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ABSTRACT

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Litchi is a popular summer fruit in Bangladesh and the production of litchi is increasing day by day. However, the production procedure of litchi is not a problem free venture. The Meherpur district of Bangladesh is a suitable place for commercial cultivation of litchi. Thus, the present study was conducted to determine the status of litchi cultivation and to identify the problems confronted by the litchi growers of Meherpur Sadar and Mujibnagar upazila of Meherpur district, Bangladesh. Data were collected through a pre-tested interview schedule from 60 respondents selected by accidental sampling during May to June, 2019. Majority of the respondents (58.3%) belong to early initiation category of litchi cultivation (during 1996 to 2012) with early (3-5 years) fruit collection (51.7%). Most of the respondents (80.0%) allotted small area (up to 0.5 ha) of land for litchi cultivation; and 41.7% used low extent for litchi cultivation i.e., 40% of the potential area; and all the respondents belonged to continuous adoption category. Most of the respondents (80.0%) cultivate Bombai variety and 73.3% had moderate number (86-135) of plants in their orchard; and about one-third of the respondents (30.0%) maintain a spacing of 4.65m×6.20m in their litchi orchard. Two-fifth (40.0%) of the respondents harvested a moderate yield (1,00,001-2,00,000 fruits ha⁻¹), however, most of the respondents (81.67%) argued that they get low price (up to 1,25,000 BDT ha⁻¹) from their litchi orchards. Majority of the respondents (68.33%) reported that litchi fruit and shoot borer infest their orchard while the orchards of 45% respondents were infested by fruit rot disease. Majority of the respondents (68.3%) confronted medium extent of problems followed by low (18.3%) and high (13.4%) extent of problems. The most severe problems were lack of training on litchi cultivation and low shelf life of litchi as reported by all (100%) of the respondents. Among eleven selected socioeconomic characteristics of the respondents' only farm size, annual income, cosmopolitanism and knowledge on litchi cultivation showed significant negative relationship with their problem confrontation. It might be concluded that proper, adequate and timely extension activities would minimize the extent of problems in litchi cultivation to ensure sustained higher yield in Bangladesh.

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INTRODUCTION

Litchi is a popular summer fruit in Bangladesh. It is botanically designated as *Litchi chinensis* Sonn. and widely known as litchi (pronunciation- "Lee-chee"), belongs to order "Sapindales and family "Sapindaceae". Litchi, one of the most environmentally sensitive subtropical tree fruit crops, is adapted to areas of the World characterized by warm subtropics and elevated tropics having cool dry winters and warm wet summers. The fruit consist of a single seed covered by an agreeable sweet-acid tasting, crisp, white, juicy, translucent aril or pulp, which is high in vitamin C. It may be eaten fresh, frozen, canned in syrup or dried to produce "litchi nuts". It is a vigorous evergreen perennial tree attaining a

height of above 5 meters with a broad crown and spreading branches and a dense light green shining foliage bears compound leaf. Flowers borne on panicles. The tree makes beautiful landscape specimens with their dark green leaves and bright red fruit (FAO, 2002).

Litchi fruit is native to China, is grown in India since 18th century. India is the second largest producer of litchi. India accounts for about one-fifth of the global production and has a good export potential. No reliable proof on the history of cultivation of litchi in Bangladesh is available. However, it is thought that litchi came from

Myanmar to Bangladesh in the early 19th century. Chinese varieties along with Indian cultivars like Mujaffarpuri and Bombai were introduced in the early 20th century from West Bengal by the efforts of nurserymen and plant lovers. Litchi is mainly cultivated in the backyard (2-3 plants), or in very small orchards (15-20 plants) adjacent to the homesteads. The dominant litchi cultivars of India and Bangladesh are Shahi, Bombai, China, Deshi, Calcutta, Rose Scented and Muzaffarpuri (Ghosh et al., 2001).

Litchi grows almost all over Bangladesh but the main areas of cultivation are Jessore, Rajshahi, Rangpur, Dinajpur, Khulna, Dhaka, Kushtia, Sylhet and Chittagong districts. Litchi was found to grow well too in the Government horticulture centers of three hill districts namely: Rangamati, Khagrachari and Bandarban and also in Jamalpur, Rajbari, Meherpur, Chapainawabgonj and Comilla. The expansion of the litchi area in these districts is relatively slow due to high mortality rate of young litchi plants. Most of the growers as well as extension agents do not have the required knowledge and skill in litchi cultivation. As a result, interested farmers very often fail to establish new orchards. In the year 2016-'17 the total area under litchi cultivation in Bangladesh was about 2,889 ha and total annual production was about 90,297 MT (BBS, 2018).

Bombai is the oldest high yielding variety in the country, although there are a number of other cultivars growing in different areas of Bangladesh. These are Rajshahi, Madraje, Mongalbari, Kadmi, Kalipuri, Muzaffarpuri, Bedana and China-3. Bedana and China-3, introduced in the 1950s, are now cultivated successfully in different parts of Bangladesh. Also there are many unnamed land races, most of which are sour in taste with low 'pulp : stone' ratio. Recently five varieties, namely: BARI Lichu-1, BARI Lichu-2, BARI Lichu-3, BARI Lichu-4 and BARI Lichu-5 have been released by the Bangladesh Agricultural Research Institute (BARI) for farmers' adoption (BARI, 2021). Among the released varieties BARI Lichu-3 is considered to be the best in respect of fruit size, pulp, color and yield. The variety closely resembles China-3 variety (FAO, 2002).

Meherpur is one of the major litchi growing areas in Bangladesh where litchi production is increasing day by day as most of the cultivable land of this district is high land and very fertile which is very suitable for orchard establishment. The weather condition of the area is also suitable for litchi cultivation. In the year 2016-'17 total area under litchi cultivation in Meherpur was 133.2 ha and total production was 939 MT (BBS, 2018).

Although the litchi cultivation is increasing day by day, no research has been conducted on litchi cultivation of Meherpur district so far. The production procedure is not free of problems. So, it is very important to know the present status of litchi cultivation and different problems associated with litchi cultivation. In view of the above background and facts, the present study was undertaken to identify the present scenario of litchi cultivation and to determine the extent of problem confrontation in litchi cultivation. Besides, the selected socio-economic characteristics of the respondents were

analyzed and their relationships with problem confrontation were also explored.

METHODOLOGY

Locale, Research Design, Source and Method of Data Collection

The study was conducted at Meherpur Sadar and Mujibnagar upazila in Meherpur district. Most of the cultivable land of Meherpur district is high land and very fertile which is very suitable for orchard establishment. The weather condition of the area is also suitable for litchi cultivation. The study was conducted following descriptive and diagnostic research design (Kothari, 2004). The study was confined to commercial litchi growers having litchi orchard of 0.134 ha or above. A number of 60 respondents (taking 30 from each of the upazilas) were selected as sample following accidental or convenience sampling method. Data were collected from the respondents by a pre-tested interview schedule through personal interview during May to June 2019.

Parameters for Determining Present Scenario of Litchi Cultivation

Present status of litchi cultivation was observed in terms of (i) year of initiation of litchi cultivation, (ii) first harvesting of litchi after cultivation inception, (iii) area under litchi cultivation (ha), (iv) extent of litchi cultivation (%), (v) varieties of cultivated litchi, (vi) number of litchi plants in the orchard, (vii) plants' spacing (m×m), (viii) intercultural operations conducted [application of irrigation, fertilizer and pesticides] (ix) yield of litchi (ha⁻¹), (x) price of litchi (100-piece⁻¹), (xi) total cost of production (BDT), (xii) gross income from litchi (BDT), and (xiii) net income from litchi (BDT) orchard.

Extent of litchi cultivation means the actual area (ha) under litchi cultivation divided by the potential area of litchi cultivation. It was calculated by using the following formula:

$$\% \text{ ELC} = \frac{\text{AAULC}}{\text{PAULC}} \times 100$$

Where, ELC- Extent of litchi cultivation; AAULC- Actual area of litchi cultivation; and PAULC- potential area of litchi cultivation.

Based on the extent of litchi cultivation, the respondents were classified into three different categories, viz. low ($\leq 40\%$), medium (41-60%) and high ($> 60\%$) extent.

Measurement of Problem Confrontation in Litchi Cultivation

A number of 12 problems were incorporated in the interview schedule by reviewing relevant literatures. A 4-point rating scale was employed against each of the problems such as highly severe, moderately severe, less severe and not at all. The scores assigned against the rating scales were 3, 2, 1 and 0, respectively. To determine the problem confrontation (PC) score, each of

the respondents was asked to address the problems s/he faced in litchi cultivation along with their magnitude of severity. The PC was thus determined by adding all the scores against the 12 problems and the total PC score could range from 0-36 where '0' indicates no PC and '36' indicates high magnitude of PC. Based on PC score, the respondents were classified into three different categories, viz. low (score 1-17), medium (score 18-21) and high problem (>21) confrontation.

The severity of a problem was determined by calculating a problem confrontation index (PCI) based on the following equation:

$$PCI = N_{Se} \times 3 + N_{Ms} \times 2 + N_{Ne} \times 1 + N_{No} \times 0$$

Where, N_{Se} = Number of respondents rated the problem as severe; N_{Ms} = Number of respondents rated the problem as moderately severe; N_{Ne} = Number of respondents rated the problem as less severe; N_{No} = Number of respondents rated the problem as not at all.

The PCI score could range from 0 (0%) to 180 (100%). For better understanding about the severity (relative position) of a particular problem, the PCI score was converted into percentage using the following formula:

$$\% \text{ PCI} = \frac{\text{Observed PCI score}}{\text{Possible highest PCI score}} \times 100$$

Selection and Measurement of the Socioeconomic Characteristics of the Respondents

The selected socioeconomic characteristics of the respondents were as (i) age, (ii) educational qualification, (iii) farming experience, (iv) experience in litchi cultivation, (v) family size, (vi) farm size, (vii) annual family income, (viii) organizational participation, (ix) exposure to extension media, (x) training received, and (xi) knowledge on litchi cultivation.

Age, farming experience and experience in litchi cultivation were expressed in years while educational qualification was measured in year of schooling. The number of family members in respondents' family was used to indicate family size. Farm size and annual family income were measured in hectare (ha) and '000' BDT respectively. Likert scale (Likert, 1932) was used to express the status of respondent's organizational participation, cosmopolitanism and exposure to extension media. Received training was measured in terms of number.

Compilation and Analysis of Data

After completion of field survey all the data of the interview schedule were compiled and analyzed in accordance to the objectives of the study. Various statistical measures such as mean, standard deviation, minimum, maximum and percentage values were used in describing the parameters for determining present scenario and focus issues as problem confrontation and selected socioeconomic characteristics of the respondents. For clarity of understanding, tables were used to present the data. Pearson Product Moment

Correlation Coefficient (r) was computed to explore the relationships between the selected characteristics of the respondents and their problem confrontation in litchi cultivation. Data were analyzed by using the software named Statistical Package for Social Science (SPSS 20.0).

RESULTS AND DISCUSSION

Present Status of Litchi Cultivation

Year of initiation of litchi cultivation: The respondents of the study area initiated litchi cultivation in different years. The first litchi cultivation was initiated by the respondents in the year of 1979 in the study area. However, some of them also initiated later as in 2016 (Table 1). Majority (58.3%) of the respondents initiated litchi cultivation early (i.e., in between 1996-2012) followed by later (25%) i.e., after 2012 and very early (10%) i.e., before 1996.

First harvesting of litchi after inception of cultivation: The respondents started first harvesting of litchi after 2 to 8 years of cultivation inception with a mean and standard deviation of 4.83 and 1.67, respectively. Majority (51.7%) of the respondents harvested litchi early after cultivation whereas about one-fourth (23.3%) of them harvested very early and one-fourth (25%) harvested later (Table 2).

Area under litchi cultivation: Area under litchi cultivation of the respondents varied markedly from 0.13 ha to 3.27 ha with a mean and standard deviation of 0.37 and 0.58 ha, respectively. Most of the respondents (80%) occupied small amount of land area (up to 0.5 ha), followed by medium (11.7%) and large (8.3%) amount of areas under litchi cultivation (Table 3).

Extent of litchi cultivation by the respondents: Extent of litchi cultivation means the actual area (ha) under litchi cultivation divided by the potential area of litchi cultivation, and expressed in % form. The score on extent of litchi cultivation of the respondents varied markedly from 10 to 100% with a mean and standard deviation of 50.10% and 22.2%, respectively. Highest proportion (41.7%) of the respondents belonged to the low extent category whereas 31.7% and 26.6% of the respondents belonged to medium and high extent categories, respectively (Table 4). None of the respondents discontinued litchi cultivation after its initiation. It means that all the respondents continued to grow litchi in their orchards since their adoption i.e., the respondents belong to continued adoption category.

Varieties of litchi cultivated: The respondent farmers cultivated eight different varieties of litchi in their orchard as shown in Table 5. Most of the respondents (80%) cultivated Bombai variety of litchi and almost half (45%) of the respondents cultivated 'Ati' cultivar. There were some other varieties like Muzaffarpuri and China-3 cultivated by the 20.0% and 26.7% of the respondents respectively (Table 5).

Number of litchi plants in the orchard: The number of plants ha^{-1} of orchard varied from 61 to 200 depending on the spacing with a mean and standard deviation of 109.15 and 25.7, respectively. Three-fifth (73.3%) of the respondents belong moderate number of plants (86-135 plants ha^{-1}) followed by low (16.7%) (i.e., up to 85 plants ha^{-1}) and higher (10.0%) (i.e., above 135 plants ha^{-1}) number of plants in their orchard (Table 6).

Table 1. Categories of the respondents on the basis of year of initiation of litchi cultivation

Categories	Score (Initiation year)	Respondents (N=60)	
		Number	Percent
Very early	On/before 1995	10	16.7
Early	1996-2012	35	58.3
Later	After 2012	15	25.0

Table 2. Categories of the respondents on the basis of their first litchi collection after cultivation inception

Categories	Score (Years)	Respondents (N=60)		Mean \pm SD	Range
		Number	Percent		
Very early	Up to 3	14	23.3		
Early	3-5	31	51.7	4.83 \pm 1.67	2-8
Later	>5	15	25.0		

Table 3. Categories of the respondents on the basis of area of litchi cultivation

Categories	Score (ha)	Respondents (N=60)		Mean \pm SD	Range
		Number	Percent		
Small	Up to 0.5	48	80.0		
Medium	0.51-1	7	11.7	0.37 \pm 0.58	0.13-3.27
Large	>1	5	8.3		

Table 4. Categories of the respondents on the basis of extent of litchi cultivation

Categories	Score (%)	Respondents (N=60)		Mean \pm SD	Range
		Number	Percent		
Low extent	Up to 40%	25	41.7		
Medium extent	41%-60%	19	31.7	50.10 \pm 22.2	10-100
High extent	>60%	16	26.6		

Table 5. Varieties of litchi cultivated by the respondents

Varieties	Respondent (N=60)	
	Citation	Percent
Ati	27	45.0
Bombai	48	80.0
Muzaffarpuri	12	20.0
China -3	16	26.7
Ati Bombai	4	6.7
Dhaka 90	1	1.67
Bedana	5	8.3
Madrajie	10	16.67

Table 6. Distribution of the respondents according to the number of plants categories

Categories	Score (plants ha ⁻¹)	Respondents (N=60)		Mean \pm SD	Range
		Number	Percent		
Low number of plants	Up to 85	10	16.7		
Medium number of plants	86-135	44	73.3	109.15 \pm 25.7	61-200
High number of plants	>135	6	10		

Table 7. Types of spacing of the plants in the orchard of the respondents

Types of spacing (m×m) {(P-P)×(R-R)}*	Respondents (N=60)	
	Number	Percent
6.20m ×6.20m	14	23.33
4.65m×6.20m	18	30.0
4.65m×4.65m	8	13.34
9.30m×9.30m	7	11.67
6.20m×7.75m	11	18.33
18.60m×18.60m	2	3.33

*P-P= Plant to Plant and R-R= Row to Row distance

Table 8. Distribution of the respondents according to the frequencies of irrigation applied per season

Categories	Score (times season ⁻¹)	Respondent (N=60)	
		Number	Percent
Low irrigation	Up to 2	13	21.67
Medium irrigation	3-4	39	65.0
High irrigation	>4	8	13.33

Table 9. Fertilizers applied in the orchards of the respondents

Name of the fertilizer	Respondents (N=60)	
	Citation	Percent
Cow dung / Compost	13	21.66
Urea	56	93.33
TSP (Triple Super Phosphate)	54	90.0
MoP (Muriate of Potash)	54	90.0
Zinc	34	56.67
Gypsum	28	46.6

Table 10. Major diseases of litchi found in the orchard of the respondents

Name of the disease	Respondents (N=60)	
	Citation	Percent
Fruit rot	27	45.0
Immature fruit drop	9	15.0
Fruit crack	14	23.33
Red rust	11	18.33

Table 11. Distribution of the respondents according to the litchi fruit yield

Categories	Score (No. of litchi ha ⁻¹)	Respondents (N=60)		Mean ± SD	Range
		Number	Percent		
Low yield	Up to 1,00,000	17	28.3	1,45,064.4 ± 1,03,289	3,744- 4,49,281
Medium yield	1,00,001-2,00,000	24	40.0		
High yield	>2,00,000	19	31.7		

Table 12. Distribution of the respondents according to the price of litchi

Categories	Score (BDT 100-piece ⁻¹)	Respondents (N=60)		Range
		Citation	Percent	
Low price	Up to 125	49	81.67	80-300
Medium price	126-200	15	25	
High price	>200	9	15	

Table 13. Distribution of the respondents according to total cost of production

Categories	Score (‘000’ BDT)	Respondents (N=60)		Mean ± SD	Range (‘000’ BDT)
		Number	Percent		
Low cost	Up to 20	16	26.7	42.10± 22.32	11-90
Medium cost	21-50	25	41.7		
High cost	>50	19	31.6		

Table 14. Distribution of the respondents according to gross income from litchi cultivation

Categories	Score (‘000’ BDT)	Respondents (N=60)		Mean ± SD	Range (‘000’ BDT)
		Number	Percent		
Low gross income	Up to 50	9	15.0	171 ± 92.3	41-449
Medium gross income	51-100	20	33.3		
High gross income	>100	31	51.7		

Table 15. Distribution of the respondents according to net income from litchi cultivation

Categories	Score (‘000’ BDT)	Respondents (N=60)		Mean ± SD	Range (‘000’ BDT)
		Number	Percent		
Low net income	Up to 50	14	23.3	131.6± 81.07	27-393
Medium net income	51-100	18	30.4		
High net income	>100	28	46.3		

Plant spacing in the orchard: Highest proportion (30.0%) of the respondents maintained a spacing of 4.65m × 6.20m in their orchards whereas about one-fourth (23.33%) maintained a spacing of 6.20m × 6.20m, followed by about one-fifth (18.33%) of them were maintaining a spacing of 6.20m × 7.75m (Table 7).

Intercultural operations conducted: All the respondents of the surveyed area cited that weeding was done once after the rainy season in every year. The frequency of irrigation in the orchards of the respondents varied from 2 to 6 times in a fruiting season. Majority of the respondents (65%) followed medium irrigation as compared to low (21.67%) and high (13.33%) frequencies of irrigation (Table 8). Different fertilizers were used in the orchards of the respondents. Most of them applied Urea, TSP and MoP (93.33%, 90% and 90% respectively) in their orchards. Organic manure (cow dung and compost) was also applied by one-fifth of the respondents (21.66%) (Table 9). Orchards of highest proportion of the respondents (45.0%) were infected by fruit rot disease. There were also immature fruit drop (15%), fruit crack (23.33%) and red rust (18.33%) diseases in the orchards of the respondents (Table 10). Orchards of the majority of the respondents (68.33%) were found to be infected by litchi fruit and shoot borer and litchi mite (41.66%) (Data not shown).

Yield of litchi in the orchard of the respondents: The yield of litchi varied from 3,744 to 4,49,281 pieces ha⁻¹ with a mean and standard deviation of 1,45,064.4 and 1,03,289, respectively. Highest proportion of the respondents (40.0%) obtained medium yield followed by high (31.7%) and low (28.3%) yield (ha⁻¹) of litchi (Table 11).

Price of litchi: The price of litchi varied from 80-300 BDT (Bangladeshi Taka) per hundred pieces due to varietal difference and harvesting time. Most of the respondents (81.67%) got low price followed by medium (25.0%) and high (15.0%) price (Table 12).

Total cost of production: The total cost of production varied from 11,000 to 90,000 BDT ha⁻¹ with a mean and standard deviation of 42,100 and 22,320, respectively. Highest proportion of the respondents (41.7%) belong to medium cost category followed by high (31.6%) and low (26.7%) cost categories (Table 13).

Gross income from litchi cultivation: Gross income from litchi cultivation of the respondents varied from 41,000-4,49,000 BDT with a mean and standard deviation of 1,71,000 and 92,300, respectively. Majority of the respondents (51.7%) belong to high gross income category followed by medium (33.3%) and low (15.0%) gross income categories (Table 14).

Net income from litchi cultivation: Net income from litchi cultivation of the respondents varied from 27,000-3,93,000 BDT with a mean and standard deviation of 1,31,600 and 81,070, respectively. Highest proportion of the respondents (46.3%) belonged to high net income category followed by medium (30.4%) and low (23.3%) net income categories (Table 15). The findings from the study indicate that the cost of production is medium and

price of litchi is low but the income from litchi cultivation is high in case of majority of the respondents (Table 12, 13 and 14). This might be due to that the yield of litchi was medium to high in case of the majority of the respondents (71.7%) (Table 11).

Problems Confronted by the Farmers

Level of occurrence and severity of the problems: The respondents confronted more or less 12 problems with different extent of severity. The level of occurrence and severity of the problems were determined based on the opinion of respondents. It is usually assumed that higher is the level of occurrence of the problem, the higher is the severity of the problem. From the study it was observed that lack of training on litchi cultivation and low shelf life of litchi is the most common (highly occurred) as well as most/highly severe problems (100%) followed by lack of scientific knowledge for litchi cultivation (95.56%), attack of mites in litchi, attack of litchi fruit borer and so on. The less common as well as less severe problem was lack of transportation facility for rapid marketing of litchi (Table 16).

Extent of problem confrontation of the respondents: Problem confrontation score varied from 13 to 24 with a mean and standard deviation of 19.47 and 2.22, respectively. Majority of the respondents (68.3%) confront moderate level of problems followed by low (18.3%) and high (13.4%) problem confrontation (Table 17). Similar type of finding was also reported by Hasan et al. (1998) in respect of mango production in Rajshahi district.

Findings on Selected Socioeconomic Characteristics of the Respondents

Majority of respondents (53.3%) were in middle aged group having small sized family (55%), where the highest proportion of them (41.7%) hold secondary level of education. Majority of them (55.0%) obtained moderate experience in both farming and cultivation of litchi (63.30%). Highest proportion of the respondents (48.3%) belong small sized farms but majority of them (56.7%) earn a moderate annual income. Majority of the respondents showed a low organizational participation (71.70%) and medium cosmopolitanism (73.3%). Most of the respondents have medium level of extension media contact (83.30%) and no training (93.3%) with high knowledge (60.0%) in litchi cultivation (Table 18).

Relationships between the Selected Characteristics of the Respondents and their Problem Confrontation:

Among eleven selected characteristics of the respondents' only farm size, annual income, cosmopolitanism and knowledge in litchi cultivation showed significant negative relationship with their problem confrontation. It means that the higher is the farm size, annual income, cosmopolitanism score and knowledge in litchi cultivation of the respondents; the lower is their problem confrontation (Table 19).

The finding of this research related to farm size has similarity with the findings of Rahman (1996) and Rahman (1995). Rahman (1996) found that the farm size of the respondents have a negative significant relationship with their problem confrontation in mango cultivation. Similarly, Rahman (1995) reported that farm size of the farmer have a significant negative influence on their problem confrontation in pineapple cultivation. However, Karim (1996) conducted a study and found no relationship between farm size of the respondents with their problem confrontation. Rashid and Mahabub (1987) obtained similar findings as it was found from the current study.

As it has been found from the current study, a similar significant negative relationship between annual income and problem confrontation was reported by Rahman (1995) and Karim (1996) while they conducted their studies on pineapple and mango, respectively. The finding of this study related to cosmopolitanism has similarity with the findings of Pramanik (2001). He found that the cosmopolitanism of the farm youth have negative correlation with their fruit production, health and recreational problems. The finding of this study related to knowledge in litchi cultivation has harmony with the findings of Karim (1996) and Rahman (1995). Karim (1996) indicated that the agricultural knowledge of the mango growers has significant negative relationship with their problem confrontation.

Table 16. Level of occurrence and severity of the problems faced by the respondents in litchi cultivation

SL. No.	Problems	Level of Occurrence of Problem (N=60)			Severity based on PCI		Rank
		PC	PNC	Total	Score	Percent	
1.	Lack of suitable land for litchi cultivation	52	8	60	55	30.50	8 th
2.	Lack of good variety of Litchi	6	54	60	6	3.33	10 th
3.	Lack of High Yielding variety	10	50	60	10	5.56	9 th
4.	Attack of mites in Litchi	60	0	60	153	85	3 rd
5.	Attack of Litchi fruit borer	54	6	60	140	77.78	4 th
6.	Low production of litchi	46	14	60	70	38.89	7 th
7.	Lack of scientific knowledge for litchi cultivation	60	0	60	172	95.56	2 nd
8.	Lack of training on litchi cultivation	60	0	60	180	100	1 st
9.	Low market price of litchi	60	0	60	137	76.11	5 th
10.	Lack of transportation for rapid marketing of litchi	3	57	60	3	1.67	11 th
11.	Low shelf life of litchi	60	0	60	180	100	1 st
12.	Fruit rot disease	49	11	60	119	61.11	6 th

Table 17. Distribution of the respondents according to extent of problem confrontation in litchi cultivation

Categories	Score	Respondents (N=60)		Mean ± SD	Range
		Number	Percent		
Low problem confrontation	1-17	11	18.3	19.47 ± 2.22	13-24
Medium problem confrontation	18-21	41	68.3		
High problem confrontation	>21	8	13.4		

Table 18. Facts on the selected socioeconomic characteristics of the respondents

Selected Characteristics	Categories	Score	Respondents (N=60)		Mean ± SD	Range
			Number	Percent		
Age (Year)	Young age	Up to 35	10	16.70	46.07 ± 11.74	19-85
	Middle age	36-50	32	53.30		
	Old age	>50	18	30.00		
Educational qualification (Years of Schooling)	Illiterate	0	04	06.70	7.32 ± 5.35	0-17
	Primary	1-5	21	35.00		
	Secondary	6-10	25	41.70		
	Higher Secondary	11-12	2	03.30		
Experience in farming (Year)	Above Higher Secondary	>12	8	13.30	26.18± 12.65	3-70
	Low	Up to 10	9	15.00		
	Medium	11-30	33	55.00		
Experience in litchi cultivation (Year)	High	>30	18	30.00	13.10± 8.75	3-40
	Low	Up to 5	13	21.70		
	Medium	5-20	38	63.30		
Family size (Number)	High	>20	9	15.00	4.47 ± 1.24	1-8
	Small	Up to 4	33	55.00		
	Medium	5-6	23	38.30		
	Large	>6	4	6.70		

Table 18. Continued...

Selected Characteristics	Categories	Score	Respondents (N=60)		Mean \pm SD	Range
			Number	Percent		
Farm size (hectare)	Landless	<0.02	0	0	1.53 \pm 1.38	0.29-6.63
	Marginal	0.02-0.2	0	0		
	Small	0.21-1.0	29	48.30		
	Medium	1.01-3.0	25	41.70		
	Large	>3.0	6	10.00		
Annual income ('000' BDT)	Low	Up to 150	16	26.7	421.76 \pm 506.97	100-3050
	Medium	151-500	34	56.7		
	High	>500	10	16.6		
Organizational participation (Score)	No participation	0	17	28.30	1.7 \pm 1.54	0-6.0
	Low participation	1-6	43	71.70		
	Medium participation	7-12	0	0.00		
	High participation	>12	0	0.00		
Extension media contact (Score)	Low	Up to 16	0	0.00	29.08 \pm 4.23	19-39
	Medium	17-32	50	83.30		
	High	33-48	10	16.70		
	Very high	>48	0	0.00		
Training received (Number)	No training	0	56	93.30	0.25 \pm 1.35	0-10
	Low training	1-4	3	5.00		
	Medium training	5-8	0	0.00		
	High training	>8	1	1.70		
Knowledge on litchi cultivation (Score)	Low	Up to 4	0	0	9.0 \pm 1.34	6-11
	Medium	5-8	24	40.00		
	High	>8	36	60.00		

Table 19. Relationships between the selected characteristics of the respondents and their problem confrontation

Independent issues	Focus variable	Correlation coefficient (r)
Age	Problems in litchi cultivation	0.042
Educational qualification		-0.018
Experience in farming		-0.019
Experience in litchi cultivation		-0.192
Family size		0.110
Farm size		-0.434**
Annual family income		-0.322*
Organizational participation		-0.003
Cosmopolitanism		-0.340**
Extension media contact		-0.210
Training received		-0.198
Knowledge on litchi cultivation		-0.393**

** Significant at the 0.01 level * Significant at the 0.05 level

CONCLUSIONS

The litchi cultivation started since 1979 in Meherpur district, Bangladesh and got popularity. But the farmers are facing some problems like lack of scientific knowledge for litchi cultivation, low shelf life of litchi, attack of mites and fruit borer, low market price of litchi etc. The respondents with larger farm size, high annual income, cosmopolitanism and knowledge on litchi cultivation confronted less problems. However, the present situations indicate that litchi could be considered as a prospective and economically profitable fruit in the study area. Moreover, proper, adequate and timely extension activities should be conducted to overcome the encountered problems for ensuring sustained higher yields of litchi.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this article.

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