Research Article

Present Scenario and Problem Confrontation of Tomato (*Solanum lycopersicum* L.) Growers in Khulna District

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A B S T R A C T

The objectives of this study were to analyze the present scenario of tomato production and to explore the relationship between personal characteristics of the respondents and the problems confronted by them. Data were collected from randomly selected 50 respondents of five villages viz. Raingamari, Sachibunia and Dorgatola of Bathiaghata upazila and Mirzapur and Baratia of Dumuria upazila of Khulna district through personal interview method using an interview schedule during 11 March to 23 April, 2018. Problems confronted by the farmers were the dependent variable and the seven selected characteristics of the respondents considered as the independent variables. Most of the farmers (80%) possessed medium high land but majority of them (68%) bought small and marginal amount of land under vegetable and tomato cultivation respectively. The farmers cultivate Surakkha (80%) varieties followed by Guli (21%) and Paltola (18%). Fruit borer (62%) and wilting (70%) was the most prevalent insect and disease of tomato respectively. About half of the respondents (48%) fell into high problem confrontation category as compared to that of medium (32%) and low (20%) category. High cost of materials (86.67%) was the most reported severe problem while unavailability of labors (22.67%) was the least severe problem. Among the seven selected characteristics of the respondents, annual family income and area of land under tomato cultivation showed a negative significant relationship with their problem confrontation.

INTRODUCTION

Tomato (*Solanum lycopersicum L.*) is one of the most important solanaceous vegetable crops in the world in terms of both production and cultivated area. It ranks third in terms of world vegetable production (FAO, 2011) next to potato and sweet potato. Tomato as vegetable and fruit crop occupies an important place in healthy daily diet. During the last 50 years, tomato has become a popular and highly consumed food because it contains a variety of nutrients that are beneficial to overall health, including vitamin E, trace elements, flavonoids, phytosterols, and several water-soluble vitamins (Agarwal and Rao, 1998). Tomato is also a rich source of folate, vitamin C and vitamin A (Canene-Adams *et al.,* 2005). Moreover, the antioxidant activity of lycopene as well as several other carotenoids and their abundance makes tomato a rich source of antioxidants.

In Bangladesh, tomato is cultivated all over the country due to its adaptability to wide range of soil and climate. Production of tomato in Bangladesh is 368 thousand tons (BBS, 2017). Low yield of tomato in Bangladesh may be explained with various factors like insects, diseases, soil salinity, climate, farm size, variety etc. (Kakar et al., 1990). So it is necessary to increase the production of tomato crops in Bangladesh to fulfill people's nutritional demand.

Bangladesh is an extensively populated country with its limited land area. Agricultural land is gradually converting to homestead and other uses to meet the demand of growing people. Due to the extensive cultivation of shrimp in the agricultural lands of Khulna region, the scope of vegetables production is decreasing day by day. The increasing homestead area and dikes of shrimp farms can be brought under vegetable cultivation. Along with salinity, numerous problems also hinder cultivation of tomato in this region. Thus the present study was undertaken with a view to:

i. analyze the socio-economic profile of the respondents
ii. study the present scenario of tomato production
iii. identify the problems confronted by the farmers and
iv. explore the relationships between the selected characteristics of the respondents and their problem confrontation

METHODOLOGY

The study was conducted at five selected villages namely Raingamari, Sachibunia, Dorgatola in Bathiaghata upazila and Mirzapur, Baratia in Dumuria upazila of Khulna district during 11 March to 23 April, 2018. A number of 50 tomato growers were selected and treated as sample of the study. The interview schedule was prepared for data collection in Bangla. The interview schedule contained both simple and direct form of questions to collect data on the selected variables. The researcher met the selected respondents and explained the purpose of the study and requested them to co-operate for collecting data with the help of the interview schedule. After completion of survey all the interview schedules were compiled for data processing. At first all the qualitative data were converted into quantitative form by means of suitable code and score whenever necessary. In several instances indices and scales were constructed through the simple accumulation of

scores assigned to individual or pattern of attributes. Indices and scales are considered the efficient instrument for data reduction and analysis. Seven selected characteristics related to the respondents were treated as independent variable for this study. The selected characteristics were age, occupation, annual family income, family size, farm size, land area under vegetable cultivation and land area under tomato cultivation. Present scenario of tomato production was determined based on some parameters viz. - land area under vegetable cultivation, land area under tomato cultivation, cultivated tomato varieties, incidence of insects and infestation of diseases. For determining problem confrontation (the dependent variable), 4-point rating scale such as highly severe, moderately severe, negligible and not at all was employed against each of the problems and a score of 3, 2, 1 and 0 was assigned against the rating scale respectively. Each of the respondents was asked to rate the extent of problem confrontation against each of the 10 problems. Thus, the problem confrontation score of a respondent could range from '0' to '30' where '0' indicates no problem confrontation and '30' indicates high problem confrontation. To compare among the statements related to problems about tomato cultivation, PCI (Problem Confrontation Index) was calculated. For better understanding of the problems, the PCI score was converted into percentage. Problem Confrontation Index (PCI) was calculated by using the following formula:

$$PCI = N_1 \times 3 + N_2 \times 2 + N_3 \times 1 + N_4 \times 0$$

Where,
N_1 = No. of respondents rated the problems as highly severe
N_2 = No. of respondents rated the problems as moderately severe
N_3 = No. of respondents rated the problems as negligible
N_4 = No. of respondents rated the problems as not at all

After collection, data were analyzed and tabulated for interpretation. Statistical parameters such as number, mean, standard deviation, range, rank order etc. were used to interpret data. To explore relationship between any two variables Pearson's product correlation 'r' and Spearman rank correlation and regression analysis were employed. For analysis of data Statistical Package for Social Science (SPSS) version 20 was used.

RESULTS AND DISCUSSION

The results of this study have been presented according to the objectives. The selected characteristics of the respondents have been presented in this section.

Socio economic profile of the respondents

The socio economic profile of the respondents was determined based on some parameters viz.– age, occupation, annual family income, family size and farm size (Table 1). The age of the respondents was varied markedly. Based on age, the respondents were classified into different categories are shown in Table 1. The age of the respondents ranged from 25 - 75 with a mean and standard deviation of 44.28 and 12.06 respectively. Data presented in Table 1 reveal that about 40% of the respondents were middle aged, 32% young and 28% were old. The occupation of the respondents were measured by what he/she was doing for the living professionally. Based on occupation, the respondents were classified into four

categories. The occupation of the respondents ranged from 2-28 with a mean and standard deviation of 12.5 and 12.39 respectively. The data shows that 56% of the respondents were farmer, 34% were business man, 6% were service holder and 2% were in other professions. The distribution of the respondents according to their annual family income indicated that annual family income ("000" BDT) ranged from 50-800 with a mean and standard deviation of 287 and 176 respectively. The majority (58%) of the respondents reported medium income while 24% had high income. Only 18% of the respondents had low income. Based on their family size scores, the respondents' families were classified into three categories. The family size (number) of the respondents ranged from 3-9 with a mean and standard deviation of 5.34 and 1.40 respectively. Data presented in Table 1 showed that majority (62%) of the respondents belonged to the medium sized family while 30% and 8% of the respondents belonged to small size family and large size family, respectively. The farm size of the respondents ranged from 0.10-12.15 ha with a mean and standard deviation of 0.82 and 1.67 respectively. The findings regarding farm size of the respondents show that most (80%) of the respondents possessed medium sized farm compared to 14% and 4% of them having small and marginal sized farm respectively.

Present scenario of tomato cultivation

Data on present scenario of tomato cultivation were presented in Table 2. The area of land under vegetable cultivation ranged from 0.02-4.05 ha with a mean and standard deviation of 0.18 and 0.57 respectively. Data on Table 2 show that majority (68%) of the respondents brought small sized farm under vegetable cultivation while 20% of them brought marginal sized farm and 10% of them brought medium sized farm. The land under tomato cultivation ranged from 0.01-0.81 ha with a mean and standard deviation of 0.06 and 0.13 respectively. The results regarding land area under tomato cultivation reveal that most of the respondents (90%) were marginal farmers compared to 6% and 4% of them under small sized farm and landless respectively. Number of cultivated varieties ranged from 1-3 with a mean and standard deviation of 1.22 and 0.46 respectively. Most of the farmers (80%) cultivate the tomato variety Surakkha followed by Guli (21%) and Paltola (18%). Incidence of insects ranged from 1-3 with a mean and standard deviation of 1.54 and 0.76 respectively. Incidence of fruit borer was dominant (62%) followed by cutworm (22%) and nematode (16%). Data on infestation of disease ranged from 1-3 with a mean and standard deviation of 1.52 and 0.83 respectively. The infestation of wilting disease (70%) was dominant followed by blight (8%) and leaf curl virus (2%).

Problem confrontation

Distribution of the respondents according to their problem confrontation score is shown in Table 3. The problem confrontation score of the respondents ranged from 7 to 27 with a mean and standard deviation of 16.62 and 5.44 respectively. Data presented in Table 3 indicate that about half (48%) of the respondents had high problem confrontation followed by medium (32%) and low (20%) problem confrontation.

Table 1. Socio economic profile of the respondents

Characteristics	Category	Percentage	Mean	Sd	Range	
					Min	Max
Age (Year)	Young (<35)	32	44.28	12.06	25	75
	Middle aged (35-50)	40				
	Old (>50)	28				
Occupation	Farmer	56	12.5	12.39	2	28
	Business man	34				
	Service holder	6				
	Others	4				
Annual family income ("000" Taka)	Low income (<75)	18	287	176	50	80
	Medium income (75-150)	58				
	High income (>150)	24				
Family size (Number)	Small (<5)	30	5.34	1.40	3	9
	Medium (5-7)	62				
	Large (>7)	8				
Farm size (ha)	Landless (<0.02)	0	0.82	1.67	0.10	12.15
	Marginal (0.02-0.20)	4				
	Small (0.21-1.00)	14				
	Medium (1.01-3.00)	80				
	Large (>3.00)	2				

Table 2. Present scenario of tomato cultivation

Characteristics	Category	Percentage	Mean	Sd	Range	
					Min	Max
Land under vegetable cultivation (ha)	Landless (<0.02)	0	0.18	0.57	0.02	4.05
	Marginal (0.02-0.20)	20				
	Small (0.21-1.00)	68				
	Medium (1.01-3.00)	10				
	Large (>3.00)	2				
Land under tomato cultivation (ha)	Landless (<0.02)	4	0.06	0.13	0.01	0.81
	Marginal (0.02-0.20)	90				
	Small (0.21-1.00)	6				
	Medium (1.01-3.00)	0				
	Large (>3.00)	0				
Cultivated varieties	Surakkha	80	1.22	0.46	1	3
	Paltola	18				
	Guli	2				
Incidence of insects	Fruit borer	62	1.54	0.76	1	3
	Cutworm	22				
	Nematode	16				
Infestation of diseases	Blight	8	1.52	0.83	1	3
	Wilting	70				
	Leaf curl virus	2				

Comparative problem confrontation of farmers regarding individual statement related to problem of tomato production

Based on the Problem Confrontation Index (PCI) score and percent, the statement was also arranged in rank order as shown in the Table 4.

Data presented in Table 4 indicate that the farmers' had high problem confrontation regarding 'high production cost for materials (Seed, Fertilizer, Pesticide etc.)', 'low market price' and 'high incidence of diseases and pests' etc. On the other hand, the farmers had low problem confrontation regarding 'unavailability of labors', 'land does not available timely for cultivation' and 'low yield'.

Relationship between the selected characteristics of the respondents and problems confronted

This section deals with the relationship between selected characteristics of the tomato farmers and their problems confronted. To explore the relationships between the selected characteristics of the respondents and their problems confronted Pearson's Product Moment co-efficient of correlation (r) as well as Spearman Rank Correlation Coefficient were used. The relationship of the selected characteristics of the respondents with their problems confronted appeared in Table 5. Data presented in Table 5 show that among 10 selected characteristics of the respondents, family income and land area under tomato cultivation showed a significant negative relationship with their problems confronted. It means that with the increase of family income and land area under tomato cultivation the problems confronted by the farmers decreases significantly. Ghosh (2007) found opposite result in his study. He found that annual income of farmers had a positive significant effect on their problem confrontation. Rahman (2001) and Rahman (2011) found that family size and farmers' education have negative relations with their problem confrontation.

Table 3. Distribution of respondents according to their problem confrontation score

Categories	Score	Distribution of respondents (N= 50)		Mean	Sd	Range	
		Number	Percentage			Min	Max
Low problem confrontation	1-10	10	20	17.62	5.44	7	27
Medium problem confrontation	11-20	16	32				
High problem confrontation	>20	24	48				
Total		50	100				

Table 4. Relative position (rank order) of the statements related to problem regarding production of tomato based on Problem Confrontation Index (PCI)

Sl. No.	Problems	Extent of Severity				PCI		Rank
		High (3)	Moderate (2)	Low (1)	Not at all (0)	Score	Percent	
1.	Scarcity of quality seed	39 (13)	26 (13)	7	17	72	48	6th
2.	Land does not become available timely for cultivation	6 (2)	18 (9)	12	27	36	24	9th
3.	High incidence of diseases and pests	63 (21)	32 (16)	7	5	100	66.67	3rd
4.	Unavailability of labors	9 (3)	18 (9)	7	19	34	22.67	10th
5.	High production cost for materials (Seed, Fertilizer, Pesticide etc.)	108 (36)	18 (9)	4	1	130	86.67	1st
6.	Impurities of pesticides	36 (12)	26 (13)	16	19	78	52	5th
7.	Low yield	30 (10)	26 (13)	11	16	67	44.67	8th
8.	Low market price	93 (31)	16 (8)	9	2	118	78.67	2nd
9.	Lack of preservation/processing facilities	36 (12)	40 (20)	15	3	91	60.67	4th
10.	Unavailability of cold storage	36 (12)	36 (18)	16	3	68	45.33	7th

Table 5. Computed coefficient of correlation (r) and spearman rank correlation between the selected characteristics of the respondents and their extent of adoption

Characteristics (Independent variable)	Dependent variable	Correlation coefficient	Remark
Age		-0.018[NS]	PPCC
Occupation	Confronted problems	-0.041[NS]	SRCC
Family income		-0.406[**]	PPCC
Family size		0.057[NS]	PPCC
Farm size		-0.115[NS]	PPCC
Area of land under vegetable cultivation		-0.068[NS]	PPCC
Area of land under tomato cultivation		-0.320[*]	PPCC

NS= Non-significant **. Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed). PPCC =Pearson's Product Moment co-efficient of correlation. SRCC =Spearman Rank Correlation Coefficient.

CONCLUSIONS

Most of the farmers (80%) possessed medium high land but majority (68%) of them bought small and marginal amount of land under vegetable and tomato cultivation respectively. The farmers mostly cultivate Surakkha varieties (80%) followed by Guli (21%) and Paltola (18%). Fruit borer (62%) and wilting (70%) was the most prevalent insect and disease of tomato. About half of the respondents (48%) fell into high problem confrontation category as compared to medium (32%) and low (20%) problem confrontation category. High cost of materials was the most severe problems (86.67%) while the least severe problem (22.67%) was the unavailability of labors. Among seven selected characteristics of the respondents, annual family income and land area under tomato cultivation showed a negative significant relationship with their problem confrontation.

RECOMMENDATIONS

1. Similar research should be conducted by the researchers in other areas of Bangladesh.
2. Training programs should be arranged for farmers.
3. Marketing facilities should be increased.

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