A Survey Study on Farmers’ Attitude Regarding Strawberry Cultivation

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The major objective of this study was to explore the attitude and determine the contribution of the selected characteristics of the farmers on their attitude regarding strawberry cultivation. The selected characteristics were age, level of education, farm size, strawberry cultivation area, annual family income, income from strawberry cultivation, training exposure, extension contact, strawberry cultivation experience, problem faced in strawberry cultivation, knowledge and practice on strawberry cultivation. Data were collected from 113 farmers from two villages (Shahapur and Mirkamari) of Charghat Upazila under Rajshahi District by using a pretested interview schedule. Descriptive statistics such as mean, standard deviation, range and percentage were used to describe the variables under consideration. Stepwise multiple regressions were used to examine the contribution of the selected characteristics of the farmers on their attitude regarding strawberry cultivation using SPSS software. Overwhelming 97.3% of the respondents had a low to high favorable attitude towards strawberry cultivation. Where, 51.3% farmers had a medium favorable attitude, 40.7% had a low favorable attitude and 5.3% farmers had a high favorable attitude. Stepwise multiple regressions exposed that knowledge on strawberry cultivation, Problem faced in strawberry cultivation, Strawberry cultivation experience, age, level of education and income from strawberry cultivation of the strawberry farmers had significant contribution on their attitude towards strawberry cultivation and which contribute 63.4% of the total variation. The percentages of favorable attitudes among the farmers are satisfactory but the study recommended that proper support of extension agents should be given in each step of strawberry cultivation, postharvest management and marketing period to keep up the positive attitude of the farmers.

Keywords: Attitude, Descriptive statistics, Farmer, Interview schedule, Pretest, Strawberry, Stepwise Multiple Regression

INTRODUCTION

Bangladesh is mainly an agro-based country and agriculture plays a vital role for ensuring food security, employment generation, poverty alleviation, raising standard of living and increasing export earnings. Many developing countries like Bangladesh benefited from the green revolution in cereal production in the past but were not able to substantially reduce poverty and malnutrition. Fruits and Vegetables production can help farmers to generate income which eventually alleviate poverty and reduce malnutrition (DAE, 1999). Strawberry, a nutritious and delicious exotic fruit has recently been adapted in Bangladesh and it has already drawn an attention of the Government, farmers as well as some businessmen. Strawberry is a new fruit crop and its cultivation technique is fairly new in Bangladesh whereas cultivation area is increasing day by day.

Commercial production of strawberries is possible in a wide climatic range including subtropical areas like Bangladesh (Barney,1999). Although strawberry normally produced in countries having cold weather particularly in

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west, however country’s weather is favorable for the production of high-quality strawberries in terms of photoperiod, temperature and humidity and it is cultivated during the month of October to April then harvested from the month of last November (Hossan et al., 2013). In Bangladesh, it is grown commercially in limited districts such as Tangail, Rajshahi, Joypurhat, Bogra, Kumilla, Sathkhira, Khagrachari and Coxibazar (Khatun et al., 2019). The edible portion of fruit is about 98 percent and contains various nutritionally important elements. Strawberry has great dietetic value and is one of the potential sources of vitamin C. Strawberries mainly consist of water (91%) and carbohydrates (7.7%). They contain only minor amounts of fat (0.3%) and protein (0.7%) (www.healthline.com). Due to its deep red color, it is a rich source of anthocyanin possessing high antioxidant activity (Sun et al., 2002). A potential anti-cancer compound known as ellagic acid is also found in strawberry (Basu, et al., 2014).

Now, an enormous number of people, mostly unemployed young people, have become dependent on strawberry farming to earn a living, as its cultivation is easier and its fruits can be obtained early in the seasons where there is no fresh fruit in the market, its marketability is high and it can bring back the investment in a short period. Along with the income per unit area is higher in strawberry cultivation compared to some other quick growing seasonal fruits. (Hossan et al., 2013). The youths are supplying strawberries to different markets across the country as the soft fruit is being used in preparing ice-cream, jam, jelly, pickles, chocolates and biscuits (The Daily Star, 2015). Most of the people of Bangladesh like strawberry flavor in food, accordingly strawberry has high demand as the food manufacturing industries. To meet the increasing demand in our local market dealers Bangladesh imports large amounts of strawberry from different foreign countries. Describing strawberry as ‘nutritious fruit’ and also a ‘cash crop’ and strawberry could play an important role in fulfilling nutrition and also earning foreign currency through exports (The daily observer, 2016). Numbers of growers are becoming interested in strawberry cultivation in spite of facing several problems such as, less sweetness, short shelf-life, color degradation and damage during transportation. Strawberry is genetically a perishable fruit, which cannot tolerate stress like hot weather, direct sunlight and overloaded condition during transportation. Besides, the strawberry growers need to count about 25 percent loss for post-harvest crop (The daily observer, 2016).

Above problems are the great constraints of commercial strawberry production in Bangladesh. Though in Bangladesh, some varietal trials of strawberry have been conducted but the number of sustainable strawberry cultivars is absent for the country’s climate (Hossan et al., 2013). So, People’s favorable attitude, proper knowledge, appropriate guidelines and application of sustainable technologies are required to find suitable cultivar(s) for quality commercial strawberry production in Bangladesh. People’s favorable attitude towards strawberry cultivation can make a great opportunity to unemployed young and to export this crop Bangladesh will be more economically resourceful. Keeping in view the above facts and importance of this potential fruit crop, evaluation of farmers’ attitude towards strawberry cultivation has taken as a research focus with the following objectives: i) to explore the attitude of the farmer regarding strawberry cultivation and ii) to determine the contribution of the selected characteristics of the farmers on their attitude regarding strawberry cultivation.

MATERIALS AND METHODS

Study Area, Population and Sample Size:

Two villages named Shahapur and Mirkamari were purposively nominated from Yusufpur union under charghat upazila of Rajshahi district. The study area is located on the alluvial plains of the Padma River. The pH of the soil ranges from 6.0 to 7.5. Here average temperature in the winter season (October to March) is 31.9°C(89.4°F) to 10.2°C(50.4°F) (www.banglapedia.org). So, the environment of the study area is suitable for strawberry cultivation. The strawberry farmers of selected two villages were considered as the population of the study. Strawberry farmer's list was prepared with the help of Sub Assistant Agriculture Officers (SAAO) of that area. Total strawberry farmers of this area were 160.

There are several methods for determining the sample size; at this time, to make a relevant sample size from the population following formula was used which developed by (Kothari, 2004):

\[ n = Z^2 \times P \times Q / (N-1) \times e^2 + Z^2 \times P \times Q \]

[Where, \( n \) = Sample size, \( Z \) = Table value at 1 df (1.96), \( P \) = Probability (assume 0.5), \( Q \) = Remaining from probability (1-P), \( N \) =Total population, \( e \) = Level of precision (5%)]

By using this formula, 113 strawberry farmers were selected proportionately and randomly as the sample of the study.

![Figure 1: The map of Bangladesh showing (circled area) Rajshahi district](image)
Attitude of a respondent regarding strawberry cultivation was measured by Five-point Likert Scale method where summated ratings were used to find out the strawberry farmers’ attitude towards strawberry cultivation. Thirteen (13) statements expressing positive and negative feelings regarding strawberry cultivation were constructed. A statement was considered positive if it indicated a favorable attitude regarding strawberry cultivation. If the case was reversed, it was considered as a negative statement. Out of these thirteen statements seven were positive and six were negative. Scoring was done by assigning 4, 3, 2, 1 and 0 scores to the five alternative responses as "strongly agreed", "agreed", "undecided", "disagreed", and "strongly disagreed" respectively in case of a positive statement. Reverse score was assigned for a negative statement. However, the attitude towards strawberry cultivation of a farmer was obtained by summing up his/her scores for all thirteen (13) statements in item no. 13 of the interview schedule. Attitude score, thus, obtained for a respondent could range from zero (0) to 52, where zero (0) indicated a very unfavorable attitude, 26 indicated neutral attitude and ‘52’ indicated the highest level of favorable attitude.

Attitude score of the respondents towards strawberry cultivation could theoretically range from 0 to 52. However, the observed range was 25 to 45 with an average of 36.29, standard deviation of 3.72. Based on the attitude scores, the respondents were placed under five categories namely unfavorable, neutral, low favorable, medium favorable and high favorable. The distribution of the respondents under each of the five categories has been shown in Table 1.

**Table 1: Distribution of the farmers according to their attitude regarding strawberry cultivation**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Basis of categorization (score)</th>
<th>Farmers Number</th>
<th>Percent</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfavourable</td>
<td>&lt; 26</td>
<td>1</td>
<td>0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>26</td>
<td>2</td>
<td>1.8</td>
<td></td>
<td>36.29</td>
</tr>
<tr>
<td>Low favourable</td>
<td>27-35</td>
<td>46</td>
<td>40.7</td>
<td>3.72</td>
<td></td>
</tr>
<tr>
<td>Medium favourable</td>
<td>36-43</td>
<td>58</td>
<td>51.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High favourable</td>
<td>44-52</td>
<td>6</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Author’s estimation

Data presented in Table 1 reveal that an overwhelming 97.3 percent of the respondents had a low to high favorable attitude towards strawberry cultivation. Where, 40.7 percent low favorable attitude, 51.3 percent medium favorable attitude and 5.3 percent farmers had high favorable attitude regarding strawberry cultivation. Rest 1.8 percent and 0.9 percent of the farmers had neutral and unfavorable attitudes respectively regarding strawberry cultivation. Farmers of the study area have more or less positive attitude towards strawberry cultivation as its easy cultivation procedures, high demand, approximately double profit and less disease and pest infestation.

**Contribution of the selected characteristics of the strawberry farmers on their attitude regarding strawberry cultivation**

For measuring contribution of the selected characteristics of the strawberry farmers on their attitude regarding strawberry cultivation, 12 characteristics were considered which includes: age (x₁), level of education (x₂), farm size (x₃), strawberry cultivation area (x₄), annual family income (x₅), income from strawberry cultivation (x₆), Training exposure (x₇), extension contact (x₈), strawberry cultivation experience (x₉), problem faced in cultivation (x₁₀), knowledge on strawberry cultivation (x₁₁) and practice on...
strawberry cultivation \((x_{12})\). Attitude towards strawberry cultivation \((x)\) was a dependent variable in this case.

Then full model regression analysis was also run with selected 12 independent variables where the dependent variable was attitude strawberry cultivation. It was observed that the full model regression results were misleading due to the existence of interrelationships and multicollinearity among the variables. Therefore, in order to avoid the misleading results and to determine the best explanatory variables, the method of stepwise multiple regressions was administered and 12 independent variables were fitted together in stepwise multiple regression analysis. Table 3 shows the summarized results of stepwise multiple regression analysis with 12 independent variables on the farmers’ attitude towards strawberry cultivation. It was observed that out of 12 variables 6 independent variables namely knowledge on strawberry cultivation \((x_{11})\), problem faced in strawberry cultivation \((x_{10})\), strawberry cultivation experience \((x_9)\), age \((x_1)\), level of education \((x_2)\) and income from strawberry cultivation \((x_6)\) were entered into the regression equation. Other six variables were not entered into the regression equation. The regression equation so obtained is presented below:

\[
X = 22.31 + 0.439X_{11} - 0.210X_{10} + 0.204X_9 + 0.238X_1 + 0.186X_2 + 0.140X_6
\]

### Table 2: Measurement techniques of the selected characteristics of the strawberry farmers

<table>
<thead>
<tr>
<th>S/N</th>
<th>Characteristics</th>
<th>Score Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>1 for each complete year of age of the respondent</td>
</tr>
<tr>
<td>2.</td>
<td>Level of education</td>
<td>1 for each year of school education, 0 for illiterate and 0.5 for can sign only</td>
</tr>
<tr>
<td>3.</td>
<td>Farm size</td>
<td>1 for each hectare of land</td>
</tr>
<tr>
<td>4.</td>
<td>Strawberry cultivation area</td>
<td>1 for each hectare of land</td>
</tr>
<tr>
<td>5.</td>
<td>Annual family income</td>
<td>1 for each (000' Taka) income in a year</td>
</tr>
<tr>
<td>6.</td>
<td>Income from strawberry cultivation</td>
<td>1 for each (000' Taka) income in a year</td>
</tr>
<tr>
<td>7.</td>
<td>Training exposure</td>
<td>1 for each day training participation</td>
</tr>
<tr>
<td>8.</td>
<td>Extension contact</td>
<td>0 for no contact, 1 for rarely contact, 2 for occasionally contact and 3 for regularly contact</td>
</tr>
<tr>
<td>9.</td>
<td>Strawberry cultivation experience</td>
<td>1 for each year of cultivation experience</td>
</tr>
<tr>
<td>10.</td>
<td>Problem faced in strawberry cultivation</td>
<td>0 for no problem, 1 for low problem, 2 for moderate problem and 3 for severe problem</td>
</tr>
<tr>
<td>11.</td>
<td>Knowledge on strawberry cultivation</td>
<td>0 for no/wrong answer, 1 for partial answer and 2 for full answer</td>
</tr>
<tr>
<td>12.</td>
<td>Practice on strawberry cultivation</td>
<td>0 for no practices, 1 for rarely practices, 2 for occasionally practices and 3 for regularly practices</td>
</tr>
</tbody>
</table>

\((n=113)\)

### Table 3 Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the farmers on their attitude regarding strawberry cultivation

<table>
<thead>
<tr>
<th>Variable entered</th>
<th>Standardized Partial 'b' Coefficients</th>
<th>Value of 't' (with probability level)</th>
<th>Adjusted Increase in (R^2)</th>
<th>Variation Explains in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge on strawberry cultivation ((x_{11}))</td>
<td>0.439</td>
<td>5.957(.000)</td>
<td>0.516</td>
<td>51.6</td>
</tr>
<tr>
<td>Problem faced in strawberry cultivation ((x_{10}))</td>
<td>-0.210</td>
<td>-3.216(.002)</td>
<td>0.570</td>
<td>5.4</td>
</tr>
<tr>
<td>Strawberry cultivation experience ((x_9))</td>
<td>0.204</td>
<td>3.139(.002)</td>
<td>0.578</td>
<td>1.8</td>
</tr>
<tr>
<td>Age ((x_1))</td>
<td>0.238</td>
<td>3.504(.001)</td>
<td>0.601</td>
<td>1.3</td>
</tr>
<tr>
<td>Level of education ((x_2))</td>
<td>0.186</td>
<td>2.650(.009)</td>
<td>0.620</td>
<td>1.9</td>
</tr>
<tr>
<td>Income from strawberry cultivation ((x_6))</td>
<td>0.140</td>
<td>2.275(.025)</td>
<td>0.634</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>0.634</strong></td>
<td><strong>63.4</strong></td>
</tr>
</tbody>
</table>

- Multiple \(R\) = 0.831 \(R\)-square = 0.690
- Adjusted \(R\)-square = 0.634 \(F\)-ratio = 18.53
- Standard error of estimate = 2.20 \(Constant\) = 22.31

The multiple \(R\) and \(R^2\) values were found to be 0.831 and 0.690 respectively and the corresponding \(F\)-ratio was 18.53 which were significant at 0.000 levels. For determining a unique contribution on farmers’ attitude towards strawberry cultivation, each of the six variables’ increase in \(R^2\) value was determined. These six variables together explained 63.4 percent of the total contribution on attitude towards strawberry cultivation. Knowledge on strawberry cultivation had the highest contribution (51.6 percent of the variation) followed by Problem faced in strawberry cultivation (5.4 percent), Strawberry cultivation experience (1.8 percent), age (1.3 percent), level of education (1.9 percent) and income from strawberry cultivation (1.4 percent) on attitude towards strawberry cultivation.
Table 3 showed that knowledge on strawberry cultivation, problem faced in strawberry cultivation, strawberry cultivation experience, age, level of education and income from strawberry cultivation had significant contribution on attitude towards strawberry cultivation i.e. the farmers having more knowledge on strawberry cultivation, less problem faced in strawberry cultivation, high strawberry cultivation experience, age, level of education and high income from strawberry cultivation were found to have more positive attitude towards strawberry cultivation and in this connection, some predictive importance has been briefly discussed below:

**Knowledge on strawberry cultivation on attitude regarding strawberry cultivation**

Knowledge on strawberry cultivation of the strawberry farmers had the highest contribution (51.6%) on their attitude regarding strawberry cultivation. Practically knowledge and attitude are dependent on each other. Attitude could be positive or negative but it depends on knowledge. To any new innovation, at first farmers gather knowledge then take decisions to adopt or reject the innovation. Mandal (2016) found a positive significant relationship between knowledge and attitude towards watermelon cultivation.

**Problem faced in strawberry cultivation on attitude regarding strawberry cultivation**

Problem faced in strawberry cultivation had the 2nd highest contribution (5.4%) on their attitude towards strawberry cultivation. Problem faced in strawberry cultivation and attitude towards strawberry cultivation has an inverse relationship. With the increase of problems, an unfavorable attitude towards strawberry cultivation may be formed and with the decrease of problems, a more favorable attitude towards strawberry cultivation may be formed. If a farmer faces different problems and he/she can't achieve expected production and profit then this situation may distract him/her from strawberry cultivation and vice-versa. Mandal (2016) found a significant negative relationship between problem and attitude towards watermelon cultivation.

**Strawberry cultivation experience on attitude regarding strawberry cultivation**

From stepwise multiple regressions, it was found that strawberry cultivation experience of the strawberry farmers had 3rd highest contribution (1.8%) on their attitude towards strawberry cultivation. Knowledge of experience is much greater than theoretical knowledge. So, experience of strawberry cultivation helps farmers to increase their attitude regarding strawberry cultivation. Islam (2012) found that farmer's attitude has positive significant relationship with farming experience.

**Income from strawberry cultivation on attitude regarding strawberry cultivation**

Income from strawberry cultivation of the strawberry farmers had 6th contribution (1.4%) on their attitude towards strawberry cultivation. The main purpose of strawberry cultivation is to be self-reliant. So, more income increases a more favorable attitude regarding strawberry cultivation. According to Mandal (2016) and Shing (2019) the finding was that attitude has positive significant relationship with watermelon cultivation and maize cultivation respectively.

**Age on attitude regarding strawberry cultivation**

Age of the strawberry farmers had 4th contribution (1.3%) on their attitude regarding strawberry cultivation. Generally, the young generation has a strong mentality to take any challenge. So, young people can adopt any innovation more easily than older. In these Research table 2 showing 53.36% young aged farmers are cultivated strawberry. After observing the result older people form positive or negative attitudes regarding innovation. Shing (2019) found a significant positive relationship between age and attitude towards maize cultivation.

**Level of education on attitude regarding strawberry cultivation**

From the findings it was found that the level of education of the strawberry farmers had 5th contribution (1.9%) on their attitude regarding strawberry cultivation. Education creates a favorable mental atmosphere for accepting new practice. It produces change in knowledge, attitude and skill by widening people’s mental horizons and by developing favorable mental looks. Education is the most influencing force-factor in adoption of innovation (Bhuiyan, 2012). Islam (2016) found that education background had significant contribution at 5% level of significance on their attitude towards commercial cultivation of cut flowers. Shing (2019) also found a significant positive relationship between level of education and attitude towards maize cultivation.

**CONCLUSION**

The finding shows that the majority 97.3% of the respondents had a low to high favorable attitude regarding strawberry cultivation. Farmer’s six characteristics knowledge, problem, strawberry cultivation experience, age, level of education and income from strawberry cultivation has significant contribution on their attitude regarding strawberry cultivation and the contribution is 63.4%. Therefore, it may be concluded that farmers’ attitude towards strawberry cultivation are good enough in the study areas of Bangladesh. So, proper steps should be taken to keep it up and try to spread it in other potential areas of Bangladesh through different extension activities like training, farm visit, demonstration etc. The role of Extension agents is very important in such cases.
RECOMMENDATIONS

The study recommended that strawberry production and positive attitude of the farmers towards strawberry cultivation will be improved through low cultivation cost and maximum economic returns, availability of high yielding varieties, proper storage facilities, and good market access of this crop. Government and non-government organizations like different Universities, Bangladesh Agricultural Research Institute, Department of Agricultural Extension, Horticultural Research Centre etc. have to put effort to allocate resources and encourage both rural and urban people to undertake strawberry cultivation.

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CONFLICT INTEREST

We hereby declared that no conflict of interest exists in the study between the authors. Both authors are contributed equally in data collection, data analysis and report writing.

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