Socio-Economic Status of Pineapple Growers in Bangladesh: A Study on Tangail District

Shabikunnahar Bonna[1]* and Laily Akter[1]

[1]Department of Economics, Jatiya Kabi Kazi Nazrul Islam University, Mymensingh, Bangladesh.

*Correspondence: bonnashabikunnahar@gmail.com (Shabikunnahar Bonna, Assistant professor, Department of Economics, Jatiya Kabi Kazi Nazrul Islam University, Mymensingh, Bangladesh).

ABSTRACT

Pineapple is an important fruit worldwide due to its many nutritional and economic uses. To determine the overall lifestyle of the pineapple growers socio-economic indicators are most important indicators. The aim of our study is to examine the socio-economic status of the pineapple farmers. The researchers selected the madhupur upzilla of Tangail district. Data were randomly collected from 98 farmers. A well-structured questionnaire was used for collecting data. We have used both descriptive and functional analysis in this study. Descriptive statistics including frequency, sum, average, percentage and ratios were used to analyze the data. The studies revealed that majority of the farmers were small (73.47 percent) and medium (15.31 percent) categories. Most of pineapple growers were middle aged (31- 50 years), whereas a little portion of them were older aged (greater than 51). In the study area, it was found that 92.86 percent of the respondents were married. Almost all farmers were literate and more than 25.51 percent of them had primary education in the study areas. Majority of the farmers had below 10 years of farming experience and their primary occupation of them (81.63 percent) was agriculture including pineapple cultivation. Only 6.12 percent of people received training from government agriculture extension office and 62.24 percent of pineapple farmers received credit from both banks and NGOs. Total cost for pineapple cultivation in the study area was 38206100 taka. Net return was 26917700 taka in the study area. Average BCR was 1.70 but farmers face various problems like lack of capital processing industry or factory storage of pineapple marketing natural calamities etc. This research study will try to analyze socio-economic profile of pineapple growers, financial significance of pineapple production and solution to specific problems. It will also provide some recommendations for improving the condition of pineapple production and processing by using latest agro technology.

Keywords: Socio-economic profile, Pineapple cultivation, Growers, Profitability, Constraints, and Strategies.

INTRODUCTION:

Pineapple (*Ananas comosus*) is one of the most important fruit in the world. In the overall economic performance of Bangladesh fruits play a vital role. In terms of total cropping area and production, pineapple is rank 4th among all the fruits in the country. Generally, the people of Bangladesh consumes the ripen pine-

apple. It contains calcium, potassium, vitamin C, carbohydrates, water, minerals, crude fiber etc that very important for human body. For making pickles green pineapple is used. After making juice the extra portion and the tender leaves are used as the livestock feed. On the other hand pineapple is used for producing various food items such as squash, syrup, jelly etc. Pineapple is

also recommended as medical diet for certain diseased person (Moniruzzaman, 1988). In Bangladesh the climate is favorable for pineapple cultivation. Pineapple is almost grown all over the country but especially it is grown in high land and hilly areas because there is almost no water stagnation. On the otherhand long time drought affects pineapple quality quantity and size. In Bangladesh the climate and soils of many parts are suitable for pineapple production. It is widely cultivated in some districts such as, Tangail, Rangamati, Mymensingh, Gazipur, Chatttogram, Khagrachori, Bandarban, Moulovibazar, Sylhet and Dhaka. Every year huge amounts of pineapple are cultivated in the country. In 2018-19, Bangladesh produced 217439 metric tons of pineapple from 3600 acres of land (BBS). In the world at least ninety varieties of pineapple are cultivated.

However three varieties if pineapple are mostly grown in Bangladesh. The three varieties are: Honey Queen, Ghorasal and Giant Kew. Giant Kew variety of pineapple is abundantly cultivated for the last few years in the study area. Besides this variety, one local variety named "Asshina" is grown by some farmers in the study area. In Tangail district Madhupur upazila is the largest pineapple producing upazila in Bangladesh that covers maximum amount of pineapple production per year. But pineapple growers of our country are afraid to invest in the production of pineapple. There is a negative impact on the investment motive of pineapple growers in studied area. Because, existing knowledge gap on the socio-economic factors influence the pineapple production. Thus it important to analyze the socio-economic status of pineapple growers which give clear idea about the respondent farmers that may help the researcher and policy maker to suggest better locally specific reliable solutions for the improvement of efficiency. Therefore, the authors made an effort to evaluate the socio-economic status focuses on age, family size, educational profile, farming experience, occupational & marital status, training facilities, access to instituteonal credit of pineapple farmers, & mainly by cost benefit analysis in Madhupur upazila of Tangail district.

Objectives of the Study

This research paper tries to focus on the Socio-Economic Status of Pineapple Growers in Bangladesh: A Study on Tangail District. Our main objecttives are:

1) To study the present status of pineapple cultivation of the respondents.
2) To find out and analyze the cost and profit of pineapple growers per hectare of land.
3) To study the impact of pineapple cultivation on socio-economic status of the pineapple growers.

Review of Literature

➢ Tumpa Datta, Jiban Krishna Saha, Mohammad Ataur Rahman & Muslima Akter studied on "Socio-Economic Status of Pineapple Growers in Moulvibazar District of Bangladesh." And they found that socio-economic indicates are significant for determining the overall lifestyle of the pineapple growers.

➢ S.S. Hasan, M.A. Ali & M.I. Khalil studied on "Impact of pineapple Cultivation on the Increased Income of pineapple Growers." & they found that intercropping of other crops with pineapple plays a vital role for increasing income of respondents.

➢ Tipu Sultan, Syful Islam, Md. Shafiqul Islam, Md. Kamruzzaman & Md. Imrul Kaysar studied on "A Comparative profitability of pineapple-mono crop and pineapple inter cropping of Modhupur area in Tangail district of Bangladesh." and they found that profitability of pineapple mono crops growing farmers were lower than the profitability of pineapple inter crops growing farmers.

➢ Parvej Alam & Tareq Usmani studied on "Impact of pineapple cultivation on the socio-economic status of farmers: case study of Chopra Block, Uttar Dinazpur (West Bengal)." And found that about 70 percent farmers were agree or have positive response of pineapple cultivation.

➢ Atanu Nanda, Renjit Sarker, Saroj Monalal studied on "The socio-economic status of pineapple growers under contract farming condition." And found that ADO's, panchayat, personal society personnel and input dealers where the cosmopolite source whereas friends, neighbors, & village leaders as localize source of farm information for pineapple growers.

In Madhupur upazila there are limited researches especially regarding the socio-economic status of the pineapple farmers. So, providing clear information through research is important which might help in profitable pineapple production in target upazila.

METHODOLOGY:

The study was carried out at Madhupur Upazila of Tangail district in Bangladesh. Five villages namely Jalchatra, Oronkhola, Laufulia, Moterbazar and Aussara were selected randomly for the study from the upazila. A total of 98 farmers were taken small, medium and large famers. Pineapple is generally planted from February and continued to March. Harvesting time started from April and continued up to July. For this study, 2021-22 was chosen as plantation year. The study mainly based on primary data. The data were collected from the famers through a face to face interview using a well structural questionnaire. The required data were collected from April to May 2022. Here we have used both statistical and descriptive techniques to analyze the collected data. We have used STATA programs and MS Excel to get a meaningful result in this study. To calculate the sum, average and percentage of costs, gross return, net return and profitability of pineapple we have used descriptive technique. Here we have used Cobb-Douglas production function to determine the effects of the most important variables to the gross return of pineapple.

Profitability Analysis

Net return analysis technique was used to determine the profitability of pineapple cultivations in study area. We have calculated net return by deducting total cost from gross return. We have used following equation to determine. The net return of pineapple cultivation:

$$\prod = \sum P_y \times Q_y + \sum P_b \times Q_b - \sum (P_{xi} \times X_i) - TFC \text{--------- (1)}$$

Where,
$\prod$ = Net return
P_y = Price of main product per unit
Q_y = Total quantity of main product.
P_b = Price of by product.
Q_b = Quantity of by product.
P_{xi} = Price of the input per unit used for pineapple production.
X_i = Quantity of the input used for pineapple production.
TFC = Total Fixed Cost
$\sum$ = sum i = 1, 2, 3-----n (number of inputs)

Benefit Cost Ratio (BCR)

To calculate benefit cost ratio we have used following formula:
Benefit - Cost Ratio = Gross Benefit/Gross Cost

Cobb-Douglass Production Function

We have used the following Cobb-Douglas production function to determine the major factors influencing gross return of pineapple cultivation.

$$Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}X_7^{b7}eUi\text{……………} (2)$$

Cobb-Douglas production function was further transformed into the following logarithm form:

$$lnY = lna + b_1lnX_1 + b_2lnX_2 + b_3lnX_3 + b_4lnX_4 + b_5lnX_5 + b_6lnX_6 + b_7lnX_7 + Ui\text{………………………………….. (3)}$$

Where,
Y = Gross return from pineapple production (tk/ha)
a = Constant or intercept value
X_1 = Cost of human labor (tk/ha)
X_2 = Cost of seeds (tk/ha)
X_3 = Cost of irrigation (tk/ha)
X_4 = Cost of fertilizer (tk/ha)
X_5 = Cost of power tiller (tk/ha)
X_6 = Cost of insecticides (tk/ha)
X_7 = Cost of transportation
Ui = Stochastic disturbance term
ln = Natural logarithm
b_1 b_2-----------b_7 = Coefficient of respective variables.

Socio-economic condition of pineapple growers in Tangail district based on field survey

Madhupur Upazila is the largest pineapple producing upazila in Tangail district of Bangladesh. Every year farmer of this upazila produces maximum amount of pineapple in the country. In 2018-2019 farmers produced 126538 tons of pineapple from 18107 hectares of land. In our study we that land holding & productivity of pineapple are increasing every year, because it is a profitable farm business. By doing this business people reduce their poverty and improve their socio-economic condition. The people of Bangladesh consume ripen pineapple, it contains calcium, potassium, vitamin, carbohydrates, water, mineral crude timbers that a very important for human body. On the other hand pineapple used for producing various food items such as squash, syrup, jelly etc. After making juice the extra portion and the tender leaves are uses as the livestock feed. So there is greater use & usefulness of pineapple and its demand in increasing day by day. It is a profitable farm business for the people of this area. So majority of the farmers in the study area are related to pineapple production.

Present Scenario of Pineapple Cultivation in Tangail district

The present scenario of the pineapple production in Tangail District for nearest years is shown by the following **Table 1**.

Table 1: Scenario of Pineapple cultivation in recent years (Source: Bangladesh Bureau of Statistics).

Years of Production	Amount of land for cultivation (In hectares)	Amount of production (in tonnes)
2015-16	15297	108023
2016-17	17007	120352
2017-18	16535	117011
2018-19	18107	126538
2019-20	18673	126865
2020-21	17992	127795

Table 1 from above table we see that in 2015-16 pineapple production of Tangail district was 108023 tones, and the land used for pineapple cultivation was 15297 hectares. In 2020-21 pineapple production was 127795 tones land used 17992 hectares. Table shows that every year land used and pineapple production is increasing in Tangail district because it is a profitable farm business.

Age distribution of the sample farmers

Age of farmers plays an important role for increasing pineapple production. For risk young age people are more energetic and middle age and old age people are more experienced. Here we have classified sample farmers into three age groups. These are below 30 years, 31 to 50 years and 51 above. Age distribution of the sample farmers is shown by following **Table 2**.

Table 2: Distribution of sample farmers according to age groups.

Age Groups	No. of respondents	Percentage
Below 30	34	34.69
31-50	51	52.04
51- Above	13	13.27
Total	98	100

Table 2 from above table we see, the age group 31-50 years was the largest (52.04%) among all the age group. This group is well experienced & most energetic group. So productivity & profitability is high of this group.

Marital Status of the Respondent

For pineapple farmers marital status is an important socio-economic indicator. Married respondents might be more active and available then unmarried respondents for farming. Marital status of the respondent farmers is shown by following **Table 3**.

Table 3: Marital status of the respondent's farmers.

Marital Status	No. of respondents	Percentage
Married	91	92.86
Unmarried	7	7.14
Total	98	100

Table 3 in study area 92.86 percent respondents was married. Married person might be more active and available than single person. And unmarried respondents are 7.14%. For this reasons productivity is high in the study area.

Education level of Respondents

Education makes a man more capable to earn maximum profit. Education has its own merit and it contributes increasing quality production. The education level of respondents is as follows.

Table 4: Education Status of the Respondents.

Education Level	No. of respondents	Percentage
Illiterate	18	18.37
Literate	15	15.31
Primary	25	25.51
Secondary	26	26.53
Higher Secondary	5	05.10
Tertiary	9	09.18
Total	98	100

Table 4 from education point of view; the sample farmers were grouped into six groups. From above table, it is important that majority 26.53% respondents have secondary education, illiterate farmers were 18.37%, Literate farmers were 15.31% and tertiary level have 9.18% respondents. Our study shows that profit margin is high in the farm of education farmers.

Family Size of the Respondents

Family size of the respondent farmers is shown by following table:

Table 5: Family size of the Respondents.

Family Size	No. of respondents	Percentage
Small Family	37	37.76
Medium Family	52	53.06
Large Family	9	9.18
Total	98	100

Table 5 in study family size has been defined as total numbers of persons living together without servants and taking their meals unitedly from the same kitchen and living under the control of one head. The respondent family size was classified into three categories, small, medium and large family. In our study majority of the respondents 53.06% were belongs to medium family, 37.76 & belongs to small family and 9.18% belongs to large family. It is believed that to large family size with more active person and to there are like an asset as source of family labor in the agricultural production.

Farm size of the respondents
Farm size of respondent farmers is shown in table:

Table 6: Farm size of respondents.

Particulars	No. of respondents	Percentage
Small (0-2 Acres)	72	73.47
Medium (2.1-3 Acres)	15	15.31
Large (3.1 acres above)	11	11.22
Total	98	100

Table 6 in study farm size of the respondent farmer was classified into three categories: small farm size (0-2 acres land), medium farm size (2.1-3 acres of land) & large (3.1 acres above land) farm size. In our study most of the respondents 73.47% belongs to small farmer size, 15.31% are medium farmer size & 11.22% are large farm size. That means maximum pineapple farmers were belonging in small farm category in study area.

Farm ownership of the respondent farmers
Farm ownership of the respondent farmers is shown by following table:

Table 7: Farm ownership of the respondent farmer.

Ownership	No. of respondents	Percentage
Own	52	53.06
Leasing	46	46.94
Total	98	100

Table 7 land ownership of the respondents farmers are classified into two categories, own land, leasing land.

In our study most of the farmers (54.06%) farmers' cultivated land was leasing land.

Farming experience of the respondents
The farming experience of the respondent farmers is shown by following table:

Table 8: Farming experience of the respondent.

Experience (Year)	No. of respondents	Percentage
Below 10 years	45	45.92
11-20 Years	34	34.69
21-30 Years.	15	15.31
Above 31 Years	4	04.08
Total	98	100

Table 8 farming experiencing is a vital socio-economic characteristic which effect the overall performance in pineapple cultivations. On the basis of farming experience the respondents were classified into four categories: experience below 10 years, experience between 11-20 years, experience between 21-30 years, and experience above 31 years. In our study we saw that, 45.92% sample farmers have below 10 years of farming experience that was highest compared to other groups. On the other hand, only 4.08% have more than 31 years of farming experience, 34.69% have 11-20 year and 15.31& have 21-30 years farming experience. So it was found that average farming experience is not good enough, which implies that all the pineapple farmers are not well experience in farming activities.

The pineapple growers' occupational status
Occupational status of the pineapple growers is shown by following table:

Table 9: Occupational status of pineapple grower.

Occupation	No. of respondents	Percentage
Main Occupation		
Agriculture (Pineapple)	80	81.63
Business	16	16.33
Service	2	02.04
Total	98	100
Subsidiary Occupation		
Agriculture (Pineapple)	65	66.33
Business	21	21.43
Services	3	03.06
No Occupation	9	9.18
Total	98	100

Table 9 the most important indication of socioeconomic status is occupation because it is closely related with the income, wealth condition and living standard of the households.

The most of the people in rural area are engaged in agriculture as their main occupation. In this study, the pineapple cultivations are involved in various types of activities such as agriculture but mainly pineapple cultivation was 16.33% business and service was 21.43% and 3.06% respectively.

Training status of respondent farmers
Training status of respondent farmers is shown in following table

Table 10: Training status of respondent farmers.

Training Status	No. of respondents	Percentage
Yes	6	06.12
No	92	93.88
Total	98	100

Table 10 for increasing farmer's knowledge & skill training is the most important tool. In our study, we saw that only 6.12% respondent received training & 93.88 have not.

Credit status for pineapple production
Credit status for pineapple production is shown by following table:

Table 11: Credit status for pineapple production.

Credit Status	No. of respondents	Percentage
Yes	61	62.24
No	37	37.76
Total	98	100

Table 11 illustrates that majority of the farmers 64. 24% taken credit for pineapple cultivation from public and private institution. And 37.76% do not receive credit facility for pineapple production.

Sources of seeds, irrigation, fertilizer and system of land cultivation
In this studied area maximum farmers use seeds produced in their own farms. On the other hand, some farmers use seed buying from the local hat bazar which is produced by the other farms in their locality. For irrigation farmers use sallow machine and deep tube well. Some farmers use plough and most of them use power tiller for cultivation. Farmers use both chemical and organic fertilizer in the production of pineapple. That means farmers use both old and modern technologies in producing of pineapple.

Cost and Profitability analysis of pineapple cultivation
Cost and profitability analysis is the most important motive of private investment project. Here cost of production involves, human labor cost, seed cost, irrigation, fertilizer, insecticides, power tiller, interest of capital, land use cost, machine cost etc. We know cost is two types: Fixed cost and variable cost. In our study machine, tools cost and land use costs are fixed cost. One the other hand variable cost involves, seed cost, irrigation cost labor cost fertilizer cost, power tiller cost, transportation cost and insecticides cost. The costs of these items were valued on the basis of market price. The output was also valued at price that the farms get. Human labor is required for different operation like land preparation, transportation wedding, fertilizer and manure application, insecticides application. Two types of human labor cost hired and family labor. Family labors included the farmers himself and the variable cost involves the cost of hired labor. The cost of labor was 500 tk per pay and the total labor cost per hectare was estimated tk 5186100. Seed cost is also important determinants of pineapple cultivation. Very few famers buy seeds from different seed producing institution or other farmers. Most of the farmers collect seeds from their own farm. In our study, per hectare seed cost is 7923000 tk. The cost of irrigation is 1273700 tk. cost of fertilizer 11263000 taka in per hectare production. Cost of power tiller 584300 taka, cost of insecticides 1294500 taka and cost of transportation was 4811500 tk. Total variable cost was 32336300 tk. Land cost 5554000 taka & Machine tool cost 315800 taka per hectare. Total fixed cost was 5869800 tk.

Total Cost
Total cost is the combination of all fixed costs and all variable costs. The formula to calculate total cost is: TC (total cost) = TFC (total fixed cost) + TVC (total variable cost). Here total cost amount taka 38206100 for per hectare land. Per hectare production cost of pineapple cultivation is shown by following table:

Gross Return
Gross return per hectare was calculated by multiplying the total amount of pineapple and by product by the average price that farm received. That is gross return is the summation of return from main products and by products.

Table 12: Per hectare production cost of pineapple cultivation.

Items	Unit	Average Unit Price	Total Cost (Tk)	Percentage of total cost
Variable Cost Items				
Human Labor Cost	Per day	500	5186100	13.57
Cost of Seeds	Per khata	500	7923000	20.74
Cost of Irrigation	Per hour	250	1273900	3.33
Cost of Fertilizer	Per season	---	11263000	29.48
Cost of Power tiller	Per hour	250	584300	1.53
Cost of Insecticides	Per season	---	1294500	3.34
Cost of Transportation	Per season	---	4811500	12.60
(A) Total Variable Cost	Tk		32336300	84.64
Fixed Cost Items				
Land use Cost	Per season		5554000	14.54
Machine tool Cost	Per season		315800	0.83
(B) Total Fixed Cost			5869800	15.36
Total Cost (A+B)			38206100	

Before the deduction of any fees, commissions, or expenses the gross rate of return is the total role of return of an investment. In our study, the gross return for per hectare land was 65123800 taka where return form pineapple was 58772800 tk and return from mixed food was 6351000 tk.

Net Return

Net return is very important to analyze the profit of an enterprise. It is calculated by subtracting total cost from total return. A net return is considered as the return of investments after costs. Such as taxes, inflation and other fees. In our study net return was 26917700 tk. Total cost, total return, net return & benefit cost ratio of the farm is shown in table:

Table 13: Total cost, total return and benefit cost ratio of the farm.

Items	Unit	Average total cost and return
(A) Gross Cost	Per season	38206100
Return Items		
Sale of pineapple	Per season	58772800
Sale of Mixed Food	Per season	6351000
(B) Gross Return	Per season	65123800
C) Net Return (B-A)	Tk	26917700
D) Benefit cost ratio		1.70

From the information of this table a Pie Chart can be drawn as follows:
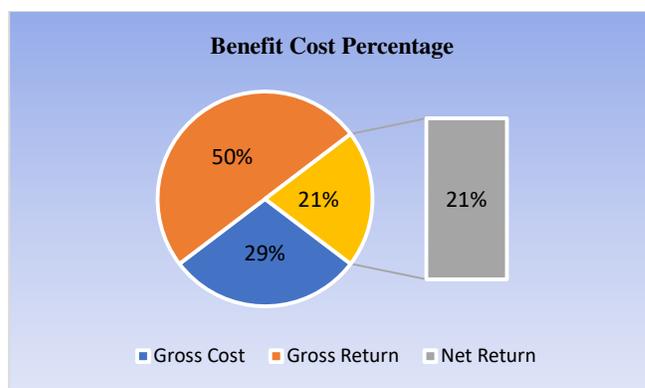

Fig. 1: Percentage of Net Return in respect of Gross Cost and Gross Return.

In the above Pie Chart we can see that the percentage of Net Return in respect of Gross Cost & Gross Return. Here gross cost 29 percent, gross return 50 percent so net return is 21 percent.

Benefit Cost Ratio

A benefit cost ratio is an important indicator to analyze cost benefit. It compares the present value of all benefits and costs of an investment projects. The formula of benefit cost ratio:

Gross return/Gross cost.
Value range of benefit cost ratio: General interpretation
BCR> 1 = Investment option is profitable.
BCR = 1 = Investment is neither profitable nor loss.
BCR<1 = Investments options generates losses.

By calculation the BCR we get 1.70 that means in-comes, investment for pineapple is profitable.

Factors affecting pineapple production

Pineapple production can be measured as a function of several variables. In the analysis of profitability we have used seven independent variables namely, human labor cost, cost of seeds, cost of irrigation, cost of fertilizer, cost of power tiller, cost of insecticides and transportation cost which have great impact on pineapple production.

Functional Relationship

The effect of an independent variable on a dependent variable is called functional relationship. If changes in the independent variables result in changes in dependent variable then there is a functional relationship between the two variables. In this profitability analysis we represent the estimated coefficient & related statistics of Cobb-Douglas production for pineapple production.

$$\text{Ln } Y = 3.793 + 0.079 \ln X_1 + 0.026 \ln X_2 - 0.004 \ln X_3 + 0.346 \ln X_4 - 0.026 \ln X_5 + 0.319 \ln X_6 + 0.160 \ln X_7$$

Effects of independent variables on dependent variable are shown by following table:

Table 14: Effects of independent variables on dependent variable.

Explanatory Variable	Estimated Coefficient	Standard Error	t values	P>|t|	95% Confidence interval for B	
					Lower bound	Upper bound
(Constant)	3.793	0.6294	6.03	0.000	2.5425	5.0432
Human Labor Cost ($\ln X_1$)	0.0789	0.0581	1.36	0.178	-0.0365	0.1943
Seed Cost ($\ln X_2$)	0.0255	0.0962	0.27	0.791	-0.1656	0.2167
Irrigation Cost($\ln X_3$)	-0.0041	0.0656	-0.06	0.950	-0.1345	0.1263
Fertilizer Cost ($\ln X_4$)	0.3461	0.0836	4.14	0.000	0.1801	0.5121
Power tiller Cost ($\ln X_5$)	-0.260	0.0600	-0.43	0.666	-0.1453	0.0933
Insecticides ($\ln X_6$)	0.3192	0.0863	3.70	0.000	0.1477	0.4906
Transportations ($\ln X_7$)	0.1602	0.0499	3.21	0.002	0.0611	0.2594
R^2	0.7901					
Adjusted R^2	0.7738					
F Value	48.39					
Number of observation	98					

Interpretation of input coefficient

1) Human labor cost (x_1): The regression co-efficient of human labor cost was 0.079. It is significant & positive. One percent increase in human labor cost gross return would increase by 0.079%.

2) Seed cost (x_2): The co-efficient of seed cost was 0.026 it is positive. One percent increase in seed cost would increase gross return by 0.026 %.

3) Irrigation cost (x_3): The co-efficient for irrigation cost was -0.004. Thus the relationships between irrigation cost and gross return is negative. That means if irrigation cost rises then productivity reduces.

4) Fertilizer Cost (x_4): The co-efficient for fertilizer cost was 0.346. It is positive and significant. The value of coefficient indicates that keeping all other factors constant. One percent increase in fertilizer cost gross return would increase by 0.346 %.

5) Cost of Power Tiller (x_5): The co-efficient of power tiller was -0.026. Thus the relationships between Power Tiller cost and gross return is neg-

ative. That means if power tiller cost rises then productivity reduces.

6) Cost insecticides (x_6): The co-efficient of insecticides cost was 0.319. It is positive significant. It indicates that holding other factors constant. One percent increase in insecticides cost would increase the gross return by 0.319%.

7) Transportation cost (x_7): The co-efficient of transportation cost was 0.160. It was positive and statistically significant. It indicates that holding other factors constant. One percent increase transportation cost would increase the gross return by 0.160 %.

R² Value

The co-efficient of determination, R^2 of the model were 0.79. It indicates that explanatory variables can explain the variations of gross return of the farms by 79 % in the model.

F value

F value of the equation derived for the functions were 48.39 which were significant. It indicates that all the

explanatory variables were important for explaining the variations in gross return for the terms.

RESULTS AND DISCUSSION:

From our study we have found that in 2015-2016 pineapple production of Tangail district was 108023 tones and land used for pineapple cultivation was 15297 hectares. But in 2020-21 pineapple production was 127795 tones and land used was 17992 hectors. So we have found that every year land used and pineapple production is increasing in Tangail district, because it is a profitable farm business. In case of pineapple production benefit cost ratio is high and in model discussion R^2, adjusted R^2, t value, F value are significant. It indicates that pineapple production is profitable and efficient farm business (Jamim *et al*., 2022).

So, it helps the farmers to reduce poverty and improves their socio- economic status. Pineapple growers are now financially strong and their living standard is rising day by day. But still they are facing various problems. Necessary steps should be taken to solve those problems. In Tangail district Madhupur upazila may be a model upazila in pineapple production because the climate to this upazila is favorable for pineapple production.

Problems and policy recommendations

Pineapple cultivation is a profitable farm business. It helps the farms to reduce poverty and improve the socio-economic status of pineapple growers. Pineapple growers are now financially strong and their living standard is rising day by day. Cost and benefit ratio shows that pineapple is now one of the leading cash crops in this study area. But farmers of this occupation are facing various problems. Among these insects pests make considerable loss. Necessary steps should be taken to contrast insects and pests in this study area. Disease free clean seed and modern production technology should be provided for this area. The problems and constraints were classified into four general categories:

Economic constraints

Lending from money lender, lack of capital, high input price low price of capital etc are the economic constraints of pineapple cultivators.

Technical constraints

Lack of clean seeds infestation of disease and pests, lack of irrigation facility, lack of credit facilities, etc. are technical constrains that are faced by pineapple cultivator.

Marketing constraints

Low price of pineapple, lack of transport facility, lack of communication facility, inadequate demand, lack of proper marketing channel, lack of storage facilities are marketing constraints of pineapple cultivation.

Socials problems

Shortage of electricity and adulation of facilities are social problems of pineapple cultivation.

Policy recommendations

Based on the results of the study important policy recommendation for socio economic starts of pineapple Growers are high heighted here:

1) In the study area high yielding varieties of pineapple should be provided.
2) Disease free clean the seed should be provided among the pineapple cultivators.
3) Immediately the availability of adulterated fertilizers and seeds should be stopped.
4) Government should step to establish pineapple processing and preservation house.
5) Price of pineapple should be increased to enhance the interest of the pineapple growers.
6) Government should provide training on scientific cultivation.
7) In this study labor savings technology should be expanded to reduce costs of production.
8) Authority should provide credit facility to the pineapple growers to enhance the production.
9) Marketing and communication facilities should be developed.
10) Availability of deep tube-well and shallow machine should be increased to reduce irrigation problem.
11) For smooth progress of pineapple cultivation political disorders & corruption should be reduced.
12) Government should provide subsidy to pineapple growers to increase the interest of pineapple cultivation.
13) Awareness among pineapple grower should be developed for minimize various problems.

CONCLUSION:

Pineapple cultivation is profitable farm business in this study area. Here benefit cost ratio is 1.70, so producing pineapple can increase the living standard of general people. The study concluded that most of the pineapple growers are middle aged and they are literate. So they are more capable to adopt modern production techniques. If governments provide training facilities then the quality and production of pineapple will in increase in the study area. On the other hand pineapple cultivators cultivate different kinds of fruits such as banana, lemon, ginger, turmeric etc which increase their real income. If the farmers get necessary training facility, credit facility, crucial improvement will possible in farms productivity. This study shows that most of the sample farmers received credit facility from different credit institutions and NGOs. This study also shows that socio-economic characteristics have positive impact on pineapple growers in this study area. So it is important to take necessary actions by government or higher authority to reduce problems and take others steps for the development of pineapple cultivation in this study area.

CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

REFERENCES:

1) Akter, K., Islam, M. A., & Noman, A. U. (2018). Exploring Economic Efficiency of Pineapple Production at Madhupur Upazila of Tangail District, Bangladesh. *Asian J. of Agricultural Extension, Economics & Sociology*, **27**(4), 1-11.

2) Change, C. (2007). Bangladesh. *ICDDRB,* 20 Apr 2011.

3) Datta, T., Saha, J. K., Rahman, M. A., Akter, M., & Ahmed, M. R. (2020). Socio-Economic Status of Pineapple Growers in Moulvibazar District of Bangladesh.
https://doi.org/10.9734/ajaees/2020/v38i830398

4) Hasan, S. S., Ali, M. A., & Khalil, M. I. (2010). Impact of pineapple cultivation on the increased income of pineapple growers. *The Agriculturists,* **8**(2), 50-56.
https://doi.org/10.3329/agric.v8i2.7577

5) Hossain, M. F., & Islam, M. A. (2017). Pineapple production status in Bangladesh. *Agriculture, Forestry & Fisheries*, **6**(5), 173-177.
https://doi.org/10.11648/j.aff.20170605.15

6) Jamim AA, Ahmed F, and Akter S. (2022). Does socioeconomic status of students influence their career choice? A study on the tertiary level students, *Asian J. Soc. Sci. Leg. Stud.*, **4**(4), 112-121.https://doi.org/10.34104/ajssls.022.01120121

7) Sharma, A., Roy, B., & Chakravorty, D. (2012). Potential of Self Help Groups as an Entrepreneur: A Case Study from Uttar Dinajpur District of West Bengal. *J. of soc. Sci.*, **30**(1), 83-87.
https://doi.org/10.1080/09718923.2012.11892985

8) Sultan, T., Islam, M. S., & Kaysar, M. I. (2018). A comparative profitability of pineapple-mono crop & pineapple intercrops of Modhupur area in Tangail district of Bangladesh. *Asian-Australasian J. of Food Safety & Security*, **2**(2), 56-64.