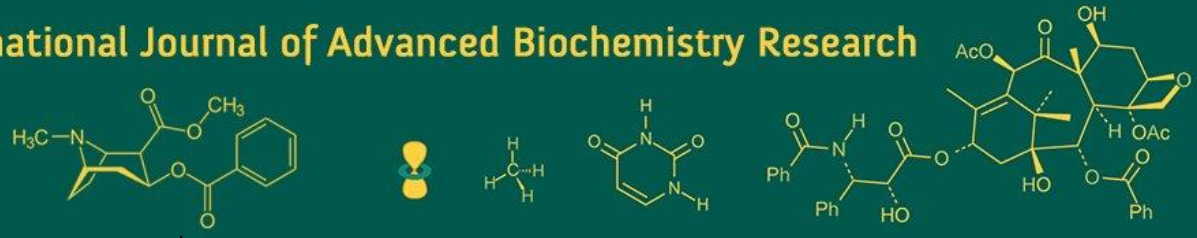
International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; 8(6): 289-295
www.biochemjournal.com
Received: 25-03-2024
Accepted: 29-04-2024

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Correlation analysis of training need of silkworm rearers with socio-economic and psychological characters

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DOI: https://doi.org/10.33545/26174693.2024.v8.i6d.1323

Abstract
A study was performed on 160 randomly selected sericulture farmers in 8 selected villages of Golaghat district of Assam during 2021-22. A total of fourteen socio-economic and psychological characteristics of eri, muga and mulberry silkworm rearers were considered. The study revealed that majority of the respondents (60.63%) belonged to middle age group, 50.00% belonged to OBC category with education up to middle school (41.25%). Small-sized (55.00%) families were found to be dominant with farming was their primary occupation and medium level of income ranging from Rs. 45630.07 to Rs. 124682.43. Regarding the size of operational land holdings, a major part (60.62%) of the silkworm rearers owned operational land holdings below 1 ha resided in *semi pucca* house (40.62%). Majority of them (63.75%) had farming experience between 5.27 to 19.53 years. Most of the respondents (73.13%) had medium level of extension contact, mass media exposure (75.00%), and the marketing channel producer-consumer was found to be more prevalent among the majority of respondents (59.38%). Regarding, social participation and training exposure, only 39.38% of the silkworm rearers had participated in any social activities and 25.63% had received training. Among the variables, extension contact had positive and significant impact on training needs of eri (0.263) and muga (0.806) rearers, whereas social participation also influenced significantly on training needs of eri (0.315) and mulberry (0.322) rearers. Farming experience followed same trend as well in case of muga (0.511) and mulberry (0.307) rearers.

Keywords: Eri, muga, mulberry, training needs, variables

Introduction
Sericulture involves both agricultural and non-agricultural activities, providing enormous employment potential for both men and women (Priyadarshini and Kumari, 2017) [20]. It plays an important role in rural development as it integrates with farming systems and has the potential to generate attractive income all year round (Dewangan, 2016) [8]. Sericulture can be considered one of the most remunerative occupations for all categories of farmers, from a small/marginal farmer with meager resources to a large farmer and the return from this activity is quick with a short gestation period (Goswami and Bhattacharya, 2013) [11]. India is the world's second-largest silk producer and the world's largest silk consumer with a strong traditional domestic market, producing all four types of silk *viz*., mulberry, eri, tasar and muga (Bukhari and Kour, 2019) [6]. Among them, the golden muga silk-producing Saturniidae insect, muga silkworm is endemic to Assam and a few neighboring states in north-east India. The total raw silk production in the country during 2022-23 was 36,582.00 MT, the mulberry raw silk production was 27,654.00 MT similarly, *vanya* silk, including tasar, eri and muga silk production was 1,318.00 MT, 7,349.00 MT, and 261.00 MT, respectively (Anon., 2022) [1]. Sericulture has been associated with the life and culture of the Assamese people since ancient times. Among the four types of silk, eri ranks first in terms of output and employment generation in Assam. However, tasar is not cultivated commercially in Assam. The sericulture industry is significant and continues to play a distinctive role in Assam's economy. Assam is the third leading state (5721.00MT) in silk production however production is very low compared to Karnataka (11823.00MT) and Andhra Pradesh (9312.00MT) (Anon., 2022) [1].

Silk production in Assam is way behind in comparison to Karnataka and Andhra Pradesh may be because of the traditional method of rearing. Therefore, training and motivation are necessary to increase production as well as improve the socio-economic conditions of the silkworm rearers. In the recent past, both the central and local government has made several efforts for the growth and development of the sericulture industry in the state. Mass production of high-quality silk requires training and motivation. Training is the process of acquiring new skills, attitudes and knowledge related to preparing for employment and increasing productivity in the profession (Sajeev *et al.*, 2021) [21]. Training needs assessment is a way to determine if there is a training need and, if so, what training is needed to fill the gap. Keeping in view the above facts into consideration, the present study was undertaken to assess the correlation between training needs of silkworm rearers with their socio-economic and psychological characteristics in Golaghat district of Assam.

Materials and Methods

The research was carried out purposively in 4 developmental blocks *viz*., Podumoni block, Morongi block, Dergaon block and Gamariguri block of Golaghat district. From each selected development block, two villages were selected *viz*., Kaborugaon and Henshua gaon from Padumani development block; Doigrung gaon and Bishnupur gaon from Morongi development block; Dadhoraahom gaon and Notunsapori gaon from Dergaon development block and Chowdang pathar gotonga chuk and Rupkolia gaon from Gamariguri development block. The total numbers of respondents were 160; twenty (20) respondents from each selected village were selected randomly by using snowball sampling method. Fourteen (14) independent variables were selected for study (Table1) *viz.*, age, education level, family size, caste, housing pattern, land holding, primary occupation, annual family income, farming experience, source of extension contact, mass media exposure, social participation, training exposure and marketing exposure. The dependent variable of the present study was the extent of training needs of silkworm rearers in scientific silkworm rearing practices. The data were collected through the scheduled interview with the help of standardized interview schedule from April 2022 to June 2022. The frequency, mean, standard deviation and Karl Pearson's correlation co-efficient were employed for data analysis and interpretation.

Results

Profile characteristics of sericulture farmers in Golaghat district of Assam

A total of fourteen socio-economic and psychological variables were observed (Table 1) to study the profile of the farmers. Majority of silkworm rearers (60.63%) were between the ages of 36 and 50. The data pertaining to education level revealed that majority (41.25%) of the respondents had completed middle school followed by high school (23.13%), primary school (16.25%) and higher secondary (13.75%). On the other hand, 4.38 per cent were found to be illiterate and only 1.25 per cent of the respondents had finished graduation. Table 1 showed that highest percentage of the respondents (55.00%) belonged to small sized family, 29.38 per cent medium sized family and only 15.63 per cent of the respondents had large sized family. It is evident from Table 1 that bulk of the respondents (50%), belonged to the Other Backward Class (OBC), Scheduled Tribe (ST) accounted for 30.00 per cent of the respondents; 8.13 per cent and 11.88 per cent were from Schedule Caste (SC) and of General Caste respectively. Most of the respondents (40.62%) had *semi-pucca* houses, 22.50 per cent had *pucca* houses, 19.38 per cent had *chang ghar*, and the rest had *kutcha* type houses with no *hut* type house. Table 1 indicated that bulk of the rearers (60.62%) were from marginal category with land holding up to 1 ha, followed by small (25.63%) land holding, 5.00% and 1.25% rearers belonged to semi medium and medium category, respectively whereas 7.50% respondents were landless and no rearers were found to be from high category. It was found that major part (61.88%) of the respondents main occupation was farming, followed by daily wage earners (12.50%), service (10.63%), farming and service (8.13%) and farming along with business (6.885). Majority of the respondents had medium level of annual income and farming experience (63.75%), 20.00% and 16.25% had high and low level of farming experience in sericulture Degree of extension contact also followed the same trend, 73.13%, 14.38% and 13.75% of the respondents had medium, low and high level of extension contact. Most of the respondents (75.00%) had medium level exposures to mass media followed by low (14.38%) and high (10.62%) level of mass media exposures. Maximun number of respondents (60.62 5) of the silkworm rearers were not affiliated with any organizations, 39.38% were associated with organizations such as SHG, co-operative society, *mahila samiti* and others. 74.38% of the respondents had not attended any training only 25.63% of the respondents had attended training on different areas of silkworm rearing practices. The marketing channel producer- consumer were found to be more prevalent among most of the respondents (59.38%), succeeded by channel producer-village-trader-consumer (28.12%), producer-commission agent-consumer (7.50%) and producer-government agencies- consumer (5.00%).

Relationship between the training needs of the silkworm rearers with their socio-economic and psychological characteristics

It was evident from Table 2 that out of the fourteen independent variables, two variables *viz.*, extension contact ('r'= 0.263*) and social participation ('r'= 0.315**) was found to be positive and significant in eri silkworm rearers. The independent variables which have positive and non-significant relationship with the dependent variable were age ('r'=0.045), education level ('r'=0.000), family size ('r'=0.066), housing pattern ('r'=0.174), land holding ('r'=0.119), annual family income ('r'=0.031), farming experience ('r'=0.003), mass media exposure('r'=0.020), training exposure ('r'=0.180) and marketing channel ('r'=0.084).

Table 2 indicated that the independent variables like farming experience ('r'=0.511**) and extension contact ('r'=0.806**) were positively and significantly correlated with the dependent variable of muga rearers. On the other hand, age ('r'= -0.434**) was negatively and significantly correlated with the extent of training needs of muga rearers. However, the independent variables education level ('r'=0.010), family size ('r'=0.172), land holding ('r'=0.084), annual family income ('r'=0.105), mass media

exposure ('r'=0.060), social participation ('r'=0.186) and marketing channel ('r'=0.192) were positive and non-significantly associated with the extent of training needs of the muga rearers.

With regards to mulberry silkworm rearers (Table 2), two independent variables *i.e.* farming experience ('r'=0.307*) and social participation ('r'=0.322*) were found positive and significant. On the other hand, age ('r'=-0.371*) was found negative and significantly correlated with the extent of training needs of mulberry silkworm rearers. It denotes that with the increase in age the extent of training needs decreases.

Table 1: Profile characteristics of sericulture farmers in Golaghat district of Assam

S. N.	Profile characteristics of Sericulture farmers		Frequency	Percentage (%)
1.	Age	18-35 (Young)	25	15.63
		36-50 (Middle)	97	60.63
		51 and above years (Old)	38	23.75
2.	Education	Illiterate	7	4.38
		Primary School Passed	26	16.25
		Middle School Passed	66	41.25
		High School Passed	37	23.13
		Higher Secondary Passed	22	13.75
		Graduate and above	2	1.25
3.	Family size	Small family (2-4)	88	55.00
		Medium family (5-7)	47	29.38
		Large family (More than 8)	25	15.63
4.	Caste	Gen	19	11.88
		OBC	80	50.00
		SC	13	8.13
		ST	48	30.00
		Others	Nil	Nil
5.	Housing Pattern	*Hut*	0	0
		kutcha	28	17.50
		Pucca	36	22.50
		Semi-pucca	65	40.62
		Chang ghar	31	19.38
6.	Type of Land holding	Landless (0)	12	7.50
		Marginal (Below 1 ha)	97	60.62
		Small (1 to 2 ha)	41	25.63
		Semi medium (2 to 4 ha)	8	5.00
		Medium (4 to 10 ha)	2	1.25
		Large (10 ha and above)	0	0
7.	Primary source of income	Farming	99	61.88
		Farming+ business	11	6.88
		Farming+ service	13	8.13
		Farming+ daily wage earner	20	12.50
		Service	17	10.63
8.	Annual income	Low (Up to 45,630.07)	24	15.00
		Medium (45,630.07 to 1,24,682.43)	117	73.12
		High (Above 1,24,682.43)	19	11.88
9.	Farming experience	Low (Below 5.27)	26	16.25
		Medium (5.27 to19.53)	102	63.75
		High (Above 19.53)	32	20.00
10.	Extension Contact	Low (Below 18)	23	14.38
		Medium (18 to 22)	117	73.13
		High (Above 22)	22	13.75
11.	Mass Media Exposure	Low (Below 4.69)	23	14.38
		Medium (4.69 to 9.27)	120	75.00
		High (Above 9.27)	17	10.62
12.	Social Participation	Yes	63	39.38
		No	97	60.62
13.	Training Exposure	Yes	41	25.63
		No	119	74.38
14.	Marketing Channel	Producer-consumer	95	59.38
		Producer-village trader-consumer	45	28.12
		Producer-village trader-primary wholesaler-consumer	0	0
		Producer-commission agent-consumer	12	7.50
		Producer-government agencies-consumer	8	5.00

Table 2: Relationship between the training needs of eri, muga and mulberry silkworm rearers with their socio-economic and psychological characteristics

Sl. No.	Variables	Eri (r)	Muga (r)	Mulberry (r)
1.	Age	0.045	-0.434**	-0.371**
2.	Education level	0.000	0.010	-0.113
3.	Family size	0.066	0.172	-0.024
4.	Caste	-0.185	-0.009	-0.259
5.	Housing pattern	0.174	-0.060	-0.026
6.	Land holding	0.119	0.084	-0.123
7.	Primary source of income	-0.137	-0.240	-0.005
8.	Annual family income	0.031	0.105	0.139
9.	Farming experience	0.003	0.511**	0.307*
10.	Extension contact	0.263*	0.806**	0.077
11.	Mass media exposure	0.020	0.060	-0.086
12.	Social participation	0.315**	0.186	0.322*
13.	Training exposure	0.180	-0.083	-0.075
14.	Marketing channel	0.084	0.192	-0.056

**Significant at 0.01% level,*Significant at 0.05% level

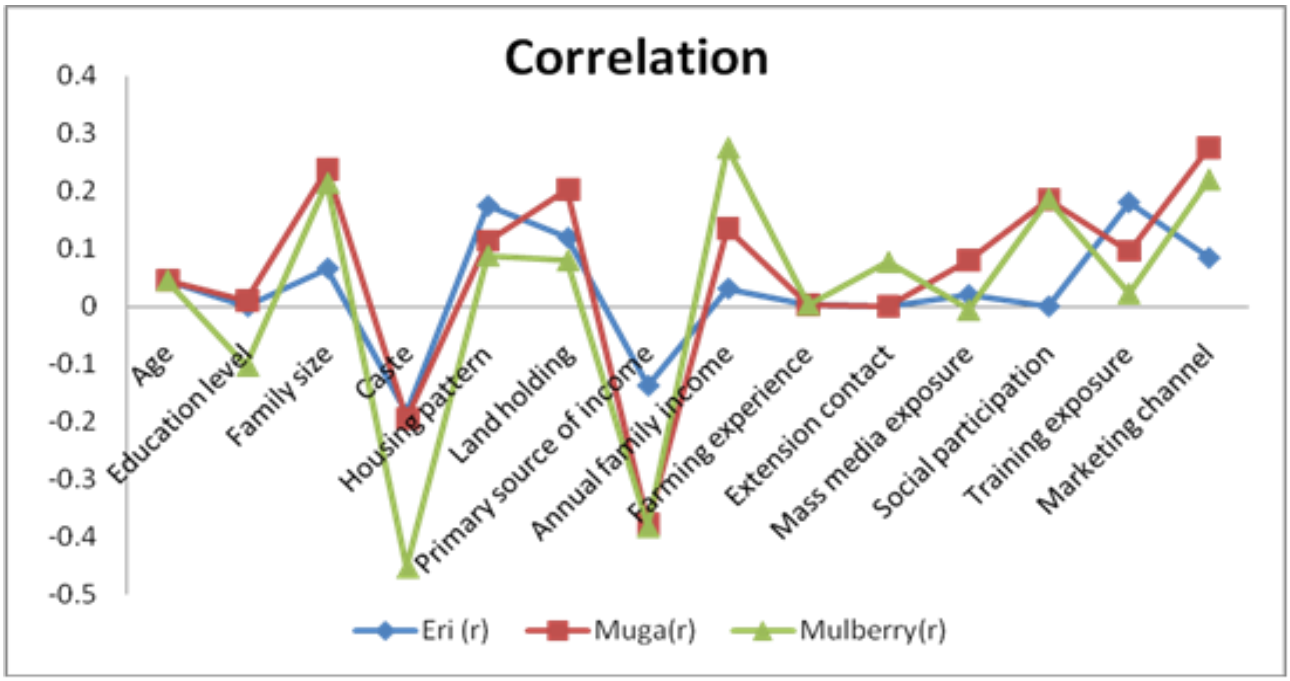

Fig 1: Relation between training needs on silkworm rearers with their socio-economic and psychological characteristics

Discussion

It can be concluded that higher percentage of silkworm rearers belonged to the middle age category might be because of the fact that silkworm rearing is viewed as risky, full of uncertainty and dependent on climate variability. Kumar *et al.* (2020) [15] reported that the most of the sericulture farmers (60.00%) in Krishnarajpet of Mandya district were middle aged, which was succeeded by old aged farmers (28.00%) and younger farmers (12.00%). Gogoi and Barman (2020) [10] found that the majority of the women silkworm rearers (51.67%) were belonged to middle age category 30-50 years.

Most of the silkworm rearers were literate but unable to complete their higher education due to poor financial condition, family pressure and distant educational institutions. According to Vijay *et al.* (2020) [22], the majority of the muga farmers (46.67%) of Assam had completed primary school, while 42.00% had completed secondary school. Goswami *et al.* (2015) [12] found that the majority of the silkworm rearers (60.00%) were 10th grade, 27.27% were below 12th grade, 7.27% were illiterate and 5.45% with graduate degree.

Small and medium sized family were more prevalent among the sericulture rearers which could be attributed to the fact that living in huge family often make it harder to make sound judgments, challenges with accommodation, lack of privacy and generation gap make lot of difference in lifestyle and psychology. According to Mech *et al.* (2016) [16], 86.00% of the muga farmers belonged to medium sized family consisting of 4-5 members. Bhagabaty *et al.* (2018) [3] revealed that 60.00% of muga silkworm rearers belonged to small family and only 15.00% of respondents belonged to a large family, while 25.00% belonged to 4-6 member family.

All categories of rearers were engaged in sericulture activities as a significant opportunity for their economic development irrespective of social class. According to Brahma *et al.* (2020) [5], in the Udalguri district, 62.50% of sericulture farmers belonged to the ST caste and 37.50% to the OBC caste. Geetha and Rao (2016) [9] stated that majority of group members in Nandagudi Hobli, Hoskote taluk, Bangalore rural district, belonged to the "Vokkaliga" (ST) community (72.00%), followed by other backward caste (27.00%) and scheduled caste/scheduled tribe (1.00%).

Brahma *et al*. (2020) [5] observed that 39.17% of sericulture farmers had cemented house, 35.83% had semi-cemented house and 25% had hut kind of housing. Dewangan and Sahu (2017) [24] found that Lailunga & Dharamjaigarh had 100% *kachha* houses with no *pakka* houses.

Major part of the rearers had marginal land holding. The enterprise requires less land as well as the respondents in the studied area were poor and adopted this venture just to meet their livelihood needs or for support to their other economic resources. Jakkawad *et al*. (2019) [13] reported that 52.50% of the sericulturists had marginal land holding (up to 1 hectare), while 28.75% had small (1.1 to 2 hectare) land holding. Only 13.75% and 5.00% had medium and semi-medium land holding respectively, and no one had a large land holding. Kumar *et al*. (2020) [15] found that a greater percentage of farmers (60.00%) owned less than one acre of mulberry land, 24.00% had between one and two acres, and just 16.00% who owned more than two acres. Farming was the primary source of income for majority of the respondents might be because they belonged to rural areas where farming improves the infrastructure, business opportunities, and environmental quality. According to Vijay *et al*. (2019) [25] the majority of the muga farmers (69.33%) reported agriculture as their primary occupation whereas 21.33% considered muga culture as their primary occupation.

Rajeshwar *et al*. (2019) [26] revealed that more than half of the sericulturists (65.00%) had medium yearly income (Rs. 41501 to 161000), while 21.25% and 13.75% had high (above Rs. 161001) and poor (up to Rs. 41500) annual income respectively. Yadav and Sharma (2016) [23] studied on the socio-economic status of Chhattisgarh sericulturists and discovered that the majority of the sericulturists (70.37%) had an income ranging from Rs. 30,001 to Rs. 60,000. Major part of the silkworm rearers belonged to middle age category; hence their experience was also medium. Joshi *et al*. (2021) [14] reported that 65.00% of sericulture farmers were having medium level of experience in sericulture, followed by 20.00% of them having high and 15.00% of them having low level of farming experience. As per findings of, Gogoi and Barman (2020) [10], 64.17% women sericulture farmers had medium level of experience.

The medium levels of extension contact and mass media contact may be attributed to the respondent's diversity in terms of age, education and ignorance respectively. In comparison to older and illiterate respondents, the younger and middle-aged respondents are more likely to access these sources. The majority of sericulture farmers (47.00%) had medium mass media exposure whereas 27.00% and 16.00% of respondents had little and high media exposure, respectively. Mir *et al*. (2015) [17] observed that only 7.33% of sericulture farmers had high levels of exposure to the mass media, 34.00% had medium levels and 58.67% who had low levels of exposure to media.

A greater part of the sericulture farmers were not associated with any organizations. Kumar *et al.* (2020) [15] observed that only a small number at Krishnarajpet taluk of Mandya district were actively participated in milk co-operative organizations (6.00%) and mahila mandals (2.00%), indicating that a large proportion of farmers did not show any interest in social activities. Yadav and Sharma (2016) [23] reported that the largest percentage of sericulturists (54.08%) in Chhattisgarh were members of one organization, while 42.22% had no social activity. However, just 3.70% were office bearer of organization.

Lack of training exposure indicates that only a part of the rearers had good information regarding training which might be due to unawareness and gap between rearer and extension agents and low social participation as well. Yadaw and Sharma (2020) [27] reported that the majority of (61.85%) tasar rearers in Chhattisgarh had not attended any training programme, whereas 38.15% had attended training programme in tasar silk cultivation. Hatibaruah (2020) [28] reported almost similar findings in their study.

The rearers employed a variety of channels based on their convenience due to the lack of a proper marketing channel. Arya and Ramchandra (2022) [2] studied on economic analysis of production and marketing of silk in Bhagalpur district of Bihar and three marketing channels were found for the selling of cocoons. A Major part of the muga rearers of Dhakuakhana sub-division of Lakhimpur district, Assam (60.00%) marketed their products mainly through village traders, 37.50% of the respondents marketed their products directly to consumer and only 2.50% of the respondents had marketed their products through village trader and primary wholesaler (Chamua *et al*., 2022) [7].

The variables, extension contact and social participation had positive and significant relationship with the extent of training needs of eri rearers. So, whenever rearers communicate with extension staff and participate in various social activities, they become conscious of the necessity of training and wish to learn advanced silk cultivation practices. The higher the extension contacts and social participation the more will be the extent of training needs of eri rearers.

In case of muga rearers, extension contacts and farming experience were directly dependent on training needs. On the other hand, negative correlation of age signifies that with the increase in age the extent of training needs of muga rearers decreases. It was evident that age has negative and significant relationship to the extent of training needs of muga and mulberry rearers indicating that training needs decrease with an increase in the age of rearers. Hence, the interest of old age rearers decreases as they get older, also the younger ones are more curious to acquire new skills. Similar findings were observed by Patel (2020) [19] while studying the training needs of pulse growers in the Bundelkhand region of Uttar Pradesh. On the other hand, extension contact had positive and significant relationship with the extent of training needs of eri and muga silkworm rearers. It might be that an individual who has contact with extension agencies may perceive higher training needs as they receive the most up-to-date information from extension agencies. The study also inferred that social participation had positive and significant relationship with the extent of training needs of eri and mulberry silkworm rearers may perhaps be due to higher social participation which increases the rearer's awareness to learn innovative skills through training. Bharti (2020) [4] reported that social participation was positive and significantly correlated with the training needs of backyard poultry farmers of Bihar. Moreover, it was found that farming experience had positive and significant relation with muga and mulberry silkworm rearers for the reason that the rearers wanted to learn scientific methods as well as traditional methods to apply it in near future. Okwoche *et al*. (2015) [18] observed that the training needs of livestock farmers in Benue state, Nigeria increases with farming experience and number of extension contact.

Conclusion

Present investigation was an attempt to study the profile characteristics of silkworm rearers and to analyze the correlation between training needs of silkworm rearers with their socio-economic and psychological characters. Training is considered as an effective tool in enhancing knowledge and skills of the silkworm rearers. So, training programmes must be arranged and executed by extension agencies in accordance with the need, convenience and interest of the silkworm rearers. The spread of awareness among the rearers and transfer of modern technologies need to be emphasized to extend their income. The factors like age, education, family size, land holding, source of income will be beneficial in decision making and implementation of programmes and schemes. The independent variables which have positive impact on the rearers should be taken into consideration while choosing the beneficiaries.

Acknowledgement

The authors are thankful to Assam Agricultural University, Jorhat for providing necessary support to carry out the research work.

References

1. Anonymous. Annual Report (*2022-23*). Central Silk Board, Ministry of Textiles. Govt. of India; c2022. p. 81.
2. Arya A, Ramchandra. An economic analysis of production and marketing of silk in Bhagalpur district of Bihar. The Pharma Innovation Journal. 2022;11(6):1917-1924.
3. Bhagabaty A, Das AN, Borah AB. A study on the problems and prospects of rearing of muga silkworm (*Antheraea assama* Westwood) in Boko, Kamrup district, Assam. Remarking An Analisation. 2018;3(8):6-15.
4. Bharti R. Study on training need assessment of backyard poultry farmers of Bihar. M.Sc. Thesis, Bihar Animal Sciences University, Patna, Bihar; c2020.
5. Brahma U, Bose DK, Yadav S. Adoption level of sericulture farmers towards improved sericulture production technology in Udalguri block of Udalguri district, Assam. International Journal of Advances in Agricultural Science and Technology. 2020;7(10):34-39.
6. Bukhari R, Kour H. Background, current scenario and future challenges of the Indian silk industry. International Journal of Current Microbiology and Applied Sciences. 2019;8(5):2448-2463.
7. Chamuah P, Borah B, Saikia M, Saikia H, Borgohain A, Bora D, *et al*. A study on the socio-economic and psychological characteristics of muga rearers of Dhakuakhana sub-division of Lakhimpur district, Assam. The Pharma Innovation Journal. 2022;11(3):1233-1237.
8. Dewangan SK. Livelihood opportunities for tribe through sericulture in Raigarh, Chattisgarh, India. Nature & Environment. 2016;21(2):1-12.
9. Geetha GS, Rao PS. Group approach and technology adoption - A case study in sericulture. Global Journal of Interdisciplinary Social Sciences. 2016;5(3):52-56.
10. Gogoi R, Barman S. Degree of farm women participation in sericulture activities – A study in Sivasagar district of Assam. International Journal of Current Microbiology and Applied Sciences. 2020;9(11):3195-3202.
11. Goswami, Bhattacharyya. Contribution of sericulture to women's income in Assam: a case study in Goalpara district of Assam, India. International Journal of Scientific and Research Publications. 2013;3(3):1-6.
12. Goswami NK, Nath P, Saharia D. A study on socio-economic assessment and adoption of scientific technologies by the muga rearers of Assam. International Journal of Scientific Research. 2015;4(2):349-353.
13. Jakkawad SR, Patange NR, Ahire RD. Adoption of sericultural practices by the sericulturists. Journal of Entomology and Zoology Studies. 2019;7(3):1363-1366.
14. Joshi RR, Kapse PS, Jakkawad SR. Relationship between profile of sericulture farmers with impact of sericulture enterprise. The Pharma Innovation Journal. 2021;10(12):1860-1863.
15. Kumar RA, Megha HT, Shreyas S, Sannappa B, Manjunath KG. Personal and socio-economic status of sericulture farmers in Krishnarajpet taluk of Mandya district. International Journal of Applied Research. 2020;6(7):273-277.
16. Mech D, Das SC, Ahmed M. Adoption of improved technology among the muga farmers in Golaghat district of Assam. International Journal of Innovative Research and Advanced Studies. 2016;3(1):79-83.
17. Mir MA, Baqual MF, Kamili AS, Mir SA, Saleem S, Verma GR. Impact of mass media exposure and innovation proneness on cocoon production. Journal of Experimental Biology and Agricultural Sciences. 2015;3(V):454-457.
18. Okwoche VA, Abu O, Hon FA. Analysis of training needs by livestock farmers in Benue state, Nigeria; c2015.
19. Patel RR. Training need assessment of pulse growers in Bundelkhand region of Uttar Pradesh. M.Sc. Thesis, Banda University of Agriculture & Technology, Uttar Pradesh, India; c2020.
20. Priyadarshini MB, Kumari NV. A study on the adoption of improved sericulture technologies and success of sericulture in Chittoor and Kadapa district of Andhra Pradesh, India. International Journal of Applied Agricultural Research. 2017;12(1):43-48.
21. Sajeev MV, Venkatasubramanian V, Singha AK. Identifying training needs of farmers and rural youth of Nagaland state. Indian Journal of Extension Education. 2021;57(2):115-122.
22. Vijay N, Mech D. Impact of improved muga culture training programme on adoption level of the farmers. Journal of Pharmacognosy and Phytochemistry. 2020;9(1):2220-2224.
23. Yadav KN, Sharma ML. Socio-economic status of sericulturists of Chhattisgarh. Indian Journal of Extension Education & Research Development. 2016;24:157-161.
24. Sahu MK, Dewangan DN. A survey on handwritten character recognition. International Advanced Research Journal in Science, Engineering and Technology. 2017 Jan;4(1).
25. Vijay R, Singaravelu DL, Vinod A, Sanjay MR, Siengchin S. Characterization of alkali-treated and

untreated natural fibers from the stem of parthenium hysterophorus. Journal of Natural Fibers; c2019 May 9.
26. Rajeshwar BK, Jang I, Yi C. Effect of microwave on mechanical properties of epoxy mortar. Construction and Building Materials. 2019 Sep 10;218:681-688.
27. Sharma RK, Yadav P, Yadav M, Gupta R, Rana P, Srivastava A, *et al*. Recent development of covalent organic frameworks (COFs): Synthesis and catalytic (organic-electro-photo) applications. Materials Horizons. 2020;7(2):411-454.
28. Hatibaruah A, Saha S. A production inventory model for ameliorating and deteriorating items with price, time and advertisement frequency dependent demand under the effect of inflation. International Journal of Applied and Computational Mathematics. 2022 Aug;8(4):201.