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Women in Muga culture: Assessing socio-economic status and livelihoods in Lakhimpur District of Assam

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Abstract

This study examines the socio-economic condition of women engaged in muga culture activities in the Lakhimpur district of Assam. Muga culture, a traditional sericulture practice, is notable source of livelihood for women in the region. The research assesses the influence of socio-economic variables such as age, education, caste, family size, Primary occupation, landholding, and experience on the income earned by women from muga culture. Using a Chi-Square (χ^2) test, Cramer's V, and the coefficient of contingency (C), the study analyses data collected from 400 women engaged in muga culture. The findings reveal moderate to strong associations between income and factors such as age, education, family size, and landholding. The study concludes with policy recommendations to enhance the socio-economic status of women in muga culture, including financial inclusion, skill development, and infrastructure support.

Keywords: Muga culture, socio-economic status, women empowerment

1. Introduction

Muga – culture is a traditional, agro-based Eco-friendly activity, involving cultivation of host plants, rearing of cocoons, reeling and weaving, and the end product of which is “Silk”. The silk yarn is of golden yellow in colour and Assam is only place where traditionally muga silk is produced. Muga, the semi domesticated multi volatile silkworm represents a rare endemic silkworm (*Antheraea assamensis*) species found only in the North-Eastern-Region of India and not anywhere else in the world. Muga silk is among the most expensive silks in the world due to its durability and beauty. The luster of the fabric increases with each wash and which lasts throughout the lifetime of its owner. Muga silkworm and its host plants are indigenous to North – East India. Muga culture is unique to the state of Assam and is an inherent part of the tradition and culture of Assam. Natural surroundings, climate and humidity play an important role in the development of muga culture in the state. As such in 2007 Assam received the Geographical Indication (GI) tag for muga silk and subsequently in 2014, muga silk got its own logo.

The muga culture industry is labor-intensive, with women playing a central role in various stages of the process, including rearing, extraction of silk, weaving and marketing. Despite their significant contributions, women engaged in muga culture often face socio-economic challenges, including limited access to education, healthcare, financial resources, and market opportunities. These challenges hamper their ability to maximise their income and improve

their overall socio-economic status.

The Lakhimpur district of Assam, located between 26°48' and 27°53' N latitude and 93°42' and 94°20' E longitude with its rich tradition of muga culture, serves as an ideal location for studying the socio-economic conditions of women involved in this sector. Women in Lakhimpur are not only custodians of this traditional culture but also key contributors to their household economies. However, their socio-economic status remains understudied, and there is a lack of comprehensive data on the factors influencing their income and well-being. This study aims to fill this gap by assessing the socio-economic conditions of women engaged in muga culture in Lakhimpur district and exploring the factors that impact their income and livelihoods.

The framework of this study focuses on the income earned by women from muga culture activities. It examines the relationship between socio-economic variables—such as age, education, caste, family size, primary occupation, landholding, and experience—and the income generated from muga culture. The study categories annual income into three groups: less than Rs. 50,000, Rs. 50,000 to Rs. 1,00,000, and above Rs. 1 lakh. By analysing these variables, the study seeks to understand how socio-economic factors influence the income and status of women in muga culture.

The objectives of the study

To assess the socio-economic condition of women involved in muga culture activities in Lakhimpur district.

To offer suggestions for their socio-economic upliftment
Hypothesis for Testing:

Null hypothesis (Ho): There is no significant association between the socioeconomic variables and the income earned from muga culture activities by the respondents.

Alternative hypothesis (H1): There is significant association between the socio-economic variables and the income earned from muga culture activities.

2. Scope of the Study

The scope of this study is comprehensive and multifaceted, focusing on the socio-economic status of women engaged in muga culture activities in the Lakhimpur district of Assam. It aims to provide a detailed understanding of the factors that influence their income and livelihoods, while also identifying opportunities for their socio-economic upliftment. The study examines a wide range of socio-economic variables, including age, education, caste, family size, primary occupation, landholding, and experience in muga culture, to assess their impact on the income earned by women from muga-related activities. Income levels are categorised into three groups—less than Rs. 50,000, Rs. 50,000 to Rs. 1,00,000, and above Rs. 1 lakh—to facilitate a nuanced analysis of income disparities and their underlying causes. Using robust statistical tools such as the Chi-Square (χ^2) test, Cramer's V, and the coefficient of contingency (C), the study evaluates the strength and significance of the relationships between these variables and income, providing insights into the key drivers of economic outcomes for women in this sector. Beyond analysis, the study also seeks to offer practical recommendations for policy interventions, such as financial inclusion, skill development, infrastructure support, and awareness campaigns, aimed at empowering women and enhancing their socio-economic status. By focusing on Lakhimpur district, a region with a rich tradition of muga culture, the study highlights the cultural and economic significance of this industry while addressing the unique challenges faced by women in this area. However, the study acknowledges its limitations, including its geographical specificity and dependence on self-reported data, which may affect the generalisability of its findings. Ultimately, the study aims to contribute to the broader goals of women's empowerment, sustainable development, and the preservation of cultural heritage in Assam.

3. Materials and Methods

The study was conducted in Lakhimpur district, Assam, using a mixed-method approach. For the present study, the data was mainly collected through primary survey. Primary data has been collected from 399 rearers chosen by multistage sampling procedure from the Lakhimpur district, the highest muga cultivating district of Assam where 4297 families are engaged in muga cultivation (Statistical Hand Book of Assam, 2018-2019).

Sample Size Calculation: Size of the sample has been determined using the following formula given by Taro Yamane (1967)

$$n = \frac{N}{1 + Ne^2}$$

Where

n = sample size

N = Population Size (4297)

e = Acceptable sampling error

n = 400 respondents

Schedule & Questionnaire Design: After a preliminary field research, a draft questionnaire/schedule was formulated and pilot tested. Interview method was adopted in the collection of data.

Tools for Analysis: The data was analysed using descriptive statistics and the Chi-Square (χ^2) test to assess the association between socio-economic variables and income earned from muga culture. Cramer's V and the coefficient of contingency (C) were used to measure the strength of these associations.

4. Review of Literature

The literature on sericulture highlights its significant role in empowering women, particularly in rural areas, by providing opportunities for income generation, skill development, and enhanced decision-making capabilities. Roy *et al.* (2000) emphasized that women play a crucial role in various stages of sericulture, including plantation, rearing, reeling, and weaving, as well as in the decision-making process. This underscores the importance of sericulture as a livelihood option that actively involves women in both operational and strategic roles. Suman Chandra (1997) ^[14] further reinforced this by concluding that educated women can improve their socio-economic status through active participation in sericulture, demonstrating a positive correlation between education, economic development, and social change among sericulturists.

Rani (2004) ^[15] conducted a detailed study on the impact of sericulture on women in the Anantapur District of Andhra Pradesh, revealing that nearly 72.70% of sericulture activities are carried out by women. The study highlighted that sericulture significantly enhances women's economic independence, social confidence, and involvement in family decision-making. Similarly, Anitha (2011) ^[16] discussed the global performance of the Indian silk industry, attributing its growth to favourable climatic conditions and the active participation of women. She emphasized that women's involvement is a key strength of the industry, contributing to its development on a global scale.

In Assam, Goswami and Bhattacharyya (2013) ^[17] identified challenges such as pests, price fluctuations, and lack of institutional support that hinder the adoption of sericulture as a primary occupation. However, they suggested measures like encouraging women's participation in marketing, providing training, and ensuring access to credit to strengthen the sector. Das (2020) ^[22] noted that Muga and Eri sericulture, being family-based enterprises, involve women in about 60% of the activities, making it a vital source of empowerment for women in Assam. Kalita and Dutta (2014) ^[18] echoed this sentiment, describing sericulture as a women-friendly occupation that can serve as a tool for economic empowerment. However, they also pointed out the deteriorating state of Muga culture due to

environmental degradation, climate change, and industrial pollution, calling for improved technology and skills to revive the industry.

Chakravarty (2015)^[19] focused on the Pat-Muga industry in Kamrup District, Assam, and highlighted its potential to empower rural women by providing employment opportunities and enhancing their socio-economic status. Bhattacharyya (2015) further quantified the impact of sericulture on women's empowerment, reporting a 20.64% gain in the Women Empowerment Index. Her study found significant associations between women's empowerment and factors such as education, income, landholding, and training. However, the study's limitation was the lack of hypothesis testing and the use of only nine variables to calculate the Empowerment Index.

5. Analysis and Findings

5.1. Respondents' demographic and socioeconomic characteristics

The frequency distribution of the respondents' demographic characteristics in Table 1(a) shows that the total annual income derived from Muga culture varies significantly across different demographic and socio-economic variables, including age, educational status, caste, nature of family, and size of family. The income is categorised into three groups: Up to Rs 50,000, Rs50,000 - Rs1 Lakh, and Above Rs1 Lakh, providing insights into the economic engagement of various groups in Muga culture.

The interpretation of the results from table 1(a) reveals significant insights into the socio-economic dynamics of women engaged in muga culture in Lakhimpur district. In terms of age, the majority of respondents (38.5%) fall within the 31-40 age group, with a substantial portion earning between Rs. 50,000 to Rs. 1 lakh annually. Women aged 41-50 also form a significant group (32.25%), indicating that middle-aged women are the most active participants in muga culture. Regarding education, a large proportion of respondents (34.5%) have completed HSLC, with many earning between Rs. 50,000 to Rs. 1 lakh, highlighting the positive impact of education on income levels. However, illiterate women (6.5%) and those with only primary education (11.25%) tend to earn less, underscoring the need for educational interventions. In terms of caste, the majority of respondents belong to the OBC category (57.75%), with a significant portion earning between Rs. 50,000 to Rs. 1 lakh, while ST and SC communities (16% each) also show active

participation, reflecting the inclusive nature of muga culture. The nature of family shows that 74.5% of respondents belong to nuclear families, with a higher proportion earning between Rs. 50,000 to Rs. 1 lakh, suggesting that nuclear families may provide greater autonomy and opportunities for income generation. Finally, regarding family size, the largest group (41.5%) consists of families with 4-5 members, with many earning between Rs. 50,000 to Rs. 1 lakh, indicating that moderate family sizes may facilitate better resource allocation and participation in muga culture activities. Overall, these findings highlight the influence of age, education, caste, family type, and family size on income levels, providing a foundation for targeted interventions to uplift the socio-economic status of women in muga culture.

From the table 1(b), it is revealed that the primary occupation of the family significantly influences income levels, with 21.25% of families engaged in muga cultivation and 25.75% in general cultivation earning substantial incomes, particularly in the Rs. 50,000 to Rs. 1 lakh and above Rs. 1 lakh categories. Families involved in service (24.5%) also show a strong presence, with many earning between Rs. 50,000 to Rs. 1 lakh, while those in animal husbandry (11.25%) tend to earn less, indicating the need for diversification of income sources. Regarding annual family income, a significant proportion of families (35.25%) earning between Rs. 4 lakh to Rs. 5 lakh are associated with higher incomes from muga culture, while families earning below Rs. 2 lakh (5.75%) show limited participation, highlighting the role of financial stability in supporting muga culture activities. In terms of landholding, families with 2 to 3 acres (32.25%) dominate, with many earning above Rs. 1 lakh, emphasizing the importance of land resources in muga culture. Conversely, families with no land (8.25%) or less than 1 acre (29.25%) tend to earn lower incomes, underscoring the need for land reforms and support for landless families. Finally, experience in muga culture plays a crucial role, with 31% of respondents having 5 to 10 years of experience earning between Rs. 50,000 to Rs. 1 lakh, and 23.75% with over 15 years of experience earning above Rs. 1 lakh, demonstrating that experience enhances income potential. These findings highlight the interplay of occupation, family income, landholding, and experience in shaping the economic outcomes of women in muga culture, providing valuable insights for targeted interventions and policy measures.

Table 1(a): Cross Tabulation of respondents demographic characteristics and annual income derived from muga cultivation

Variables	Group	Total Annual Income derived from Muga Culture			Frequency	Percentage
		Up to 50,000	50,000 - 1 Lakh	Above 1 Lakh		
Age	Below 30	5	6	11	22	5.5
	31-40	28	100	26	154	38.5
	41-50	16	88	25	129	32.25
	51-60	15	36	20	71	17.75
	Above 60	0	14	10	24	6
Educational Status	Illiterate	0	15	11	26	6.5
	Primary School	8	30	7	45	11.25
	Upper Primary School	12	32	16	60	15
	HSLC	17	90	31	138	34.5
	HS	23	55	23	101	25.25
	Graduate	0	19	4	23	5.75
	Post Graduate	4	3	0	7	1.75

Caste	OBC	32	143	56	231	57.75
	ST	11	37	16	64	16
	SC	9	44	11	64	16
	General	12	20	9	41	10.25
Nature of Family	Joint	10	60	32	102	25.5
	Nucleus	54	184	60	298	74.5
Size of family	Up to 3	13	52	11	76	19
	4 tp 5	35	86	45	166	41.5
	6 to 7	8	57	25	90	22.5
	Above 7	8	49	11	68	17

Source: Compiled from the collected data

Table 1 (b): Cross Tabulation of respondents demographic characteristics and annual income derived from muga cultivation

Variables	Group	Total Annual Income derived from Muga Culture			Frequency	Percentage
		Up to 50,000	50,000 - 1 Lakh	Above 1 Lakh		
Primary Occupation of family	Muga cultivation	19	42	24	85	21.25
	Business	16	36	17	69	17.25
	Service	13	73	12	98	24.5
	Animal Husbandry	0	38	7	45	11.25
	Cultivation	16	55	32	103	25.75
Annual family Income (in Rs)	Upto 2Lakh	23	0	0	23	5.75
	2Lakh to 3Lakh	41	0	0	41	10.25
	3Lakh to 4Lakh	0	103	0	103	25.75
	4Lakh to 5Lakh	0	141	0	141	35.25
	Above 5Lakh	0	0	92	92	23
Land Holding	No land	0	18	15	33	8.25
	Less than 1 acre	27	67	23	117	29.25
	1 to 2 acre	22	70	7	99	24.75
	2 to 3 acre	11	78	40	129	32.25
	Above 3 acre	4	11	7	22	5.5
Experience in Muga culture	Below 5 years	20	60	23	103	25.75
	5 to 10 years	32	67	25	124	31
	10 to 15 years	0	58	20	78	19.5
	Above 15 years	12	59	24	95	23.75

Source: Compiled from the collected data

5.2. Association between socio-economic variables and income earned from muga culture activities (n=400)

From the table (2), it is found that the chi-square (χ^2) test results reveal significant associations between several variables and income derived from Muga culture. Variables such as age ($\chi^2 = 28.661$, $df = 8$), educational status ($\chi^2 = 31.703$, $df = 12$), size of family ($\chi^2 = 16.667$, $df = 6$), primary occupation of family ($\chi^2 = 32.772$, $df = 8$), annual family income ($\chi^2 = 800.00$, $df = 8$), experience in Muga culture ($\chi^2 = 25.676$, $df = 6$), and landholding ($\chi^2 = 41.435$, $df = 8$) all show statistically significant associations ($p < 0.05$). This indicates that these factors play a crucial role in determining income levels from Muga culture. For instance, annual family income has the strongest association

(Cramer's $V = 1.000$), highlighting that wealthier families derive significantly higher earnings. Similarly, landholding and primary occupation show moderate to strong associations, emphasizing their importance in income generation. On the other hand, caste ($\chi^2 = 8.381$, $df = 6$) and nature of family ($\chi^2 = 7.564$, $df = 2$) do not show statistically significant associations ($p > 0.05$), suggesting that these variables have minimal impact on income levels. Overall, the results underscore the importance of factors like landholding, experience, and education in enhancing income from Muga culture, while also highlighting the need for targeted interventions to support families with smaller landholdings, lower incomes, and limited experience to ensure equitable and sustainable growth in this sector.

Table 2: The relationship between socio-economic variables and income earned from muga culture activities (n=400)

Variable	χ^2	df	Co-efficient of Contingency (C)	Cramer's V
Age	28.661	8	0.259	0.189
Educational Status	31.703	12	0.271	0.199
Caste	8.381	6	0.143	0.102
Nature of Family	7.564	2	0.136	0.138
Size of Family	16.667	6	0.200	0.144
Primary Occupation of family	32.772	8	0.275	0.202
Annual family Income (in Rs)	800.00	8	0.816	1.000
Experience in Muga culture	25.676	6	0.246	0.179
Land Holding	41.435	8	0.306	0.228

Source: Compiled from the collected data

6. Conclusion

Muga culture provides a stable and moderate income source for a diverse range of demographic groups, particularly middle-aged individuals, those with basic to higher secondary education, OBC communities, and nuclear families. Policymakers and stakeholders could focus on providing targeted support, such as training programs, access to advanced technologies, and financial incentives, to boost productivity and income levels across all groups, ensuring the sustainable growth of Muga culture as a livelihood option. In conclusion, Muga culture provides a stable and moderate income source for a wide range of families, particularly those engaged in cultivation, with larger landholdings, and with long-term experience. However, there is potential to enhance income opportunities, especially for families with smaller landholdings, lower overall incomes, and limited experience. Policymakers and stakeholders could focus on providing targeted support, such as access to advanced technologies, training programs, and financial incentives, to boost productivity and income levels across all groups. By addressing these gaps, Muga culture can be further developed as a sustainable and profitable livelihood option, benefiting a broader segment of the population.

The chi-square test results reveal that annual family income, landholding, primary occupation, experience, age, educational status, and family size are significant factors influencing income derived from Muga culture. In contrast, caste and family structure do not significantly impact income levels. These findings highlight the need for targeted interventions to support families with smaller landholdings, lower incomes, and limited experience, ensuring equitable and sustainable growth in Muga culture.

7. Policy Implications

To enhance the socio-economic status of women engaged in muga culture, it is essential to implement targeted interventions such as providing access to low-interest loans and government schemes for financial inclusion, organizing skill development programs to improve sericulture and entrepreneurial skills, and enhancing infrastructure like transportation and storage facilities to support muga culture activities. Additionally, awareness campaigns should be conducted to educate women about their rights and available government schemes, while promoting land ownership among women to strengthen their economic independence. Encouraging the formation of cooperatives and self-help groups can also empower women by improving their bargaining power and reducing dependency on middlemen. These measures, combined with efforts to promote digital literacy and market access, can significantly uplift the socio-economic conditions of women in muga culture, fostering sustainable development and preserving this traditional craft.

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