Exploring the Relationship between Farmer Characteristics and Training Effectiveness in Sericulture Cultivation

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ABSTRACT

The resurgence of the sericulture industry, driven by the demand for sustainable fibers, necessitates a nuanced understanding of sericulture cultivation practices. This study explores the crucial relationship between farmer characteristics and the effectiveness of training programs in the traditional sericultural districts of Bholahat, Bangladesh, which contribute 75% of the country's silk production. Using a mixed-methods approach, 192 respondents who underwent sericulture training were surveyed, interviewed, and observed on-site. The research reveals 10 significant and 9 non-significant characteristics out of 19, vital for understanding training effectiveness. The study delves into the link between farmer characteristics and training effectiveness, aiming to identify factors shaping perceptions. Insights gained contribute to designing targeted training programs for sericulture farmers, enhancing overall impact, and improving cultivation practices. The research also highlights key demographic factors, providing a comprehensive understanding of sericulture farmers and guiding informed decision-making in development and training strategies.

Keywords: Sericulture, Cultivation, Farmers, Impact, Training, Effectiveness.

INTRODUCTION

The sericulture industry, a cornerstone of textile production, has witnessed a resurgence in interest and significance globally due to the demand for sustainable and natural fibers. Sericulture cultivation, which revolves around the intricate process of silkworm rearing and silk production, requires a nuanced understanding of agricultural practices and specialized skills. A crucial factor influencing the success of sericulture endeavors is the relationship between farmer characteristics and the effectiveness of training programs.

As scholars have noted, the success of agricultural ventures is often intricately linked to the characteristics and aptitudes of the individuals engaged in the cultivation process (Smith et al., 2019; Brown & Jones, 2021). In the context of sericulture, the unique challenges posed by silkworm rearing and silk production necessitate a comprehensive understanding of the specific traits and skills that contribute to successful sericulture practices. Additionally, the role of training programs in equipping farmers with the necessary knowledge and techniques is paramount (Johnson et al., 2020).

The dynamics of farmer characteristics encompass a wide array of factors, including but not limited to educational background, experience in sericulture, access to resources, and cultural influences. These factors collectively contribute to shaping the farmer's approach to sericulture cultivation and may influence the

adoption and implementation of best practices. Training programs, on the other hand, serve as a crucial intervention that can potentially bridge knowledge gaps, introduce innovative techniques, and enhance the overall efficiency of sericulture practices (Wang & Chen, 2018).

Based on well-known models in agricultural extension and adult learning, this study acknowledges how important these fields are for creating useful training programs for farming practices (Smith et al., 2019; Brown & Jones, 2021). Building on this foundation, Rogers (1995) proposed the conceptual model of learning readiness, which contends that personal traits like innovation orientation and risk tolerance can affect how openly and quickly people adopt new technologies and practices (Rogers, 1995). Similarly, Kolb's (1984) experiential learning cycle highlights the importance of individual learning styles and active engagement in shaping knowledge acquisition and skill development (Kolb, 1984). These theoretical frameworks provide a robust foundation for examining how farmer characteristics interact with the content and delivery of sericulture training programs.

The success of any agricultural training program hinges on a complex interplay between technical knowledge, practical skills, and the individual characteristics of the learners themselves. Previous research has shed light on the importance of technical content and effective pedagogical approaches in sericulture training (Banerjee & Maity, 2010; Islam et al., 2015). It is evident that the sericulture training program has contributed substantially to farmers' advancements in both production processes and economic standing (Ahmed et al., 2024). However, a critical gap remains in our understanding of how farmer characteristics, encompassing demographics, cognitive abilities, and psychological dispositions, interact with training to influence adoption and proficiency in sericulture practices.

The investigation into the correlation between farmers' characteristics and the effectiveness of training in sericulture cultivation involved rigorous testing of a specific null hypothesis. The central hypothesis under scrutiny throughout this study posited that "there is no correlation between the farmers' characteristics and their effectiveness in sericulture cultivation." This research delves into exploring the intricate dynamics between various farmer attributes and their subsequent impact on the effectiveness of training programs in the context of sericulture cultivation.

This research aims to unravel the intricate threads connecting farmer characteristics and training effectiveness in sericulture cultivation. By delving into these dynamics, the aspiration is to provide actionable insights for policymakers, sericultural extension services, and practitioners in the sericulture industry. Ultimately, a deeper understanding of this interplay is essential for developing targeted strategies that foster sustainable sericulture practices, benefiting both farmers and the broader textile industry.

METHODOLOGY

For this study, the focus is on a crucial area in Bangladesh, specifically the traditional sericultural districts within the Bholahat upazila under the Chapainawabganj district. This region holds historical significance, contributing a staggering 75% of the country's silk production (Ahmed et. al., 2024). The sampled group comprises 192 respondents who have undergone sericulture cultivation training.

To ensure a comprehensive understanding, a mixed-methods approach is employed, combining surveys, interviews, and on-site observations. This triangulation of quantitative and qualitative data ensures a comprehensive and detailed understanding of the complex interplay between farmer characteristics and training effectiveness. Employing this multifaceted methodology allows for a deep delve into the intricate impact of training on sericulture farming practices. The aim is to uncover the subtle ways in which training influences and shapes the cultivation methods employed by sericulturists in this significant region. For data analysis and presentation, appropriate statistical analysis tools and methods are leveraged.

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DATA ANALYSIS

The data obtained from the household surveys underwent a thorough and careful processing and analysis phase. To ensure accuracy and depth, this research employed key software tools, including IBM SPSS Statistics 20 and Microsoft Excel 2021. A crucial component of the study involved manual calculations and an in-depth analysis of economic parameters for each household, underscoring the significance of this aspect in the research.

RESULTS AND DISCUSSION

Highlighting the demographic and pertinent information about the participants, the study explored common characteristics like age, gender, education, and income level. The theoretical justification for including these characteristics lies in their crucial role in acquiring knowledge and skills and influencing individuals to become more active in their personal lives. Nineteen farmer characteristics were considered as independent variables, encompassing demographic, socioeconomic, and psychological aspects based on the study's nature. The following section details the respondents' characteristics concerning the independent variables.

The characteristics considered for this research are i) Age, ii) Gender, iii) Education, iv) Family Type, v) Family Size, vi) House Type, vii) Seri-Farming Experience, viii) Sericultural Knowledge, ix) Training Exposure, x) Farm Size, xi) Annual Family Income, xii) Sericultural Credit, xiii) Commercialization, xiv) Communication Exposure, xv) Innovativeness, xvi) Risk Orientation, Xvii) Attitude Towards Modern Sericultural Technology, xviii) Economic Motivation and xix) Living Standard.

The study's findings are succinctly outlined in the subsequent sections covering various aspects of farmers' characteristics, as presented in Table 1.

Table 1: **Distribution of respondents according to their characteristics.**

S.l.	Characteristics	Categories	Farmers		Mean	Standard deviation
			Number	Percent		
1	Age	Young aged (up to 35 years)	40	20.83	45.66	11.62
		Middle-aged (36-50 years)	90	46.88		
		Old aged (50+ years)	62	32.29		
2	Gender	Female	24	12.5	1.88	0.33
		Male	168	87.5		
3	Education	Illiterate (0)	1	0.52	6.79	4.42
		Sign only (0.5)	38	19.79		
		Primary education (1-5)	60	31.25		
		Secondary education (6-10)	60	31.25		
		Higher Secondary and above (11 and above)	33	17.19		
4	Family Type	Nuclear	168	87.5	1.72	0.45
		Joint	24	12.5		

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5	Family Size	Small family (up to 4 members)	127	66.15	4.1	1.65
		Medium family (5 to 8 members)	65	33.85		
		Large family (>8 members)	0	0		
6	House Type	Kacha (Mad & straw)	0	0	3.32	0.59
		Kacha (Tin Shade)	12	6.25		
		Half Pucca	107	55.73		
		Pucca	73	38.02		
7	Sericulture Cultivation Experience	Low (<7.17)	20	10.42	15.14	7.97
		Medium (7.17-23.11)	150	78.12		
		High (>23.11)	22	11.46		
8	Farmers' Sericultural Knowledge	Low (<21.92)	19	9.9	28.17	6.25
		Medium (21.92-34.42)	165	85.94		
		High (>34.42)	8	4.16		
9	Training Exposure	Low training (up to 20 days)	32	16.67		
		Medium training (30 days)	160	83.33	27.53	5.56
		High training (Dip. PGDS.)	0	0		
10	Farm Size	Marginal farm (up to 0.20ha)	81	42.19	0.34	0.28
		Small farm (0.21-1.00 ha)	102	53.13		
		Medium farm (1.01-3.00 ha)	9	4.68		
11	Annual Family Income	Low income (Tk. <100000)	93	48.44	123.13	67.99
		Medium income (Tk. 100001- Tk. 300000)	94	48.96		
		High income (Tk. >300001)	5	2.6		
12	Sericultural Credit	No credit receipt	139	72.4	28.81	15.24
		Low credit (<13.57)	2	1.04		
		Medium credit (13.57-44.05)	47	24.48		
		High credit (>44.05)	4	2.08		
13	Commercialization	Low (<45.83)	23	11.98	64.03	18.2
		Medium (45.83-82.23)	164	85.42		
		High (>82.23)	5	2.6		
14	Communication Exposure	Low (<18.28)	15	7.81	22.66	4.38

	Medium (18.28-27.04)	110	57.29			
	High (>27.04)	67	34.9			
15	Innovativeness	Low (<14.47)	16	8.33	16.15	1.68
		Medium (14.47-17.83)	79	41.15		
		High (>17.83)	97	50.52		
16	Risk Orientation	Low (<24.26)	27	14.06	29.34	5.08
		Medium (24.26-34.42)	158	82.29		
		High (>34.42)	7	3.65		
17	Attitudes Toward Sericultural Technology Distribution	Low (<22.48)	25	13.02	28.05	5.57
		Medium (22.48-33.62)	152	79.17		
		High (>33.62)	15	7.81		
18	Economic Motivations	Low (<22.47)	26	13.54	28.6	6.13
		Medium (22.47-34.73)	142	73.96		
		High (>34.73)	24	12.5		
19	Living Standard	Low (<30.61)	23	11.98	33.85	3.24
		Medium (30.61-37.09)	149	77.6		
		High (>37.09)	20	10.42		

Age Distribution of Respondents:

According to the revealed data of the research, participants' ages ranged from 22 to 79 years, with an average age of 45.66 and a standard deviation of 11.62. The age difference between the youngest and oldest respondents was 57 years, and the study found a variance of 134.97. Notably, the majority (46.88%) falls into the middle-aged category (36-50 years). Furthermore, 32.29% are in the old age group (over 50 years), while 20.83% belong to the young age group. In summary, a substantial proportion (79.17%) of respondents are in the middle to old age categories, constituting almost two-thirds of the total participants.

The research categorizes respondents into three age groups—young (up to 35 years), middle-aged (36-50 years), and old (over 50 years). The participants' ages ranged from 22 to 79 years, with an average of 45.66 and a standard deviation of 11.62. The majority of participants (46.88%) fall into the middle-aged category (36-50 years), with a significant portion (32.29%) in the old-aged group (over 50 years).

Gender Analysis:

The study reveals a mean gender value of 1.88, indicating slightly more male farmers than female farmers in sericulture. The distribution is relatively consistent (standard deviation 0.33) and tightly centered around the mean (variance 0.110). Table 5.2 shows that 87.50% of respondents are male, while 12.50% are female.

Educational Levels of Farmers:

The mean education level is 6.79, with a standard deviation of 4.42 and a variance of 19.54. Most respondents (31.25%) completed only primary education, followed by those with secondary education (31.25%). A significant portion (79.17%) of respondents falls into the middle-aged to old-aged category.

Family Types of Farmers:

The mean family type value is 1.72, indicating that most respondents belong to nuclear families. The data is relatively dispersed (standard deviation 0.45) but relatively homogeneous (variance 0.20). The majority

(87.50%) belong to nuclear families, while 12.50% belong to joint families.

Family Size of Farmers:

The mean family size value is 4.10, with a standard deviation of 1.65 and a variance of 2.71. The majority (66.15%) have a four-member small family, while 33.85% have a medium-sized family, and none have a large family.

House Types of Farmers:

The mean house type value is 3.32, with a standard deviation of 0.59 and a variance of 0.34. The majority (55.73%) have Half Pucca houses, 38.02% have Pucca houses, and only 6.25% have Kacha tin shade houses.

Farming Experience of Farmers:

The mean value for farming experience is 15.14, with a standard deviation of 7.97 and a variance of 63.60. Most farmers (78.12%) have medium experience, while 10.42% have low experience, and 11.46% have high experience.

Sericultural Knowledge of Farmers:

The mean knowledge value is 28.17, with a standard deviation of 6.25 and a variance of 39.00. The majority (85.94%) have medium knowledge, while 9.90% have low knowledge, and 4.16% have high knowledge.

Training Exposure of Farmers:

The mean training exposure value is 27.53, with a standard deviation of 5.56 and a variance of 30.89. Most farmers (83.33%) have medium training exposure, 16.67% have low exposure, and none have high exposure.

Farm Size of Farmers:

The mean farm size value is 0.34, with a standard deviation of 0.28 and a variance of 0.08. Most farmers have small-sized farms (53.13%), with 42.19% having marginal-sized farms.

Income of Farmers:

The mean income is 123.13, with a standard deviation of 67.99 and a variance of 4622.97. About 48.96% have medium income, 48.44% have low income, and 2.60% have high income.

Credit Receipt by Farmers:

The mean credit receipt value is 28.81, with a standard deviation of 15.24 and a variance of 232.12. Most farmers (72.40%) did not receive any credit, while 24.48% received medium credit, and 2.08% received high credit.

Commercialization of Sericulture:

The mean commercialization score is 64.03, with a standard deviation of 18.20 and a variance of 331.25. The majority (85.42%) have medium commercialization, 11.98% have low commercialization, and 2.60% have high commercialization.

Communication Exposure of Farmers:

The mean communication exposure value is 22.66, with a standard deviation of 4.38 and a variance of

19.21. Most respondents (57.29%) have medium communication exposure, 7.81% have low exposure, and 34.90% have high exposure.

Innovativeness of Farmers:

The mean innovativeness score is 16.15, with a standard deviation of 1.68 and a variance of 2.81. The majority (50.52%) have high innovativeness, 41.15% have medium innovativeness, and 8.33% have low innovativeness.

Risk Orientation of Farmers:

The mean risk orientation is 29.34, with a standard deviation of 5.08 and a variance of 25.79. Most respondents (82.29%) have a medium-risk orientation, 14.06% have a low orientation, and 3.65% have a high orientation.

Attitude Towards Sericultural Technology:

The mean attitude value is 28.05, with a standard deviation of 5.57 and a variance of 30.98. Most farmers (79.17%) have a medium attitude, 13.02% have a low attitude, and 7.81% have a high attitude towards sericultural technology.

Economic Motivation of Farmers:

The mean economic motivation score is 28.60, with a standard deviation of 6.13 and a variance of 37.57. Most farmers (73.96%) have medium economic motivation, 13.54% have low motivation, and 12.50% have high motivation.

Living Standards of Farmers:

The research data reveals that, on average, sericulture farmers have a relatively high living standard, with a mean of 33.85 and a limited variation (standard deviation of 3.24). The breakdown into low, medium, and high categories shows that the majority (77.60%) fall into a moderate living standard, while a smaller percentage (10.42%) enjoys the highest living standards. A minority (11.98%) faces lower living standards, indicating a generally positive living situation for the majority of sericulture farmers.

This research investigated how specific qualities of farmers are connected to their training in sericulture cultivation. The primary goal is to understand what influences farmers' perceptions of training effectiveness. The study also includes correlation test results, examining the relationship between farmers' characteristics as independent variables and the effectiveness of training in sericulture cultivation. The aim is to use this information to develop more focused and impactful training programs.

In this investigation, 19 selected characteristics of farmers were treated as independent variables, with their training effectiveness in sericulture cultivation as the dependent variable. Pearson's Product Moment Correlation Coefficient (r) was computed to examine the hypothesis regarding the relationship between these variables. It depended on whether the significance level was 1% (0.01) or 5% (0.05) to accept or reject the null hypothesis, which said there was no relationship between the characteristics of sericulture farmers and how well they learned how to grow sericulture.

For a comprehensive interpretation of the meaning of 'r,' Cohen and Holiday (1982) were consulted. The null hypothesis, stating "There is no relationship between the selected characteristics of the farmers and their effectiveness of training on sericulture cultivation," was rejected at a significance level of 0.05.

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According to the revealed data, there were 10 significant characteristics and 9 non-significant characteristics out of the 19 farmers' characteristics. Refer to Table 2 for an overview of the relationship between the dependent and independent variables, as described below. Table 3 also provides a quick overview of both significant and non-significant relationships among farmer characteristics.

Table 2: Relationship between Selected Characteristics and Effectiveness of Training of the Farmers on Sericulture Cultivation

Dependent variable	Independent variable Farmers characteristics	Observed 'r' values with 190 df	Tabulated value of 'r' with 190 df	
			0.05 level	0.01 level
Effectiveness of Training	1. Age	0.135 NS	0.148	0.210
	2. Gender	0.154*		
	3. Education	-0.125 NS		
	4. Family Type	-0.060 NS		
	5. Family Size	0.055 NS		
	6. House Type	0.444 **		
	7. Seri-farming Experience	0.011 NS		
	8. Sericultural Knowledge	0.836**		
	9. Training Exposure	0.036 NS		
	10. Farm Size	-0.027 NS		
	11. Annual Family Income	0.215**		
	12. Sericultural Credit	0.070 NS		
	13. Commercialization	0.903**		
	14. Communication Exposure	0.101 NS		
	15. Innovativeness	0.730**		
	16. Risk Orientation	0.684**		
	17. Attitude Towards Modern Sericultural Technology	0.862**		
	18. Economic Motivation	0.847**		
	19. Living Standard	0.714**		

*= Correlation is significant at the 0.05 level of probability

**= Correlation is significant at the 0.01 level of probability and NS = Non-significant

Age and Effectiveness of Training of Farmers on Sericulture Cultivation

After examining the data in Table 2, it was found that the correlation coefficient 'r' between participants' age and training effectiveness was 0.135, signifying a very weak positive correlation. Taking a closer look, the observed 'r' value of 0.135 was less than the tabulated value of 0.148 at a significance level of 0.05 with 190 degrees of freedom. As a result, the study did not reject the null hypothesis, indicating that there is no significant correlation between age and the effectiveness of training in sericulture cultivation.

Based on the findings, the researcher determined that there is no significant and only a very weak positive correlation between age and the effectiveness of training in sericulture. One plausible explanation for this weak relationship could be attributed to the cultural context of sericulture farming in Bangladesh. Given that sericulture is a family-oriented occupation in the country, with practices being passed down through generations, older farmers may possess more experience and knowledge in sericulture compared to their younger counterparts. This could potentially offset the advantages of younger farmers in terms of adopting new practices.

The nature of these programs may also have an impact on the relationship between age and the effectiveness of training programs in sericulture. If the training initiatives are crafted to be inclusive and relevant for farmers of all ages, the impact of the programs may not vary significantly across different age groups. It is essential to verify these findings and delve into potential explanations for this relationship. Policymakers and designers of training programs should take into account this association when creating training initiatives for sericulture farmers in Bangladesh.

Gender and Effectiveness of Training of Farmers on Sericulture Cultivation

The study examined the relationship between gender and the effectiveness of training for sericulture cultivation by testing a null hypothesis, which stated, "There is no relationship between the gender of the farmers and their effectiveness of training on sericulture cultivation." The calculated correlation coefficient 'r' from Table 2 for the analyzed variables was 0.154. The observed relationships are as follows: a) Farmers' gender and their training effectiveness show a very low positive correlation (r = 0.154). b) With 190 degrees of freedom at a 0.05 level of probability, the computed 'r' value (r = 0.154) surpassed the tabulated value (r = 0.148) in Table 2, leading to the rejection of the null hypothesis. c) A significant association has been identified between gender and the effectiveness of training in sericulture cultivation. The computed correlation coefficient value of 0.154 suggests a very low positive correlation between farmers' gender and their effectiveness in sericulture cultivation training, consistent with findings reported by Hossain et al. (2020).

Education and Effectiveness of Training of Farmers on Sericulture Cultivation

According to the findings in Table 2, the researchers observed a negative correlation coefficient 'r' of -0.125 between farmers' education and the effectiveness of their training in sericulture cultivation. Analyzing the data with 190 degrees of freedom at a significance level of 0.05, the calculated 'r' value (r = -0.125) was found to be less than the tabulated estimate (r = 0.148), leading to the non-rejection of the null hypothesis. This suggests that there is no significant correlation between the variables under scrutiny—namely, education and the effectiveness of training in sericulture cultivation.

The negative correlation coefficient of -0.125 implies an inverse relationship between farmers' education levels and their effectiveness in sericulture cultivation training. In other words, as farmers' education levels increase, there is a slight decrease in their opinions about the effectiveness of training in sericulture cultivation. While negative correlations indicate that the value of one variable tends to decrease as the value of the other increases, it's important to note that the correlation coefficient value of -0.125 signifies a weak correlation. This suggests that the relationship between education level and opinions about the effectiveness of training in sericulture cultivation is not very strong.

Family Type and Effectiveness of Training of Farmers on Sericulture Cultivation

In examining Table 2, it was determined that a correlation coefficient of -0.060 existed between the variables under consideration, yielding insights into their relationship. The correlation coefficient (r) value of -0.060 in the analysis specifically showed a negative correlation between farmers' family types and the

effectiveness of their training. Further scrutiny involved comparing the calculated 'r' value (-0.060) with the tabulated estimate (r = 0.148) at the 0.05 level of probability. Consequently, the findings did not warrant the rejection of the null hypothesis, suggesting that the variables were not significantly correlated.

The correlation coefficient of -0.060 suggests a weak negative association between participants' family types and their opinions on the effectiveness of sericulture cultivation training. This implies that as the family type of farmers changes, their opinions on training effectiveness may also marginally shift in a negative direction. However, it is crucial to note that the correlation coefficient value of -0.060 is relatively small, indicating the absence of a significant relationship between the type of family and opinions on training effectiveness. Thirunavukkarasu & Nagarajan (2013) and Nazir et al. (2016) both support this finding.

Family Size and Effectiveness of Training of Farmers on Sericulture Cultivation

In examining Table 2, it was determined that the correlation coefficient 'r' between the two variables stood at 0.055. This value led to several key observations regarding their relationship. Firstly, the coefficient of correlation (r) value of 0.055 indicated a low positive correlation between the size of the farmer's family and the effectiveness of their training. Despite this, when scrutinizing the data at a 0.05 level of probability, the calculated 'r' value (r = 0.055) proved notably smaller than the tabulated estimate (r = 0.148) with 190 degrees of freedom. Consequently, the null hypothesis could not be rejected, suggesting the absence of a significant relationship between the variables. Additionally, it was noted that the correlation coefficients between the variables were not considered significant. These findings are consistent with the evidence from Islam et al. (2019), Akinwumi et al. (2017), and Kwesiga et al. (2017), which suggests a very low positive correlation between the size of the farmer's family and the effectiveness of their training.

House Type and Effectiveness of Training of Farmers on Sericulture Cultivation

In Table 2, the calculated correlation coefficient 'r' among the variables was determined to be 0.444. This value led to noteworthy observations regarding their relationship. Specifically, the coefficient of correlation (r) value of 0.444 indicated a moderately positive correlation between the type of houses farmers have and the effectiveness of their training. The significance of this correlation was reinforced by the fact that, at a probability level of 0.01 with 190 degrees of freedom, the calculated 'r' value (r = 0.444) surpassed its tabulated estimate (r = 0.210), resulting in the rejection of the null hypothesis. Furthermore, it was established that the correlation coefficients between the variables were deemed significant. In essence, according to the findings in Table, there exists a notable and moderately positive correlation (correlation coefficient value of 0.444) between the type of houses farmers possess and the effectiveness of their training. The findings of Jahan et al. (2021), Tadesse et al. (2020), Khan et al. (2018), and Asfaw et al. (2017) are in support of this discovery.

Farming Experience and Effectiveness of Training of Farmers on Sericulture Cultivation

Upon evaluating the correlation coefficient 'r' of 0.011 between farmers' farming experience and the effectiveness of their training, several insights were gleaned. Initially, a very low positive correlation (r = 0.011) was identified between these variables. However, further scrutiny revealed that the calculated 'r' value (r = 0.011) fell short of the tabulated value (r = 0.148) at a 0.05 probability level, leading to the non-rejection of the null hypothesis. Consequently, the correlation coefficients between the variables were considered non-significant.

Farmers' farming experience does not significantly impact their perceptions of the effectiveness of training in sericulture cultivation, according to the available evidence. Given the absence of a significant correlation between the two variables, it is reasonable to conclude that they lack a crucial relationship. In this context,

farming experience pertains to the number of years a farmer has been involved in sericulture-related activities, playing a vital role in determining the effectiveness of training programs. Nonetheless, studies by Islam et al. (2021) and Venkataiah et al. (2018) indicate a weakly positive but non-significant relationship between farming experience and the effectiveness of sericulture cultivation training.

Sericultural Knowledge and Effectiveness of Training of Farmers on Sericulture Cultivation

In Table 2, the calculated correlation coefficient 'r' between the variables in focus is documented as 0.836, leading to noteworthy conclusions. The highly positive correlation coefficient (r) of 0.836 indicates that there is a strong correlation between farmers' sericultural knowledge and the effectiveness of their training. Upon further scrutiny using 190 degrees of freedom at a 0.01 probability level, the calculated 'r' value (0.836) surpassed the tabulated estimate (r = 0.210), resulting in the rejection of the null hypothesis. Consequently, it was established that highly significant correlations exist between the variables under consideration.

The data from the table implies that farmers possessing a substantial understanding of sericulture are more likely to benefit from training in sericulture cultivation, finding the training to be effective. The correlation coefficient value of 0.836 between farmers' sericultural knowledge and their perception of training effectiveness underscores a positive correlation and a highly significant relationship between these two variables. This finding is consistent with similar results reported by Ahmed et al. (2020) and Datta et al. (2017).

Training Exposure and Effectiveness of Training of Farmers on Sericulture Cultivation

As revealed by Table 2, the calculated association coefficient 'r' between farmers' exposure to training and the effectiveness of their training was determined to be 0.036, prompting specific conclusions about these variables. Firstly, it was observed that there exists a very low positive correlation (r = 0.036) between farmers' exposure to training and the effectiveness of that training. However, upon comparing the calculated 'r' value (0.036) with the tabulated estimate (r = 0.148) using 190 degrees of freedom at a 0.05 probability level, the null hypothesis was not rejected, signifying that the correlation between the variables was not statistically significant.

The data in the table suggests a positive correlation between training exposure and training effectiveness, albeit one that lacks statistical significance. Consistent with the findings of Islam et al. (2017) and Diao et al. (2018), the amount of training exposure farmers receive appears to have only a minimal relationship with the effectiveness of training in the context of sericulture cultivation.

Farm Size and Effectiveness of Training of Farmers on Sericulture Cultivation

As per the data provided in Table 2, the correlation coefficient 'r' between farmers' farm size and training effectiveness was determined to be -0.027, leading to specific observations about their relationship. The coefficient of correlation (r) value of -0.027 indicates a negative correlation between these variables. However, upon further analysis with 190 degrees of freedom at a 0.05 probability level, the computed 'r' value of -0.027 was observed to be less than the tabulated estimate of 'r=0.148, providing no grounds to reject the null hypothesis. Consequently, it was established that correlation coefficients between the variables were not deemed significant.

The correlation coefficient value of -0.027 suggests a negative correlation between farm size and the effectiveness of training for farmers in sericulture cultivation, as illustrated in Table. Nevertheless, this negative correlation does not appear to be statistically significant. These findings are consistent with the supporting data presented by Adhikari & Gauchan (2015) and Kassie et al. (2017).

Annual Family Income and Effectiveness of Training of Farmers on Sericulture Cultivation

As indicated in Table 2, a correlation coefficient of 0.215 was determined between farmer income and training effectiveness, leading to specific insights into their relationship. The coefficient of correlation (r) value of 0.215 suggests a low positive correlation between these variables. Upon closer examination, the calculated 'r' value (0.215) surpassed the tabulated value (r = 0.210) with 190 degrees of freedom at a 0.01 probability level, resulting in the rejection of the null hypothesis. This implies a significant correlation between farmer income and training effectiveness.

Contrary to expectations, the data in the table reveals that annual family income is not positively correlated with the effectiveness of training for farmers in sericulture cultivation. However, despite the absence of a positive correlation, the relationship between these two variables is deemed highly significant. Sivakumar (2005) and Li et al. (2013) both reported similar results.

Sericultural Credit and Effectiveness of Training of Farmers on Sericulture Cultivation

As outlined in Table 2, a correlation coefficient 'r' of 0.070 was determined between the variables in question, leading to specific conclusions regarding their relationship. The coefficient of correlation (r) value, calculated at 0.070, indicates a weak but positive correlation between sericultural credit and training effectiveness. However, upon further examination with 190 degrees of freedom at a 0.05 probability level, the computed 'r' value (0.070) was observed to be less than the tabulated estimate (r = 0.148), resulting in the acceptance of the null hypothesis. Consequently, it was established that the correlation coefficients between the variables were not statistically significant.

Consequently, based on the available data, it is inferred that sericultural credit does not exhibit a statistically significant correlation with the effectiveness of sericulture cultivation training. This implies that there is no solid evidence indicating that receiving sericultural credit has a significant impact on farmers' perceptions of the training's effectiveness. This finding is consistent with the conclusions drawn by Hossain and Khan (2014), aligning with the existing literature.

Commercialization and Effectiveness of Training of Farmers on Sericulture Cultivation

As depicted in Table 2, a strong correlation coefficient 'r' of 0.903 was observed between the variables, signifying a noteworthy relationship between them. Specifically, the coefficient of correlation (r) value of 0.903 indicates a robust positive correlation between the commercialization of sericulture produce and the effectiveness of training provided to farmers in the realm of sericulture cultivation. Further analysis, considering 190 degrees of freedom at a 0.01 probability level, revealed that the calculated 'r' value (0.903) surpassed the tabulated value (r = 0.210), leading to the rejection of the null hypothesis. Consequently, it was established that the correlation coefficients among the variables were highly significant.

The data from the table unequivocally suggests a high correlation between the level of commercialization of sericulture produce and the effectiveness of the training provided to farmers in sericulture cultivation. This is manifested in the strong positive correlation coefficient, affirming a highly significant relationship between the commercialization level and the training's effectiveness.

Communication Exposure and Effectiveness of Training of Farmers on Sericulture Cultivation

As depicted in Table 2, the calculated coefficient 'r' between communication exposure and training effectiveness is 0.101, revealing a very low positive correlation according to the regression model. However, when scrutinizing the relationship at a 0.05 probability level with 190 degrees of freedom, the computed 'r' value (0.101) is found to be less than the tabulated estimate (r = 0.148), leading to the inability

to reject the null hypothesis. Consequently, it is determined that the correlation coefficients among the variables are not statistically significant.

The data from the table indicates a very low positive association between communication exposure and the effectiveness of sericulture training. Although this association exists, its strength is not particularly robust, suggesting that an increase in communication exposure does not strongly predict a corresponding increase in the effectiveness of training in sericulture cultivation. As a result, a significant relationship between the two variables is not established. Furthermore, this finding aligns with similar results reported by Alam and Hossain (2018), Alam et al. (2020), and Rana et al. (2019).

Innovativeness and Effectiveness of Training of Farmers on Sericulture Cultivation

As illustrated in Table-2, the calculated correlation coefficient 'r' between innovativeness and training effectiveness is 0.730, suggesting a highly positive correlation between these two variables. With 190 degrees of freedom and a 0.01 probability level, more research shows that the calculated "r" value (0.730) is higher than the estimated value (0.210), which means the null hypothesis is not true. Consequently, it is established that the correlation coefficient among the variables is highly significant.

The data presented in the table unequivocally indicates a strong and positive correlation between innovativeness and training effectiveness. This correlation coefficient signifies a highly significant relationship between the innovative practices adopted by farmers and the effectiveness of training in sericulture cultivation. The works of Islam et al. (2021) and Akter & Islam (2020) also support the consistency of these findings.

Risk Orientation and Effectiveness of Training of Farmers on Sericulture Cultivation

According to Table 2, the calculated correlation coefficient 'r' between risk orientation and training effectiveness is 0.684, indicating a moderately positive correlation between these two variables. At a 0.01 probability level and with 190 degrees of freedom, the computed 'r' value (0.684) surpasses the tabulated estimate (0.210), leading to the rejection of the null hypothesis. Consequently, it is established that the correlation coefficients among the variables are highly significant.

The data presented in the Table provides clear evidence of a positive and moderately significant relationship between risk orientation and training effectiveness in the context of sericulture cultivation. This suggests that farmers exhibiting a higher inclination towards risk-taking tend to perceive the effectiveness of training in sericulture cultivation more favorably compared to their less risk-oriented counterparts. In the realm of decision-making, risk orientation reflects the extent to which an individual is willing to take risks. Additionally, these findings align with the conclusions drawn by Hasan & Uddin (2020) and Ahmed & Uddin (2021).

Attitude towards Modern Sericultural Technology Effectiveness of Training of Farmers on Sericulture Cultivation

Examining the data in Table 2 reveals a strong correlation coefficient 'r' of 0.862 between attitudes towards modern sericulture technology and the effectiveness of training in sericulture cultivation. This substantial score indicates a significant positive correlation, suggesting that farmers holding favorable attitudes towards modern sericultural technology tend to perceive the training in sericulture cultivation as more effective. The relationship is significant at a 0.01 probability level with 190 degrees of freedom, as shown by the calculated 'r' value (0.862) being higher than the estimated value (0.210). This means that the null hypothesis is not true. Consequently, it is established that the correlation coefficients between the variables are highly significant.

The implications of these findings are evident, highlighting the positive and significant association between sericulture farmers' attitudes towards modern sericultural technology and the effectiveness of training in sericulture cultivation. This aligns with the conclusions drawn by Rahman et al. (2021), Akter & Uddin (2020), Ali et al. (2021), and Ismail et al. (2020), supporting the consistency of these results in the existing literature.

Economic Motivation and Effectiveness of Training of Farmers on Sericulture Cultivation

Examining Table 2 reveals a robust correlation coefficient 'r' of 0.847 between economic motivation and training effectiveness in sericulture cultivation. This substantial coefficient indicates a highly positive relationship between these two variables, suggesting that farmers who exhibit stronger economic motivation are more likely to perceive training in sericulture cultivation as effective. The computed 'r' value (0.847) is greater than the tabulated estimate (0.210), which means the null hypothesis is not true. This is supported by more analysis with 190 degrees of freedom and a 0.01 probability level. Consequently, it is established that the correlation coefficient between economic motivation and training effectiveness is highly significant.

The implications of these findings emphasize the notable positive correlation between farmers' economic motivation and the effectiveness of training in sericulture cultivation. This consistent result aligns with the conclusions reached by Hossain et al. (2019), Bhuiyan et al. (2020), Gupta et al. (2018), and Zhang et al. (2017), reaffirming the validity and significance of this relationship in the existing literature.

Living Standard and Effectiveness of Training of Farmers on Sericulture Cultivation

Analyzing the data from Table 2 reveals a substantial correlation coefficient of 0.714 between farmer living standards and training effectiveness in sericulture cultivation. This significant correlation indicates a strong positive relationship, suggesting that as farmer living standards improve, there is a corresponding increase in the effectiveness of their training. The computed 'r' value of 0.714 surpasses the tabulated estimate of 0.210 at a 0.01 probability level, leading to the rejection of the null hypothesis and affirming the highly significant correlation between these variables.

The research findings strongly support the conclusion that higher living standards among farmers are closely associated with increased effectiveness in sericulture cultivation training. This positive relationship aligns with the results observed by Amin & Rahman (2016) and Swamy et al. (2018), reinforcing the consistency of this correlation in the existing literature.

Table 3: Significance and non-significant relationship

Dependent variable	Independent variable Farmers characteristics	Significance
Effectiveness of Training	1. Age	Non Significant
	2. Gender	Significant
	3. Education	Non Significant
	4. Family Type	Non Significant
	5. Family Size	Non Significant
	6. House Type	Significant
	7. Seri-farming Experience	Non Significant
	8. Sericultural Knowledge	Significant
	9. Training Exposure	Non Significant

	10. Farm Size	Non Significant
	11. Annual Family Income	Significant
	12. Sericultural Credit	Non Significant
	13. Commercialization	Significant
	14. Communication Exposure	Non Significant
	15. Innovativeness	Significant
	16. Risk Orientation	Significant
	17. Attitude Towards Modern Sericultural Technology	Significant
	18. Economic Motivation	Significant
	19. Living Standard	Significant

CONCLUSION

This research provides a comprehensive overview of various aspects of sericulture farmers' characteristics. According to the revealed data, out of the 19 characteristics studied, 10 were found to be significant, while 9 were deemed non-significant. This insight is crucial in understanding the factors that contribute to the effectiveness of training in sericulture cultivation.

The study delves into the link between specific characteristics of farmers and their training effectiveness in sericulture cultivation. By exploring this relationship, the research aims to identify key factors that influence farmers' perceptions of training effectiveness. These findings offer valuable insights for the design of more targeted and effective training programs, tailored to the unique characteristics of sericulture farmers. The objective is to enhance the overall impact of training initiatives and contribute to the improvement of sericulture cultivation practices.

Moreover, the research highlights key demographic factors, including age distribution, gender, education levels, family types, and sizes, house types, farming experience, sericultural knowledge, training exposure, farm size, income, credit receipt, commercialization, communication exposure, innovativeness, risk orientation, attitude towards sericultural technology, economic motivation, and living standards. These insights collectively contribute to a better understanding of sericulture farmers and pave the way for informed decision-making in sericultural development and training strategies.

LIMITATIONS AND POTENTIAL AREAS FOR FUTURE RESEARCH

The research focused on a single upazila to assess the influence of training on sericulture cultivation. As a result, the outcomes might not represent the situation across the entire country. Future studies could broaden the scope to include more regions nationwide, facilitating a more comprehensive understanding of this subject.

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