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Impact of improved muga culture training programm on adoption level of the farmers

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Abstract
The present study was conducted during 2017-18 in Central Muga Eri Research and Training Institute Lahdoigarh, Jorhat district of Assam. A study was undertaken in Sivsagar, Dibrugarh, Golaghat, Lakhimpur, Goalpara and Kamrup districts of Assam, India to assess the adoption level of muga farmers on improved technologies. The ex-post facto research design was used for the study with a sample of 150. The study revealed that high majority (79.30%) of the farmers have adopted selection of selection of seed cocoon followed by 34.67 per cent and 22.00 per cent of farmers have adopted pre brushing care and pruning schedule respectively. There is a significant relationship exist between age, Sericulture-income, land holding, education and experience. The results showed that the farmer skill training program has a positive impact on adoption of improved technologies of muga culture which results in increase the cocoon production and productivity.

Keywords: Cocoon, intercropping, productivity and sterilization

Introduction
Muga culture is an age-old traditional practice of the rural folk in Assam. It is an integral part of the rural economy providing gainful employment particularly to the small and marginal farmers. It has immense potentiality for socioeconomic improvement with sustainable income generation of the rural folk. Presently, more than 13,000 hectares of land is covered under muga feed plantation and almost 37,000 families are actively involved in muga culture in the state of Assam, India. Production and productivity of muga culture mostly depends on adoption of the latest technologies (Singh *et al.*, 2014 and Goswami *et al.*, 2015) [16]. In the last two decades, various improved technologies of muga culture viz., cultivation and management of muga host plants, production of disease free laying (dfl), early and late stages silkworm rearing, prophylactic measures against pests and diseases, improved mountage for cocoon spinning, etc. were developed and recommended for the benefit of farmers (Chakravorty *et al.*, 2005) [2]. However, production of muga raw silk although in a steady increasing trend, it is still behind the potential production of 200 MT and has been swinging from 105-158 MT during last 10 years (Choudhury, *et al.*, 2016) [3]. Barah *et al.*, (2004) [1] reported that in muga culture, yield gap between demonstration centre and the farmers is 50% in seed and 30% in commercial crop. Mech, *et al.*, (2004) [1] reported that none and low adoption of improved technologies among the farmers resultant the production of 20-40 cocoons per laying against 50-60 cocoons per laying by technology adopters. Keeping in view of this, present study was undertaken to assess the extent of adoption of improved technologies, identify the factors that contribute significantly to adoption of improved technologies of muga culture.

Material and Methods
The present study was conducted in 2017-18 in Central Muga Eri Research and Training institute, Lahdoigarh, Jorhat district of Assam. To assess the adoption level of improved technology of muga culture of of trained muga farmers in the upper and lower Assam. In this view, a Survey was conducted in upper and lower Assam of muga producing districts namely, Sivsagar, Dibrugarh, Lakhimpur, Golaghat Goalpara and Kamrup respectively. A list of 25 trained farmers were selected from each selected distrticts, based on the farmers skill training program undergone in training section of CMER&TI, Lahdoigarh from 2012-13 and 2013-2014. Thus making sample size of 150. Primary data pertaining to level of adoption of improved technologies of muga culture, socio personal characteristics such as age, education, experience, family size, operational land holding, sericulture income, etc. were collected through personal interview method in a pre-tested quaternaries developed for the purpose. In order to ascertain the extent of adoption of improved technologies, a total number of 16 recommended practices covered under integrated technology package of muga culture

recommended by Central Muga Eri Research & Training Institute, Lahdoigarh, Jorhat were selected. The adoption index of the respondents was measured by making use of following adoption index developed by Karthikeyan (1994) [10]. Scores '0', '1' and '2' assigned to non-adoption, partial adoption and full adoption respectively. The total score for a respondent is obtained by summing up the score obtained on each practice. Thus minimum score one could score was 1 and maximum score was 16.In order to know the relationship between socio-economic characteristics and adoption level of the farmers, collected data was statistically analyzed using correlation and regression coefficient.

Results and Discussion

Socioeconomic characteristics of the respondents in the study area

It was evident from the Table 1 that majority (74.00%) of the farmers belonged to middle age group followed by young (20.67%) and old (5.33%) age group. Majority (90.00%) of the respondents were belonged to male category. Education level of majority of the farmers (46.67%) was up to primary level followed by secondary level (42.00%). Family size of most of the farmers (80.67%) consists of 4-5 members and majority of the farmers (69.33%) considered agriculture as primary occupation. Majority (52.00%) of the respondents had less than 1.0 acre of land holding under muga host plantation. As regards to the sericulture-income, 49.33 per cent of the farmers had low level of income ranged from Rs. 30000.00 to 40000.00. Experience in muga culture was exhibited by majority (52.00%) of the trained farmers as >10 years. The people of the middle age group have more work efficiency and they have gathered more experience on muga culture over the years. This may be the probable reasons for majority of the muga farmers belongs to the middle age group. Goswami *et al.,* (2015) [9] also reported that most of the muga rearers are above 35 years and the new generation are seems not to be interested to involve in the practice. Muga silkworm is reared in outdoor condition and the farmers need to have lot of skills to conduct muga silkworm rearing effectively. Male persons are highly skilled and well experienced on muga culture hence, their involvement was also high. It is fact that education of individual determines their knowledge level and mental status and plays a key role in moulding and bringing desirable changes. Probably, the poor economic condition of the muga farmer and other social constraints made them to educate less, but as the trends are changing in the society, education level of some of the farmers are also gone up to graduate level. Mech *et al.,* (2004) [14], Borah *et al.,* (2004) [14] and Goswami *et al.,* (2015) [16] also reported the same level of education among the muga farmers. Many of the time, the farmers are failed to harvest good crops due various climatic condition and incidence of pest and disease of silkworm. In addition to that, sometimes farmers are taking only one or two crops in a year. Probably, due to these facts, the farmers considered the muga culture as secondary source of income considering the agriculture as primary.

Table 1: Socioeconomic characteristics of the respondents in the study area

(N=150)

Sl. No	Characters	Categories	Frequency	percentage
1	Age	Young (Up to 35 years)	31	20.67
		Middle (36-56 years)	111	74.0
		Old (above 56 years)	8	5.33
2	Sex	Male	135	90.0
		Female	15	10.0
3	Caste	SC	17	11.33
		ST	74	49.33
		OBC	44	29.33
		MOBC	9	6.0
		General	6	4.0
4	Marital status	Unmarried	18	12.0
		Married	132	88.0
5	Education	Illiterate	10	6.67
		Primary level	70	46.67
		Secondary	63	42.0
		Graduate and above	7	4.67
6	Family size	Small (Up to 3 members)	17	11.33
		Medium(4–5 members)	121	80.67
		Big (Above 5 members)	12	8.0
7	Land area under muga food plants	<One acre	78	52.0
		One acre	47	31.33
		>One acre	25	16.67
8	Primary occupation	Agriculture	104	69.33
		Muga culture	32	21.33
		Other	14	9.33
9	Seri income	Low (Rs. 30000-40000)	74	49.33
		Medium(Rs. 40000-60000)	40	26.67
		High (Above Rs. 60000)	36	24.0
10	No of plants	<200	70	46.67
		200-400	50	33.33
		400-600	30	20.0
11	Rearing capacity	50-100	34	22.67
		100-200	103	68.67
		>300	13	8.67

12	Experience	0-5 years	46	30.67
		5-10 years	26	17.33
		>10years	78	52.0

Overall Adoption level of respondents on improved technologies of muga culture: The results of the study indicated that (Table 2) almost 65.34 per cent of the respondents had high level of adoption followed by 34.67 percent had medium level of adoption. The present situation about the improved technologies of muga culture due to Farmers skills training imparted in the CMER&TI, Lahdoigarah, and adoption of technologies in the farmers level.

Table 2: Overall Adoption level of the respondents about improved technologies of muga culture

Sl. No.	Category	Adoption level	
		Frequency	Percentage
1	Low	0	0.0
2	Medium	52	34.67
3	High	98	65.34
	N	150	100

Adoption level of improved technologies of muga culture among the farmers: Adoption level of trained farmers on improved technologies of muga culture can be seen in Table 3 overall average of 13.17 per cent of the respondents had full adoption on improved technologies of muga culture. A considerable amount of respondents have partial adoption (24.16%) followed by non-adoption (62.13%) of the improved technologies of muga culture. Data presented in the Table 3 clearly indicated that majority of the respondents fully adoption technologies are selection of seed cocoon (79.3%), whereas partial adoption of the technology was noticed in 20.67% respondents. Similarly some of the technologies which are fully adopted by the farmers between the ranges of 0-10% are spacing of host plant (6.0%), control of stem borer (5.3%), use of dfls (7.33%), and pre brushing care (9.33%), Lahdoi (5.3%), disinfection of rearing field (8.0%) and disinfection of rearing appliances (9.33%) respectively. However above mentioned technologies are non-adopted by the farmers in the range of 30-75% are spacing of host plant (34.7%), control of stem borer (76.67%), use of dfls (65.33%), pre brushing care (77.34%), lahdoi (70.0%), disinfection of rearing field (74.67%) and disinfection of rearing appliances (68.67%).

Table 3: Adoption level of improved technologies of muga culture among the farmers (N=150)

Sl. No	Name of technologies	Full adoption		Partial adoption		Non adoption	
		No.	%	No.	%	No.	%
1	Spacing of host plants	9	06.00	89	59.30	52	34.70
2	Application FYM and NPK	18	12.00	38	25.33	94	62.67
3	Intercropping	24	16.00	56	37.30	70	46.67
4	Pruning schedule	33	22.00	52	34.67	65	43.33
5	Control of stem borer	8	5.30	27	18.00	115	76.67
6	Mother moth examination	0	0.00	9	6.00	141	94.00
7	Egg surface sterilization	0.0	0.00	0.0	0.00	150	100.0
8	use of dfls	11	7.33	41	27.33	98	65.33
9	Pre brushing care	52	34.67	60	40.00	38	25.33
10	Early stage rearing	21	14.00	68	45.33	61	40.67
11	Lahdoi	8	5.30	37	24.67	105	70.00
12	Biological control of uzi fly	0.0	0.00	0.0	0.00	150	100.0
13	Improved mountage	0.0	0.00	13	8.66	137	91.33
14	Selection of seed cocoon	119	79.30	31	20.7	0	0.00
15	Disinfection of rearing field	12	8.00	26	17.33	112	74.67
16	Disinfection of rearing appliance	14	9.33	33	22.00	103	68.67
	Average		13.7				

Table 4: Association between socio-economic characteristics and their adoption level technologies of farmers

Sl. No.	Variable	Independent Variables	Corr. coeff (r)
1	X_1	Age	0.47**
2	X_2	Education	0.34**
3	X_3	Family size	-0.02
4	X_4	Seri income	0.35**
5	X_5	Land holding	0.26*
6	X_6	Experience	0.46**

** Significant at the 0.01 level,* Significant at the 0.05 level

Association between socioeconomic variables and their adoption level technologies

An attempt was made to ascertain the relationship between selected personal and socio-economic variables of muga farmers and adoption level of improved technologies. The results of the correlation analysis with regard to the socio-economic variables and adoption level of improved technologies by the muga farmer presented in the Table 4 revealed that age, sericulture income, land holding, experience and education are positive significant relationship with the adoption level. However, family size had no significant relationship with the adoption level of improved technologies of muga culture. The positive and significant influence of age may be due to the fact that as the farmers grow old, they became capable to take right decisions for adoption of a new technology based on its extent of advantage and disadvantages. Income is directly related with any occupational venture. As the improved technologies of muga culture give higher production, their income also increased and hence a significant association was found between the income and improved technology adoption. Larger area of land provides accommodation for more number of plants and it is directly influenced the farmers to adopt the improved technologies for production of quality leaf. Experience helps an individual to think in a better way and make a person more mature to take right decisions. That is why, farmers having more experience in muga culture, have shown more interest in adoption of improved technology. The results of the study are in consistency with Dolli *et al*., (1993) [5], Srinivasa *et al*., (1996) [17], Vijay Prakash, N. B. and Dandin, S. B. (2005) [19], Vijayakumari and Rajan (2006) [20], Lakshmanan and Geethadevi (2007) [12], Dayanandh and Kamble (2008) [4] and Srinivasulu Reddy *et al*., (2010) [18] reported in mulberry sericulture.

Table 5: Multivariable relationship between socio-economic characteristics of trained farmers and their adoption level of improved technologies

Variable	Independent Variables	Regression Co-efficient		
		Reg. Coeff (b)	Std. Error	t-Value
	Intercept	32.51	12.22	12.68
X_1	Age	1.30	0.29	8.37**
X_2	Education	0.88	1.85	0.47
X_3	Family size	-0.536	0.692	-0.774
X_4	Seri income	0.0006	0.0008	0.645
X_5	Land holding	-1.181	0.782	-1.509
X_6	Experience	1.920	0.194	6.106**
	R2	0.59		
	F-ratio	1.56**		

Data presented in the Table 5, it could be observed that the regression co-efficient of the personal and socio-economic variables of the respondents namely age (X1) and experience (X6) is found highly significant at 1 per cent level towards adoption level of improved technologies. Further, the variables like family size (X3) and land holding (X5) were found negative relationship. Further education (X2) and sericulture income (X4) had a positive relationship with the adoption level of technologies among the farmers. The value of co-efficient of multiple determinations (R2) was 0.59 with significant F-ratio value significant at 1% level of significance (1.56). It clearly indicates the 59 per cent variation in the adoption level of the respondents was explained by all the independent variables put together**.**

Conclusion

The study revealed that the adoption level of the improved technologies of respondents was significantly high. The socio-economic characters like age, education, experience, seri income and land holding have a significant association with the adoption level of the respondents about improved technologies. Therefore, these factors may be taken into consideration for creating more awareness about the improved technologies among the traditional muga farmers to produce the muga raw silk in to a desired level. In this context Farmers skill Training programme has a positive impact on knowledge and adoption level of the farmer, so that main emphasis can be given to the technologies which are non-adopted and partial adopted by the farmers in the upcoming training programs. Hence, farmer's skills training play an important role in transferring and adoption of improved technologies of muga culture.

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