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Examining the Relationship between Educated Entrepreneurs and Socio-Economic Factors: A Focus on Bangladesh Agricultural Inclinations

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Abstract–This paper explored the perception of farming as a career among educated jobseekers in Bangladesh. We analyze how socio-economic determinants influence their perceptions and investigate the obstacles that prevent or limit their potential engagement in the farming sector. The analysis is conducted with a sample size of 509 and suitable analysis procedure such as descriptive statistics, SWOT analysis, overall weighted mean of career choice criteria, logistics regression, and partial least square discriminant analysis (PLS-DA) are applied. The result indicates that rural life, economic condition, and family influence play significant role in shaping educated job seekers in Bangladesh having interest in farming. It also suggests that there is a gap between the interest and the knowledge of farming among the respondents. The study also implies that rural residence, entrepreneurial intention, prior farming experience, and financial resources are key factors driving interest in farming career. In the following study the constructed PLS-DA model is highly accurate and reveals the factors that motivate people to pursue farming. Overall, this study suggests that developing and implementing vocational and technical training programs for young people that help them to move towards farming sector.

Keywords: Farming, Educated Jobseekers, Entrepreneurship, Socio-economic Determinants, Logistic Regression, PLS-DA.

I. INTRODUCTION

Farming is the practice of cultivating and growing plants, crops, or raising livestock for the purpose of producing food, fiber, or other agricultural products. It contains various activities such as planting, tending, harvesting, and managing livestock to meet the demand of human consumption, trade, or other agricultural purposes. Farming plays an ultimate role in providing sustenance and raw materials for a broad spectrum of industries worldwide. As per the World Bank's report, agriculture accounted for 90 percent of the mitigation of poverty in the five-year span from 2005, and harvest of food grain in the country tripled between 1972 and 2014, illustrating a growth rate second only to China [1], 734 million poor people who live in rural places and make less than US $1.90 a day depend on farming as their main source of income. In many parts of the developing world, over 70–80% of the food people eat comes from small farms. People think it will be very important for reducing poverty and making sure there is enough food for everyone. It could also have a big effect on nutrition by making more and different kinds of food [2]. As we see that, the population is growing at an accelerated rate than ever before. Hence the importance of farming careers is in high demand day by day.

According to the National Policy on [3] the main goal is to make sure that farming is safe and profitable, that people have enough food and nutrition, and that their social and economic situations get better. We plan to do this by increasing crop production and productivity, farmers' income, crop diversification, making sure that food is safe and nutritious, improving the marketing system, and making sure that farming is profitable and that natural resources are used efficiently [4]. While the overall unemployment rate was 3.6% in 2022, the young unemployment rate was 12.93%, which is three times higher, according to the Labor Force Survey 2022 conducted by the Bangladesh Bureau of Statistics (BBS). In addition, the poll found that young unemployment accounted for 79.6 percent of the total unemployment rate, with a greater proportion among

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youths with higher levels of education [5]. When youth can't find stable jobs after their graduation program where most of them came from middle class families. They begin to think to do something on their own capability and most of them come back to their own residence and they are harvesting on their field, raising livestock with their small capital. Young people have several creative ideas but are often excluded from planning and policy processes because of their scarcity of principle.

Over the years, farming has seen the harsh realities of many farmers who provided all their effort to yield food for the whole nation, but at the end of the day, they unable to deliver the basic needs to their own families [6]. However, we cannot deny the fact that over the last few years, we have seen a massive wave of change in the farming sector. There are two important elements such as modern machinery and advancement in technology responsible for changing this phenomenon. In this study our main goal is to analyze how educated jobseekers perceive farming as an occupation, to identify the effect of socio-economic determinants on the opinions of the respondents and investigate the confines to respondents' engagement in the farming.

II. LITERATURE REVIEW

The young population of Bangladesh ranks eighth globally. There are 169.4 million people living in Bangladesh, with 47.6 million of them being in the youth demographic (10–24 years old) [7]. This number is expected to rise to between 10 and 19 percent by the year 2050 [8]. Out of 47.6 million people in this age group, 94.46% are literate, and 12.93% of them are unemployed, according to the Bangladesh Bureau of Statistics (BBS) [9].

A case study by [10] government jobs were known to be rare and restricted to individuals with connections or the ability to bribe (in Bangladesh, for example). Government jobs continue to be the primary source of formal sector employment in lower income nations [11]. According [12] found that the number of young people dropping out of primary and secondary school has gone down over time. The rate of starting a farm business was lower than the rate of agricultural work and other industries. But the young people who took farm business classes were able to make a lot more money and make their lives much better [13]. A study by [14] found that most young people in rural areas are only slightly or not at all involved in industrial farming.

There was a positive and significant connection between how much they participated in commercial agriculture and their level of education, the size of their family farm, their annual family income, loan support, Cosmo politeness, their use of communication media, their role in organizations, and the training they got [15]. According [16] found that the attitude of young farmers was positively affected by their level of education, training, annual income, exposure to mass media, ability to make decisions, willingness to try new things, interest in science and management, drive for success, interest in money and taking risks, and their ability to make decisions [17].

Ben White found that the new field of youth studies can help us understand why young people are leaving farming. He pointed to the lack of skills among rural youth, the devaluing of farming and rural life, the long-term neglect of small-scale agriculture and rural infrastructure, and the fact that young people in rural areas are having more and more trouble getting access to land while they are still young, even if they want to become farmers [18]. According to a study by [19], 34.2% of all young people had a moderate view on agriculture. The next most common attitudes were moderately positive (28.3%) and moderately negative (18.4%). Only 10.8% had a highly positive attitude and 8.3% had a highly negative attitude toward agriculture [20]. The Food and Agriculture Council says that even though the agriculture industry is seen as having a lot of potential on a national and foreign level, young people are becoming less interested in and involved in farming. Still, most people say that young people should be in charge of bringing farms back to life because they are more likely to be creative.

According to [21], the most important predisposing factors are those that happen at the person level. The social and institutional level factors can also play a role. Based on a sample of recent college grads, it was found that a good number of them wanted to start their own business. However, only a few of them end up becoming entrepreneurs. The results also show that about one third of grads who get paid and about half of graduates who are jobless (or economically inactive) want to start their own business [10].

A study by [21] discovered that farmers were interested in learning new things (63%), and 55% of those surveyed got information from familiar sources, such as neighbors or friends (53%). 53.8% of those who answered thought the information was completely effective for increasing knowledge, 51.2%

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thought it was completely effective for understanding, and 43.8% thought it was completely effective for application. According [18] did a study and came to the conclusion that training is very important for the development of manpower, especially youth development. They also found that the training was effective in terms of training outcomes, and the people who responded wanted future trainees to be able to solve their problems while getting the knowledge they needed from the training [22].

Daniel Mains says that one problem young male job seekers in urban Ethiopia face is "the problem of passing excessive amounts of time." This is different from their busy lives in school or college, where jobless rates for young people are thought to be over 50%. According to [23] adolescents identified many unfavorable perceptions that influenced their decision to engage in agriculture: i) The youth considered that social life in rural regions for young people was insufficient, and ii) they believed that there was little potential for self-realization in agricultural employment [17].

Nowadays, educated young play an important part in the future of farming and agricultural growth. Older farmers are accustomed to old agricultural methods and lack the necessary skills to deal with new technology or advancements on their farms. Now we want to see if educated youngsters are more likely to get involved in farming.

III. RESEARCH METHODS

For this study the convenient sampling method with an online-based cross-sectional questionnaire survey was conducted at several renowned universities in Bangladesh. Though some data was collected through face-to-face interview. The target population for the survey are the graduate and the undergraduate students from those universities. The total sample size is 509 respondents. Where 56% are male and 44% are female students. Those respondents represent different divisions of the entire country.

The collected data were compiled, tabulated, and analyzed in terms of objective of the study. Data cleaning and coding process conducted by using Python programing. Microsoft office is used for report writing and editing processes. The Statistical Package for Social Science (SPSS), R programing and Minitab are used to perform the data analysis.

Descriptive statistics are performed for describe the basic feature of the collected data which help us to summarize and graphical representation of the data. We used SWOT analysis to see the strengths, weaknesses, opportunities, and threats of the event of interest. We also used Logistic regression analysis, here our main goal is to introduce with cause-and-effect relationship between a response variable having categorical in nature and a set of independent variables [24]. We applied partial least squares discriminant analysis (PLS-DA). It is a supervised classification approach that uses partial least squares regression. When the PLS-DA model is used for classification, the partial least squares regression model between predictor variables matrix (X) and response variables matrix (Y) is formed, and the dichotomous response variables matrix of Y is coded in binary (1 or 0) [19].

Table 1. Data description

Variable	Description
Gender	Dummy variable taking the value 0 for female and 1 for male.
Residence	Dummy variable taking the value 0 for urban and 1 for rural.
Family status	Categorical variable taking the value 1 for poor, 2 for middle-class, and 3 for rich.
Father occupation	Categorical variable taking the value 1 for businessman, 2 for farmer, 3 for job holder, and 4 if otherwise.
Mother occupation	Categorical variable taking the value 1 for housewife, 2 for job holder, and 3 if otherwise.
Marital status	Dummy variable taking the value 0 for single and 1 for married.
Housing status	Dummy variable taking the value 0 for own a home and 1 for rent a home.
Education level completed	Dummy variable taking the value 0 for undergraduate and 1 for graduate.
Significant debt	Dummy variable taking the value 0 for no and 1 for yes.
Significant saving	Dummy variable taking the value 0 for no and 1 for yes.
Interested in entrepreneurship	Dummy variable taking the value 0 for no and 1 for yes.
Interested in farming	Dummy variable taking the value 0 for no and 1 for yes.
Agricultural knowledge	Dummy variable taking the value 0 for no and 1 for yes.
Opportunity having own farm	Dummy variable taking the value 0 for no and 1 for yes.
Previous experience in farming	Dummy variable taking the value 0 for no and 1 for yes.
Aware of any program	Dummy variable taking the value 0 for no and 1 for yes.
Enough asset to start	Dummy variable taking the value 0 for no and 1 for yes.

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Entrepreneur in family	Dummy variable taking the value 0 for no and 1 for yes.
Social status compared	Categorical variable taking 1 for lower, 2 for about the same, and 3 for higher. Here respondent perceive the societal and community status of individuals in the agriculture sector compared to other professions.
Financial prospect compares	Categorical variable taking 1 for worse, 2 for about the same, and 3 for better. Here respondent perceive the financial prospects of a career in agriculture compared to other professions
Concerned in financial risk	Categorical variable taking 1 for concerned, 2 for neutral, and 3 for not concerned. Here if respondent concerned about the financial risks associated with a career in agriculture

IV. RESULT AND DISCUSSION

4.1 Descriptive Statistics

Table 2. Demographic characteristic on having interest in farming

Demographic Information		N	Total	%	Interested in farming	
					Yes	No
Gender	Female	224	509	44.0 %	37.1 %	62.9 %
	Male	285		56.0 %	60.0 %	40.0 %
Residence	Urban	240	509	47.2 %	32.1 %	67.9 %
	Rural	269		52.8 %	65.8 %	34.2 %
Family status	Poor	102	509	20.0 %	64.7 %	35.3 %
	Middle class	287		56.4 %	52.6 %	47.4 %
	Rich	120		23.6 %	30.8 %	69.2 %
Father occupation	Business	162	509	31.8 %	41.4 %	58.6 %
	Farmer	82		16.1 %	62.2 %	37.8 %
	Job holder	196		38.5 %	46.9 %	53.1 %
	Other	69		13.6 %	63.8 %	36.2 %
Mother occupation	House wife	458	509	90.0 %	52.4 %	47.6 %
	Job holder	47		9.2 %	25.5 %	74.5 %
	Other	4		0.8 %	50.0 %	50.0 %
Marital status	Single	466	509	91.6 %	50.0 %	50.0 %
	Married	43		8.4 %	48.8 %	51.2 %
Housing status	Own a home	353	509	69.4 %	55.0 %	45.0 %
	Rent a home	156		30.6 %	38.5 %	61.5 %
Education level completed	Undergraduate	382	509	75.0 %	50.8 %	49.2 %
	Graduate	127		25.0 %	47.2 %	52.8 %
Significant debt	No	417	509	81.9 %	48.0 %	52.0 %
	Yes	92		18.1 %	58.7 %	41.3 %
Significant saving	No	377	509	74.1 %	43.8 %	56.2 %
	Yes	132		25.9 %	67.4 %	32.6 %

We can see from Table-1 in the respondent there are 44% respondent are women and 56% respondent are men. Men are more interested in farming than women, with 60.00% of men and 37.10% of women expressing an interest. 52.8% of respondents live in rural areas, while 47.2% live in urban areas. People living in rural areas are more interested in farming than those living in urban areas, with 65.80% of rural residents and 32.10% of urban residents expressing an interest. Most of the respondents (56.4%) are from middle-class families. 20% are from poor families, and 23.6% are from rich families. People from poor backgrounds are more interested in farming than those from middle-class or richer backgrounds, with 64.70% of poor people and 52.60% of middle-class people expressing an interest. In the respondent 31.8% of respondents have fathers who are businessmen, 16.1% of respondents have fathers who are farmers, 38.5% of fathers are job holders, and 13.6% have other occupations.

People whose fathers are farmers are more interested in farming than those whose fathers have other jobs, with 62.20% of respondents of whose father are farmers and 46.90% of respondent of whose father are job holders expressing an interest. In the respondent 90% of mothers are housewife, while only 9.2% are job holders. People whose mothers are job holders are less interested in farming than those whose mothers have other occupations, with 25.50% of respondent whose mother are job holders and 52.40% of children of housewives expressing an interest in farming. 91.6% of respondents are single,

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and 8.4% are married. Single people are slightly more interested in farming than married people, with 50.00% of single people and 48.80% of married people expressing an interest. 69.4% of respondents own their homes, and 30.6% rent their homes. People who own their own homes are more interested in farming than those who rent, with 55.00% of homeowners and 38.50% of renters expressing an interest.

In the respondent we also see that 75% of respondents are undergraduates, and 25% have a graduate degree. There is no significant difference in interest in farming between people who are undergraduates and who have a graduate degree, with 50.80% of undergraduates and 47.20% of graduates expressing an interest in farming. 81.9% of respondents have no significant debt, and 18.1% do. People with significant debt are more interested in farming than those without debt, with 58.70% of people with debt and 48.00% of people without debt expressing an interest. 74.1% of respondents have no significant savings, and 25.9% do. People with significant savings are more interested in farming than those without savings, with 67.40% of people with savings and 43.80% of people without savings expressing an interest. Overall, the table suggests that there is a significant interest in farming in Bangladesh, particularly among people living in rural areas, from poor families, and with respondents whose father are involved in farming.

Table 3. Division based having interest in farming

Division	Interested in farming				Total	%
	Yes	%	No	%		
Dhaka	29	41%	42	59%	71	13.95%
Chittagong	73	45%	90	55%	163	32.02%
Rajshahi	37	55%	30	45%	67	13.16%
Khulna	41	63%	24	37%	65	12.77%
Sylhet	17	44%	22	56%	39	7.66%
Rangpur	23	51%	22	49%	45	8.84%
Barisal	24	63%	14	37%	38	7.47%
Mymensingh	10	48%	11	52%	21	4.13%
Total	254	49.9%	255	50.1%	509	100.00%

In table 3, we can see that 13.95% respondents are from Dhaka division, 32.02% from Chittagong division, 13.16% from Rajshahi division, 12.77% from Khulna division, 7.66% from Sylhet division, 8.84% from Rangpur division, 7.47% from Barisal division and 4.13% from Mymensingh division. From the table we can see that the highest percentage of having interest in farming is in Khulna and Barisal division, which is 63% and three division respondents showed relatively less interest in farming, which are Dhaka (41%), Sylhet (44%) and Chittagong (45%) respectively.

Table 4. Descriptive statistics of perception on Farming Occupation

Perception on Farming Occupation		**N**	**Total**	**%**
Interested in entrepreneurship	No	108	509	21.2%
	Yes	401		78.8%
Interested in farming	No	255	509	50.1%
	Yes	254		49.9%
Agricultural knowledge	No	371	509	72.9%
	Yes	138		27.1%
Opportunity having own farm	No	64	509	12.6%
	Yes	445		87.4%
Previous experience in farming	No	374	509	73.5%
	Yes	135		26.5%
Aware of any program	No	292	509	57.4%
	Yes	217		42.6%
Enough asset to start	No	397	509	78.0%
	Yes	112		22.0%
Entrepreneur in family	No	273	509	53.6%
	Yes	236		46.4%
Social status compared	Lower	244	509	47.9%
	About the same	186		36.5%
	Higher	79		15.5%
Financial prospect compares	Worse	158	509	31.0%
	About the same	160		31.4%
	Better	191		37.5%
Concerned in financial risk	Concerned	242	509	47.5%
	Neutral	169		33.2%
	Not concerned	98		19.3%

Table 4 represents perception on farming occupation of the respondent. In the table, we can see that 49.9% of respondents are interested in farming, where only 27.1% of respondents have agriculture knowledge. 87.4% of respondents think that having their own farm is beneficial to start agricultural carrier. We can also see that 73.5% of respondents have no previous experience in farming, while 26.5% do. 57.4% of respondents are not aware of any government programs to support farming, while 42.6% are aware. From a financial prospect 78% of

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respondents do not have enough assets to start a farm. And we have noticed that 53.6% of respondents do not have an entrepreneur in their family, while 46.4% did. But 78.8% of respondents expressed interest in entrepreneurship. In the table we can see that 47.9% of respondents feel that their social status would be lower if they become a farmer, while 36.5% feel that it would be about the same and 15.5% feel it would be higher.

On the other hand, 37.5% of respondents feel that their financial prospects would be better if they become a farmer, while 31.4% think it would be about the same and 31% are realized as worse situation. And 33.2% of respondents are neutral about the financial risks of farming, while 19.3% are not concerned and 47.5% are concerned. The finding suggested that there is a high level of interest in entrepreneurship and moderate level of interest farming in Bangladesh, but that many people lack the proper knowledge of farming, experience, and resources to get started. There is also a significant concern about the financial risks of farming.

The financial prospects of a career in agriculture compared to other professions. Though a significant portion (37.6%) believed that the financial prospect is better in farming career. From Figure-3 we noticed that almost half of the respondents are concerned about the financial risks of farming, while very few of the respondents are not concerned about it.

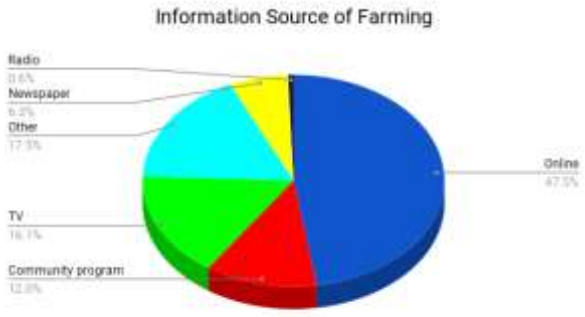

Figure 1. Information source of any government or community programs based on farming

In Figure-4, most of the respondents (47.5%) grab info on farming programs from online. Newspapers still matter to some of the respondents, while TV plays an important part (16.1%) to provide information on farming programs. Furthermore, community programs also play a role to provide information on it.

Table 5. SWOT analysis (key findings) about having interested in farming.

SWOT Analysis	
Strength	**Weakness**
• Profitable and growing market for food and agricultural products. • Responsible and sustainable contribution to global goals and environment. • Health and psychological benefits of working in nature.	• Seasonal and unstable income of agricultural work. • Lack of self-realization in agriculture. • Lack of career satisfaction in agriculture. • Physical difficulty, dirtiness in agricultural work.
Opportunity	**Threats**
• Technological innovations to improve and attract agricultural work. • Financial resources to support and fund agricultural work. • Flexible work schedule in agriculture. • Living sustainably with nature in rural areas.	• Negative perceptions and stereotypes of working in agriculture. • Lack of training and skills development in agriculture. • Lack of policies, programs, incentives, and partnerships for youth in agriculture.

4.4 Logistic Regression

Coefficient	Estimate	Odds ratio	Std.Error	z value	Pr(>|z|)	
(Intercept)	-3.66871	0.025509	0.63926	-5.739	9.52E-09	***
Gender	0.05308	1.054514	0.26597	0.2	0.841812	
Residence	1.41018	4.096693	0.26449	5.332	9.73E-08	***
Household income	-0.1541	0.857186	0.12509	-1.232	0.217953	
Household expense	-0.34053	0.711393	0.15699	-2.169	0.030074	*
Marital status	0.59374	1.810748	0.48115	1.234	0.217205	
Number of dependents	0.21465	1.239428	0.08477	2.532	0.011336	*
Housing status	-0.09509	0.909291	0.26754	-0.355	0.722279	
Education level completed	0.29728	1.346192	0.28854	1.03	0.302884	
Agricultural knowledge	0.05223	1.053618	0.28634	0.182	0.855254	
Interested in entrepreneurship	3.58852	36.18049	0.45998	7.801	6.12E-15	***
Previous experience farm	1.49164	4.444378	0.32287	4.62	3.84E-06	***
Aware of any program	0.07465	1.077507	0.25737	0.29	0.771761	
Significant debt	0.20476	1.22723	0.33829	0.605	0.54499	
Significant saving	0.90454	2.470795	0.326	2.775	0.005526	**
Enough asset to start	1.64449	5.178368	0.43417	3.788	0.000152	***
Entrepreneur in family	-0.61958	0.53817	0.24573	-2.521	0.011688	*

Significant codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
Chi square: 263.088
Degrees of freedom: 16
Significance level: 0.000

Figure 2. Logistic Regression estimation for the effects of all factors in the model of interested of farming

In figure-2 living in a rural area (as opposed to urban) is associated with a higher interest in

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farming which is highly significant (p <0.001). The coefficient for residence is 1.41018, which means that for a one-unit increase in residence, the log-odds of being interested in farming increases by 1.41018, holding all other variables constant. The odds ratio for residence is 4.096693, which means that individuals residing in rural areas are more than 4 times more likely to be interested in farming compared to individuals residing in urban areas.

Household expense is a statistically significant (p<0.05) but a negative predictor of being interested in farming. For one-unit of increase in household expense, the log-odds of being interested in farming decrease by 0.34053. In other words, individuals with higher household expenses are less likely to be interested in farming, holding all other variables constant. The number of dependents is a significant (p<0.05) positive predictor of being interested in farming. For each additional dependent, the log-odds of being interested in farming increases by 0.21465, holding all other variables constant. Odds ratio is 1.239428, which means that for each additional dependent, the odds of being interested in farming increase by 23.94%.

There is a strong significant (p<0.001) positive relationship between being interested in entrepreneurship and being interested in farming. For individuals who are interested in entrepreneurship (compared to those not interested), the log-odds of being interested in farming increase by 3.58852. The odds ratio 36.18049 refers to that Individuals who are interested in entrepreneurship are 36.18 times more likely to be interested in farming compared to those who are not interested in entrepreneurship. This means the presence of entrepreneurial interest significantly increases the likelihood of also having an interest in farming.

For individuals who have previous experience in farming, the log-odds of being interested in farming increase by 1.49164 and which is highly significant (p<0.001). The odds ratio 4.444378 refers that individuals with previous farming experience are 4.44 times more likely to be interested in farming compared to those without such experience. That means prior involvement in farming significantly increases the likelihood of expressing interest in it again.

Significant savings and being interested in farming have a positive and highly significant (p<0.01) relationship. The coefficient suggested that for individuals with significant savings, the log-odds of being interested in farming increase by 0.90454 and odds ratio 2.470795 refers that Individuals with significant savings are 2.47 times more likely to be interested in farming compared to those without such savings. It is indeed proved that financial security can play a significant role in encouraging individuals to consider farming.

A strong positive relationship between having enough assets to start and being interested in farming and the relationship is highly significant. The coefficient 1.64449 refers to that one unit of increasing enough assets to start farming, the log-odds of being interested in farming increase by 1.64449, while other factor remain fixed. The odds ratio 5.178368 refers to the fact that individuals who have enough assets to start farming are 5.18 times more likely to be interested in farming compared to those who do not.

A significant negative relationship between having an entrepreneur in the family and being interested in farming. Coefficient estimate -0.61958 refers that, with an entrepreneur in their family, the log-odds of being interested in farming decrease by 0.61958. Odds ratio 0.53817 refers to that individuals who have an entrepreneur in their family are 0.54 times less likely to be interested in farming compared to those who do not. Though the finding may indicate having entrepreneur in family may influence negatively to the individual to choose farming as career. There must be several explanations, firstly, individuals with entrepreneurial family members might be exposed to the challenges and uncertainties associated with running their own businesses, potentially leading them to seek more stable careers, including farming. Alternatively, individuals might be influenced by family members who are successful entrepreneurs to pursue similar paths, leading them away from farming career.

In the logistic regression model of having interested in farming some variable (Residence, Household expenses, Number of dependent, Interested in entrepreneurship, Previous experience in farming, Significant saving ,Enough asset to start and Entrepreneur in family) provide significant relationship with having interest in farming but some of the variable (Household income, Marital status, Housing status, Education level completed, Agricultural knowledge, Aware of any program, Significant debt) shows insignificant relationship though some of the variable may have potential to influence on choosing career as farming.

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4.3 Partial least square discriminant analysis (PLS-DA)

We used partial least squares (PLS) analysis to pick four out of ten components to predict the dependent variable, which we then cross validated.

Table 6. Analysis of Variance of PLS-DA model

Analysis of Variance					
Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	4	51.851	12.9627	86.65	0.0000
Residual Error	504	75.399	0.1496		
Total	508	127.25			

From Table-6, the F-statistic (86.65) and p-value (0.0000) both indicate the model is highly significant. This means the PLS components are jointly significant in explaining the variation in the dependent variable. The ANOVA table suggests the PLS model is a good fit for the data and explains a significant portion of the variance in the dependent variable with low error.

Table 7. Model selection using cross validation technique for having interested in farming

Model Selection and Validation for Interested in farming				
Components	X Variance	Error	R-Sq	R-Sq (pred)
1	0.136192	81.6634	0.358242	0.336093
2	0.216228	76.1762	0.401364	0.363346
3	0.303271	75.5314	0.406431	0.365164
4	0.368437	75.3987	0.407474	0.365642
5		75.3864	0.407574	0.365457
6		75.3839	0.407589	0.365171
7		75.3824	0.407601	0.364411
8		75.3825	0.407605	0.364397
9		75.3825	0.407605	0.364446
10		75.3825	0.407605	0.364445

According to table 7 we have selected the 4-component model which has R^2 value of 40.74% and predicted R^2 value of approximately 36.5%. Based on the x-variance, the 4-component model explains almost 0.37% of the variance in the predictors. If more component joins, the R^2 value increases, on the other hand predicted R^2 decreases, which indicates that if more components join, the models likely to be over-fit. In figure-5 we have shown the model plot according to the data in Table-8.

Figure 3. Partial least square model selection plot

X Loadings				
Variables	Component1	Component2	Component3	Component4
Gender	0.381703	-0.33362	-0.22948	-0.21987
Residence	0.386356	0.052289	0.136958	-0.05227
Household income	-0.31386	0.393869	-0.56655	0.247172
Household expense	-0.30076	0.395869	-0.58971	0.220577
Marital status	-0.07096	0.21827	0.120816	-0.02585
Number of dependents	0.045703	-0.02626	0.141744	0.340742
Housing status	-0.24412	0.239067	0.049057	-0.06216
Education level completed	-0.05553	0.053911	-0.02571	0.339767
Agricultural knowledge	0.160609	-0.09933	-0.38537	0.281361
Interested in entrepreneurship	0.320414	0.545564	0.024777	0.179457
Previous experience in farm	0.484803	0.149034	-0.2202	-0.18151
Aware of any program	0.157962	-0.20693	-0.17596	0.384539
Significant debt	0.110751	-0.03076	-0.01322	-0.12948
Significant saving	0.239945	0.133082	-0.37383	0.187513
Enough asset to start	0.264745	-0.19748	-0.10057	0.463172
Entrepreneur in family	0.012546	-0.39841	0.092785	0.363876

Figgure 4. X loadings (PLS weights or W scores)

From figure 5, in component-1, the variable with the highest positive loading is previous experience in farming (0.4848), Interested in entrepreneurship (0.3204) and Enough asset to start (0.2647). This means that people who have previous experience in farming are more likely to score high on component-1and another two variables with relatively high positive loadings in component-1. The variables with the highest negative loadings in component-1 are Household income (-0.3138) and Household expense (-0.3007). In component-2 we observed that this component is highly influenced by Interested in entrepreneurship which score is (0.545564). Which refers that people who have entrepreneurship aspirations have more likely score high on this component. Also, two variable Household income and Household expense has strongly positive relation

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with this component, which is (0.393869) and (0.395869) respectively. Besides, we observe that Entrepreneur in family has likely to have negative influence on this component. So, we can name component-2 as "Entrepreneurial Ambition with Stable Financial Resources" component.

In component-3 we can see that the component is mainly influenced by Household income and Household expense, which have the largest absolute values of (-0.56655) and (-0.589706), respectively. This means that the component is negatively correlated with these two variables, and that higher values of the component correspond to lower values of household income and household expense. Other variables like Agricultural knowledge and Significant saving also have negative influence on the component, which is (-0.38537) and (-0.37383) respectively. It seems that we can interpreted the component-3 as "Rural Aspiration Despite Financial Constraints" component.

In component-4 some factors have largest value like Enough asset to start (0.463172), Aware of any program (0.384539), Entrepreneur in family (0.363876) and Education level completed (0.339767). Which suggests that this group has enough resources and support to have entrepreneurial ambition. We can term component-4 as "Resource Availability**"** component.

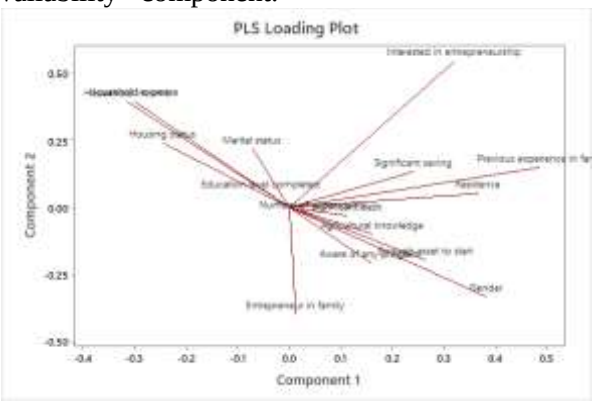

Figure 5. Partial least square loading plot

In this Figure-6, we can see that some variables are more strongly correlated with Component-1, such as Interested in Entrepreneurship, Experience in Farming, and Residence. These variables have higher values on the x-axis, which means they contribute more to the first component. On the other hand, some variables are more strongly correlated with Component-2, such as Household income, Household expense, and Housing status.

Table 8. Y-loading (Y weights or U scores)

Y Loadings				
	Component 1	**Component 2**	**Component 3**	**Component 4**
Interested in farming	0.418869	0.194479	0.0651049	0.0329933

Here in Table-9, Component-1 has the strongest relationship with interest in farming, followed by Component-2, Component-3, and Component-4. It suggests that the variables in Component-1 are the most influential in predicting whether someone having interested in farming.

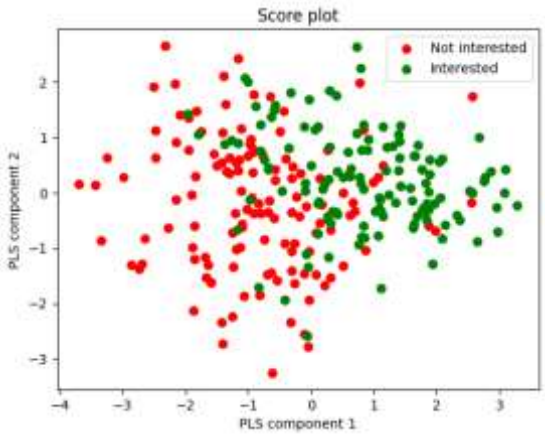

Figure 6. Score plot of partial least square

According to Figure-7, the score plot corresponds to the first two PLS components (PC) of the having interested in farming dataset. In which we can see in Table-10 PC1 and PC2 account for 41.89 % and 19.45 %, respectively, and the total cumulative informative variance contribution reached 61.34 %.

4.4 Selection of key variables

Table 9. Variable Importance in the Projection (VIP)

Variable	VIP
Previous experience farm	1.948
Interested in entrepreneurship	1.860
Residence	1.543
Gender	1.058
Household income	1.006
Household expense	0.958
Significant saving	0.950
Enough asset to start	0.874
Housing status	0.689
Agricultural knowledge	0.448
Aware of any program	0.403
Significant debt	0.376

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Entrepreneur in family	0.273
Number of dependents	0.266
Education level completed	0.146
Marital status	0.033

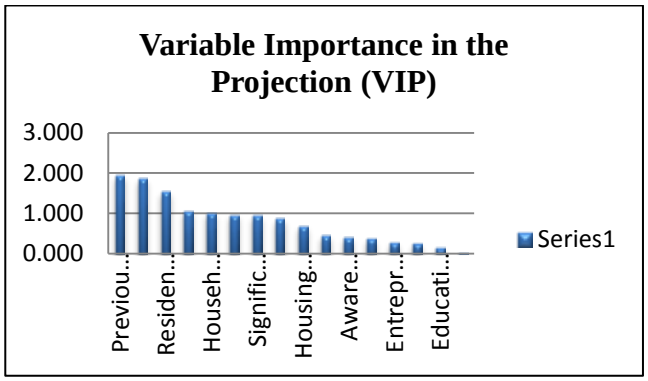

Figure 7. Variable Importance in the Projection (VIP) plot

From Figure-8, the VIP (Variable importance in the projection) result shows that the most influential variables for predicting interest in farming are previous experience in farming, interest in entrepreneurship, and residence. These variables account for the largest share of the variance explained by the model. The least influential variables are marital status, education level completed, and number of dependents. These variables have little impact on the outcome variable. Therefore, the model suggests that people who have prior experience in farming, are interested in starting their own business, and live in rural areas are more likely to have interest in farming than others.

Table 10. Confusion matrix

Confusion matrix for the training sample (Having Interested in farming)				
To From	Yes	No	Total	% Correct
Yes	190	64	254	74.80%
No	48	206	254	81.10%
Total	238	270	508	77.95%

According to table-10, in the confusion matrix, there are 190 true positives, 64 false negative, 48 false positive, and 206 true negatives. This means that the model correctly classified 74.80% (Sensitivity) of the people who are interested in farming, and 81.10% (Specificity) of the people who are not interested in farming. We can say that the confusion matrix shows that the model is doing a good job of predicting whether someone is interested in farming or not.

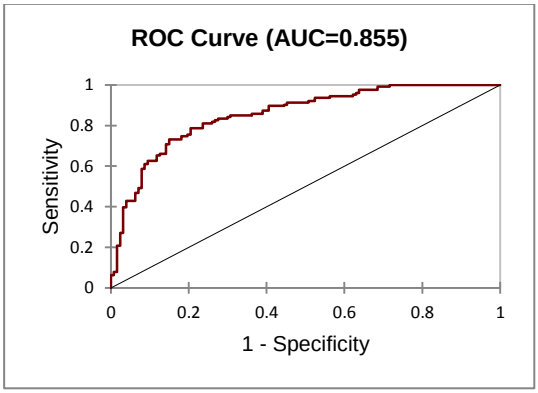

Figure 8. Receiver operating characteristic curve (ROC)

From figure-8, the area under the curve (AUC) is 0.855. This is a good AUC value, indicating that the model is performing well. Overall, this ROC curve suggests that the model performs well of predicting whether someone is interested in farming or not.

V. CONCLUSION AND SUGGESTION

Educated youth in Bangladesh can enhance their participation in farming sector, which has a lot of potentials. Our study suggests that familiarity with rural life, economic need, and family influence play significant roles in shaping educated job seekers in Bangladesh having interest in farming. We also noticed from our study that there is a gap between the interest and the knowledge of farming among the respondents. It also indicates that the respondents have mixed views on the social and financial implications of becoming a farmer.

From logistic model we found that rural residence, entrepreneurial spirit, prior farming experience, financial resources, and number of dependent family members are key factors driving interest in farming career. Though the finding may indicate having entrepreneur in family may influence negatively to the individual to choose farming as career. Based on the findings we are suggesting some policy implication. Such as providing incentives and subsidies for young farmers to start or expand their own agri-businesses. Developing and implementing vocational and technical training programs for young people interested in farming. Creating awareness and positive image of farming as a rewarding and profitable career option for educated youth, through media campaigns, role models, mentorship, etc.

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VI. REFRENCE

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