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Adoption Of Improved Technology Among The Muga Farmers In Golaghat District Of Assam

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Abstract: ***Present study was undertaken in Golaghat district of Assam covering 200 muga farmers to assess the extent of adoption of improved technologies. The study also focused on the relationship of personal and socioeconomic variables of the respondents with adoption of improved technologies and constraints for non-adoption of technologies, if any. The study revealed that majority of respondents belonged to low adopter (51.5%) category followed by medium (27.0%) and high (21.5%) adopter categories. Adoption of specific technology among the farmers was high only in spacing of host plants (64.0 %) and pre brushing care (55.5 %). Medium adoption was found in FYM and NPK (43.5 %), pruning schedule (42.0%), control of stem borer (31.5%), intercropping (42.0%), early stage rearing (42.0%), lahdoi (39.0%), On the other hand, low adoption of technologies was high in biological control of uzifly (86.0%), improved mountage (67.0%), mother moth examination (96.5%) and egg surface sterilization (98.5%). The study revealed that age, seri income, land holding, experience and extension contact have positive and significant relationship with the adoption of improved technologies. The most serious constraints identified for low and non-adoption of improved practices were inclination towards traditional practice, lack of knowledge and non-availability of silkworm seeds on time.***

Keyword: Muga culture, improved technology adoption, socio-economic factors and constraints.

I. 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 socio-economic 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). 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). 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). Barah et al. (2004) 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) reported that non 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 and constraints for non-adoption of technologies, if any among the muga farmers.

II. METHODOLOGY

The study was carried out in Golaghat district of Assam state of India during 2014-15. In Golaghat district, there are three Sub-Division namely Golaghat, Dhansiri and Bokakhat. Total 15 villages in the district i.e., 5 villages from each Sub-Division were selected randomly for the present study. From each village, 10-15 farmers were selected to make a sample size of 200 respondents. Primary data pertaining to socio personal characteristics such as age, education, experience, family size, operational land holding, occupation, seri income, extension participation, mass media participation, extension contact, etc and adoption of improved technologies of muga culture 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, 12 recommended practices of muga culture namely spacing of host plants, application FYM and NPK, pruning schedule, control of stem borer, intercropping, pre brushing care, early stage rearing, biological control of uzi fly, lahdoi, box type mountage, mother moth examination and egg surface sterilization were selected. 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 12. The adoption index of the respondents was measured by making use of following adoption index developed by Karthikeyan (1994).

$$\text{Adoption index} = \frac{\text{Respondent's total score}}{\text{Total possible score}} \times 100$$

Depending upon the extent of adoption of improved technologies, the respondents were categorized as low, medium and high using mean and standard deviation. In order to know the relationship between socio-economic characteristics and knowledge level of the farmers, collected data was statistically analyzed using correlation and regression coefficient. To determine the constraints of the respondents for non adoption of improved technologies, the respondents were provided with structured questions to mention the degree of seriousness of the constraints as very serious, serious, not very serious and not a constraints with scores 3, 2, 1 and 0 respectively. Based on the weighted mean score (WMS), the constraints were categorized.

III. RESULTS AND DISCUSSION

PERSONAL AND SOCIO – ECONOMIC CHARACTERISTICS OF MUGA FARMERS

It was evident from the Table 1 that majority (58.0%) of the respondents belonged to middle age group followed by young (26.0%) and old (16.0%) age group. Majority (87.5%) of the respondents were belonged to male category. Education level of majority of the farmers (47.0%) was up to secondary level followed by primary level (42.0%). Family size of most of the farmers (86.0%) consists of 4-5 members and majority of the farmers (68%) considered agriculture as primary occupation. Land holdings under cultivation of muga host plantation indicated that majority (40.5%) of the respondents had less than 1.0 acre. As regards to the seri-income, majority of the farmers (90.0 %) had medium level of income ranged from Rs. 30000.00 to 40000.00. Experience in muga culture was exhibited by majority (52.0%) of the farmers as 10-25 years. As many as 29.5% and 30.0% respondents was found to participated regularly in extension and mass media respectively. These findings are in accordance with the findings of Mech et al., 2004, Barah et al. 2004 and Goswami et al., 2015

Sl. No	Attributes	Categories	Frequency	Percentage
1	Age	Young (Up to 35 years)	52	26.0
		Middle (36-50 years)	116	58.0
		Old (above 56 years)	32	16.0
2	Sex	Male	175	87.5
		Female	25	12.5
3	Education	Illiterate	11	5.5
		Primary level	84	42.0
		Secondary	94	47.0
		Graduate and above	11	5.5
4	Family size	Small (Up to 3 members)	16	8.0
		Medium (4 – 5 members)	172	86.0
		Big(Above 5 members)	12	6.0
5	Operational land holding	< One acre	81	40.5
		One acre	94	47.0
		> One acre	25	12.5
6	Occupation	Agriculture	136	68.0
		Muga culture	53	26.5
		Other	11	5.5
7	Seri income	Low	180	90
		Medium	11	5.5
		High	9	4.5
8	Experience in muga culture	0-10nyears	61	30.5
		10-20 years	104	52
		Above 20 years	35	17.5
9	Extension participation	Regular	59	29.5
		Occasionally	118	59
		Never	23	11.5
10	Mass Media Participation	Regular	60	30
		Occasionally	123	61.5
		Never	17	8.5

Table 1: Socioeconomic characteristics of the muga farmers in Golaghat district, Assam

EXTENT OF ADOPTION OF IMPROVED TECHNOLOGIES

Data presented in Table 2 revealed that majority of the muga farmers (51.5%) belongs to low adopter followed by medium adopter (27.5%) and high adopter (21.5%).

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n = 200

Categories	Frequency	Percentage
Low adopter (<50.5)	103	51.5
Medium adopter (50.5 – 68.5)	54	27.0
High adopter (>68.5)	43	21.5
Total	200	100
Mean score = 59.5 and SD = 18.0		

Table 2: Distribution of respondents in different categories of adoption level of improved technologies of muga culture

Adoption of specific improved technology presented in the Table-3, indicated that extent of adoption of technologies among the farmers was high only in spacing of host plants (64.0 %) and pre brushing care (55.5 %).From the table, it is also depicted that low adopter of technologies was very high in biological control of uzifly (86.0%), improved mountage (67.0%), mother moth examination (96.5%) and egg surface sterilization (98.5%). Medium adopters of technologies was found high in FYM and NPK (43.5%), pruning schedule (42.0%), control of stem borer (31.5%), intercropping (42.0%), early stage rearing (42.0%) and lahdoi (39.0%). The reason behind the high adoption of spacing of host plants and pre brushing care is obviously due to have knowledge about the technologies and their benefit among the muga farmers. Mech et. al.(2016) reported that among the farmers, majority of the farmers have knowledge about the spacing of host plants (89.5%) and pre-brushing care (74.0%), inter cropping (87.0%), early stage rearing (86.5%), pruning schedule (81.5%), lahdoi (81.0%), application of FYM & NPK (64.5%), improved mountage (78.0%), control of stem borer (63.0%). On the other hand, knowledge on mother moth examination and egg surface sterilization was reported only in 24.5% and 33.5 % farmers respectively. The probable reason for medium and low adoption of certain technologies might be that these are relatively a new to many of the farmers and they have not experienced the benefit of the technologies as these are still in the stage of popularization. Besides, muga culture is a traditional practice over the time and it involves lot of traditional practices. Thus the muga farmers are highly inclined toward the traditional practices Mech et.al (2004) and Barah et al. (2004). This implied that farmers need to be educated regarding benefits and advantages of the new technologies for their adoption.

(N=200)

Sl. No	Name of technologies	High adopter		Medium adopter		Low adopter	
		Frequency	%	Frequency	%	Frequency	%
1	Spacing of host plants	128	64.0	56	23.5	16	8.0
2	Application FYM and NPK	17	8.0	87	43.5	96	48.0
3	Pruning schedule	54	27.0	84	42.0	62	31.0
4	Control of stem borer	39	19.5	63	31.5	98	49.0
5	Intercropping	47	23.5	84	42.0	69	34.5
6	Pre brushing care	111	55.5	37	18.5	52	26.0
7	Early stage rearing	57	28.5	84	42.0	59	29.5
8	Biological control of uzi fly	6	3.0	22	11.0	172	86.0
9	Lahdoi	34	17.0	78	39.0	88	44.0
10	Improved mountage	23	11.5	43	21.5	134	67.0
11	Mother moth examination	00	0.0	7	3.5	193	96.5
12	Egg surface sterilization	00	0.0	3	1.5	197	98.5
	Mean	43.0	21.5	54	27.0	103	51.5

Table 3: Adoption level of specific improved technologies of muga culture among the farmers

ASSOCIATION BETWEEN SOCIO-ECONOMIC VARIABLES AND ADOPTION LEVEL ON IMPROVED 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 personal and socio-economic variables and adoption level of improved technologies by the muga farmer presented in the Table 4 revealed that age, seri income, land holding, experience and extension contact are positive and education had negatively significant relationship with the adoption level. However, family size and mass media participation 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. Extension contact is one of the most important factors to enrich the farmer knowledgeable and encourage for adoption of new technologies. Thus, frequent contacts the sericulture extension personal and participated in different extension programme made the farmers influenced for adoption of improved technologies of muga culture. The results of the study are in consistency with Dolli et al., (1993), Ganapathi Rao et al., (l995), Srinivasa et al., (1996), Vijay Prakash, N. B. and Dandin, S. B. (2005), Vijayakumari and Rajan (2006), Lakshmanan and Geethadevi (2007), Dayanandh and Kamble (2008) and Srinivasulu Reddy et al., (2010) reported in mulberry sericulture. The multiple regression analysis revealed that the regression co-efficient of the personal and socio-economic variables of the respondents namely age (X_1), experience (X_6) and extension contact (X_8) were found highly significant at 1 per cent level among muga farmers towards adoption level about improved technologies. Further, the variables like education (X_2), family size (X_3), land holding (X_5) and mass media participation (X_7) and were

found negative relationship. The sericulture income (X_4) had a positive relationship with the adoption level of technologies among the farmers. The value of co-efficient of multiple determination (R2) was 0.742 with significant F value (15.32 **). It clearly indicates the 74 per cent variation in the adoption level of the respondents was explained by all the variables put together. The F-value of 15.32 was significant at 1 % level, indicating that the model is fit.

Variable code	Independent Variables	Corr. Coeff (r)	Reg. coeff (B)	Std. Error	t-Value
X_1	Age	0.972**	1.309**	0.299	4.379
X_2	Education	-0.945**	-0.887	1.855	-0.478
X_3	Family size	-0.122	-0.536	0.692	-0.774
X_4	Seri income	0.845**	0.006	0.0008	0.645
X_5	Land holding	0.268*	-1.181	0.782	-1.509
X_6	Experience	0.899**	1.920**	0.194	3.106
X_7	Mass media participation	-0.0298	-0.007	0.461	-0.015
X_8	Extension participation	0.951**	2.729**	0.979	2.786
	R^2	0.742			
	F	15.32**			

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

Table 4: Correlation between socio-economic characteristics of muga farmers and their adoption level of improved technologies

CONSTRAINTS FOR LOW AND NON-ADOPTION OF IMPROVED TECHNOLOGIES

It was found from the study that the respondents were facing number of constraints that restricted their action towards adoption of improved practices. The most serious constraints for low and non adoption of improved practices of muga culture presented in the Table 5. It was evident from the table that inclination towards traditional practice (WMS 2.43), lack of knowledge (WMS 1.80) and non availability of silkworm seeds on time (WMS 1.69) were the most serious constraint and they were ranked as I, II and III respectively based on the WMS. Based on the WMS, other constraints were non remunerative (ranked IV), lake of time (ranked V), non availability of materials (ranked VI), high cost & labour intensive (ranked VII), non availability of own farm (ranked IX) and marketing of cocoons (ranked X). Mech et al. (2004) identified the same constraints that hinder the adoption of improved technologies among the muga farmers. The finding implies that awareness of technologies among the traditional muga farmers is an urgent need. Farmer's participatory demonstration showings the result of technologies, various training, field day, exhibition, etc are the important tools to educate the farmers about the benefit of technologies. The results are supported by the findings of Latoria et al. (2001), who stated that lack of knowledge and technical guidance are the major constraints in adoption of new technologies. The main constraints for adoption were also similar to the studies made by Singhvi et al., 1994; Chikkanna et al., 1995; Mallikarjuna et al., 2006, Dayanand and Kamble 2008, Pradeep Kumar, 2010 in mulberry sericulture.

Sl. No	Constraints	Weighted Mean Score	Rank
1	Lack of knowledge	1.80	II
2	Lake of time	1.61	V
3	Non availability of materials	1.57	VI
4	High cost	1.53	VII
5	Inclination towards traditional practice	2.43	I
6	Non remunerative	1.64	IV
7	Non availability of silkworm seeds on time	1.69	III
8	Labour intensive	1.53	VII
9	Non availability of own farm	1.42	IX
10	Marketing of cocoon	1.18	X

Table 5: Constraints of muga farmers for low and non adoption of improved technology

IV. CONCLUSION

It has been observed that majority of respondents belonged to low adopter category followed by medium and high adopter categories. It has also been observed that age, seri income, land holding, experience and extension contact have positive and significant relationship with the adoption level. Therefore, these factors may be taken in to consideration for quick adoption of technologies among the farmers in to a desired level. Among the various constraints, inclination towards traditional practice and lack of knowledge are the most serious constraint hence, the knowledge level of farmers about the improved technology should be increased through training and demonstrations. The extension workers should act more as a collaborator, consultant and facilitator in dissemination of the knowledge to educate the farmers about the improved technologies. Different mass media may also be used to increase the knowledge level of farmers about improved technologies. Since, non-availability of silkworm seeds on time is another most serious constraints for non adoption of technologies, the silkworm seed organization or licensed seed producers should take proper care for supply of seeds on time to the farmers.

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