rank	
		Perceived by OLs	Perceived by farmers	OLs	Farmers
1.	Collect agricultural information regularly	95	80.71	4th	6th
2.	Keep contacts with extension agent	70	56.79	11th	13th (=)
3.	Participate in method demonstration	72	55.00	10th (=)	17th
4.	Participate in result demonstration	74	55.36	9th (=)	16th
5.	Give farmers information	99	86.43	2nd	3rd
6.	Give remedies on agricultural problem to the farmers	91	77.86	5th(=)	8th
7.	Give farmers information obtained from mass media	88	80.36	6th	7th
8.	Give farmers information obtained from extension agent	45	54.64	16th	18th
9.	Visit upazila agricultural office for solution of particular problem	51	42.88	14th	20th (=)
10.	Advice farmers to adopt modern technologies	84	76.07	7th	9th (=)
11.	Serve as catalyst for extension agent	72	56.43	10th(=)	14th
12.	Help farmers when they are in problem	91	83.93	5th (=)	4th
13.	Serve as center of interpersonal communication	63	56.79	12th	13th (=)
14.	Give advice to the farmer regarding marketing	74	64.29	9th (=)	12th
15.	Advice farmers to adopt agri-machinery for their crops	83	76.07	8th	9th (=)
16.	Attend in different training program	48	44.64	15th	19th
17.	Arrange different kind of motivational program for the farmers	62	42.88	13th	20th (=)
18.	Act as a transfer agent of agricultural technologies	72	72.14	10th(=)	11th
19.	Give financial support to the farmer	42	42.88	17th	20th (=)
20.	Remain unbiased to share information	100	97.14	1st	1st
21.	Having contacts with cities, towns and other areas outside their own communication	61	55.71	14th	15th
22.	Support farmer organization	96	90.00	3rd	2nd
23.	Use political influence to mediate development in positive direction	2	17.14	18th	21th
24.	Influence late adopters to move forward for adopting innovation	88	82.00	6th	5th
25.	Implement technologies to their own	85	73.93	7th	10th

Extreme 5 roles of OLs as perceived by them	Extreme 5 roles of OLs as perceived by farmers
1. Remain unbiased to share information	1. Remain unbiased to share information
2. Give farmers information	2. Support farmer organization
3. Support farmer organization	3. Give farmers information
4. Collect agricultural information regularly	4. Help farmers when they are in problem
5. Give remedies on agricultural problem to the farmers	5. Influence late adopters to move forward for adopting innovation

Table 3. Problem severity index of OLs as perceived by the respondent

Sl. No.	Problem faced by OLs	Problem severity score (%)		Rank	
		Perceived by OLs	Perceived by farmer	OLs	Farmers
1.	Many farmer do not share their problem	23	32.50	9th	7th
2.	Farmers are not agreed to make model demonstration farm	24	33.93	8th	5th
3.	Low eagerness of the farmers to attend in extension program	30	33.21	6th	6th
4.	Tendency of the farmer to follow conventional cultivation	27	30.00	7th	9th
5.	Traditional/ orthodox behavior of the farmer	22	30.36	10th	8th
6.	Less social appreciation	49	50.36	4th	4th
7.	Less co-operation by the extension agent	58	67.14	3rd	3rd
8.	Less recognition by the government	75	74.26	2nd	1st
9.	Lack of media exposure	81	73.93	1st	2nd
10.	Interruption by middle man	31	26.43	5th	10th

Extreme 5 problems of OLs as perceived by OLs themselves	Extreme 5 problems of OLs as perceived by farmers
1. Lack of media exposure	1. Less recognition by the government
2. Less recognition by the government	2. Lack of media exposure
3. Less co-operation by the extension agent	3. Less co-operation by the extension agent
4. Less social appreciation	4. Less social appreciation
5. Interruption by middle man	5. Farmers were not ready to make model demonstration farm

Table 4. Role of farmer extent index as perceived by the OLs

Sl. No.	Role of farmer	Role extent score (%)		Rank	
		Perceived by OLs	Perceived by farmer	OLs	Farmers
1.	Asking solution for particular problem	93	82.14	1st	4th
2.	Timely approach	90	76.78	3rd	8th
3.	Keeping regular contact to OL	92	83.57	2nd	3rd
4.	Ask for economic help	46	50.00	15th	15th
5.	Showing desire for adopting new technologies	82	81.07	8th	6th
6.	Asking help for farm management	84	88.92	6th	1st
7.	Asking help for pesticide application	83	81.78	7th	5th
8.	Asking help for marketing agricultural products	78	77.86	10th	7th
9.	Asking technical guideline	85	72.50	5th	10th
10.	Arrangement of training program	58	50.71	12th	14th
11.	Method demonstration programs	56	47.86	13th	13th
12.	Plot demonstration programs	55	48.93	14th	13th
13.	Motivational program	60	50.00	11th	12th
14.	Mutual discussion of profitability	80	76.43	9th	9th
15.	Asking guidelines for organization	89	84.64	4th	2nd

On the basis of the respondent responses the role of the farmers can be compare with their holding position in the above Table 4.

Table 5 presented the picture of role playing of OLs in providing extension service to the farmer. Both of the respondents mention that important role was playing by the OLs. The proper supervision and the carefulness were very important among for receiving the role benefits by the farmers.

The data presented in Table 6 indicate that majority of the OLs had moderate problems and rest had severe problem as perceived by the respondents. The minimum and maximum score was 10 and 23, 9 and 44 respectively.

Extreme 5 role of farmers as perceived by OLs themselves	Extreme 5 role of farmers as perceived by the Farmers
1.Asking solution for particular problem 2. keeping regular contact to OL 3. Timely approach 4. asking guideline for organization 5. Asking technical guideline	1. Asking help for farm management. 2. asking guideline for organization 3. keeping regular contact to OL 4. asking solution for particular problem 5. asking help for pesticide application

Table 5. Distribution of opinion leader according to their role in providing extension service to the farmers

Role by	Categories	Score	Number	%	Mean±SD ($\overline{X} \pm \delta$)	Range (observed)	
						Minimum	Maximum
OLs N=25	No role	0	0	0	72.76.8±7.34	60	93
	Less important	<25	0	0			
	Moderate	26-50	0	0			
	Important	51-75	15	60.0			
	Very important	>75	10	40.0			
Farmers N=70	No role	0	0	0	64.87±8.01	43	84
	Less important	<25	0	0			
	Moderate	26-50	3	4.3			
	Important	51-75	61	87.1			
	Very important	>75	6	8.6			

Table 6. Distribution of opinion leader according to the problem extent as perceived by the respondents

Problems faced by	Categories	Score	Number	%	Mean±SD ($\overline{X} \pm \delta$)	Range (observed)	
						Minimum	Maximum
OLs N=25	No	0	0	0	16.0±3.81	10	23
	Less	<10	2	8.0			
	Moderate	11-20	18	72.0			
	Severe	21-30	5	20.0			
	Highly severe	>30	0	0			
Farmer N=70	No	0	0	0	19.0±6.34	9	44
	Less	<10	2	2.8			
	Moderate	11-20	46	65.7			
	Severe	21-30	19	27.1			
	Highly severe	>30	3	4.4			

3.4.1 Relationship between the Selected Characteristics of the Respondent OLs and Their Extent of Role

From Table 8 we observed that among the selected eleven characteristics family income, training received and extension media contact had a significant and positive relationship with the extent of role of the opinion leader in providing extension service to the farmer at 1% level of significant.

3.4.2 Relationship between the Selected Characteristics of the Respondent OLs and Their Extent of Problem

Again from Table 9 we conclude that among the selected eleven characteristics educational qualification, family income, organizational participation, training received and extension media contact had negative and non-significant relationship with the extent of problem of OLs. That means higher the score of characteristics higher the ability to identify problems and ability to solve the problem. Age, family size, farming experience, farming knowledge, farm size and cosmopolitanism had a positive and non-significant relationship with extent of problems of OLs. Based on the findings, null hypothesis is accepted.

Majority of the OLs (60%) had an important role, and rest had (40%) a very important role. When the role was cross checked by the farmers it was found that majority of the OLs (87.1%) had important role in extension service. Remain unbiased to share information, give farmers information, support farmer's organization, collect agricultural information regularly and helping farmers in problem ranked 1st, 2nd, 3rd, 4th and 5th respectively. Majority of the OLs (72%) had moderate problem. The problem extent was checked by the respondent farmers where majority (65.7%) of the OLs had moderate problem. Majority of the farmers (80%) play an important role according to the OLs. In case of farmer perception majority (84.3%) of the respondents assumed that they play important role as a recipient of the service provided by the OLs. The major problems of OLs faced in technology transfer are lack of media exposure, less recognition by the government and less cooperation by the extension service. Farmers role are extremely visible in asking solution for particular problem, keeping contact regularly with the OLs and timely approach. The entire discussion indicates a significant need of OLs in technology transfer especially in rural areas.

Table 7. Distribution of farmer according to their role as recipient of extension service as provided by the OLs

Role by	Categories	Score	Number	%	Mean±SD ($\overline{X} \pm \delta$)	Range (observed)	
						Minimum	Maximum
OLs **N=25**	No role	0	0	0	44.72±4.63	35	52
	Little role	<20	0	0			
	Moderate	21-35	2	8.0			
	Important	36-50	20	80.0			
	Very important	>50	3	12.0			
Farmers **N=70**	No role	0	0	0	41.85±5.37	28	52
	Little role	<20	0	0			
	Moderate	21-35	7	10.0			
	Important	36-50	59	84.3			
	Very important	>50	4	5.7			

Table 8. Relationship between the selected characteristics of the respondent opinion Leader and their extent of role

Selected characteristics	Focus Variable	Coefficient of Correlation (r)
		Opinion Leader
Age	Extent of Role of Opinion Leader	–0.128
Educational qualification		0.396
Family size		0.091
Farming experience		–0.242
Farming knowledge		0.072
Farm size		–0.058
Family income		0.581**
Organizational participation		0.390
Training received		0.722**
Cosmopolitanism		0.140
Extension media contact		0.531**

Table 9. Relationship between the selected characteristics of the respondent opinion Leader and their extent of problem

Selected characteristics	Focus Variable	Coefficient of Correlation (r)
		Opinion Leader
Age	Problem of Opinion Leader	0.002
Educational qualification		–0.033
Family size		0.195
Farming experience		0.317
Farming knowledge		0.323
Farm size		0.173
Family income		–0.079
Organizational participation		–0.029
Training received		–0.276
Cosmopolitanism		0.021
Extension media contact		–0.100

4. Conclusions

By virtue of the social position, age, education, family reputations, wealth, prestige or political contacts the opinion leaders influence most action programs dealt by the farmers. The objectives of the study were to determine the role of OLs in technology transfer among farmers and explore the relationship between selected characteristics and extent of role played by the OLs regarding technology transfer. The study was conducted at Dumuria upazila under Khulna district of Bangladesh during October 20, 2021 to January 5, 2022. From the study area 70 farmers were randomly selected, and based on their opinions and contact with the DAE office, 25 opinion leaders were selected purposively. Data were collected through face-to-face interview.

The findings of the study indicate that all Opinion Leaders play important to very important role in technology transfer among the farmer. Majority of the OLs face moderate to acute problems in playing their role as provider of extension service to the farmers, whereas majority of the farmers also play important to very important role as recipient of extension service provided by the OLs. The accommodated role of the opinion leaders and farmers can achieve the highest rate of production rate with using of modern technologies in agriculture. Opinion leaders role has significant effect on transferring technology among the farmers. Thus OLs need to be involved in program planning and its execution in the area.

Authority should give a look on the OLs and give them support, to involve properly in technology transfer program in agriculture. Government and the authorities as well as the media should take care of incentives required

by an OL to make agricultural extension effective in field level.

Authors' Contributions

1.	*Susmita Datta*	Data collection, data analysis, manuscript writing
2.	*Md. Matiul Islam**	Research design, research supervision, data analysis, manuscript editing
3.	*Mohammad Bashir Ahmed*	Research co-supervision, manuscript editing

Conflict of Interest

There is none competing for the interests regarding the submitted manuscript, and the conducted research, except the authors mentioned in the author list.

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