

# **Factor and constrains involved in income generation from sericulture: a study in three districts of West Bengal**

## **Abstract**

Sericulture is an important sector in for income generation in rural area. Socio-personal and management factors along with relevant constrains were identified for income generation from sericulture in West Bengal. A total of 127 respondents were taken under the three districts *i.e.*, Murshidabad, Nadia and South 24 Pargana. Total 14 socio-personal and 7 management factors were taken as independent variables and were statistically analyzed to understand their relationship with dependent variable income (y). The statistic used were correlation coefficient (*r*). Only 7 from socio-personal and 5 from management variables were found positively correlated with income. A total of 14 and 3 constrains were identified against mulberry and cocoon production, respectively. For mulberry production, 7 constrains were disease-pest related where root rot disease and tukra pest (mealy bug) contributed 8.66% and 18.11% with 6<sup>th</sup> and 1<sup>st</sup> rank respectively. For cocoon production 2 constrains were solely disease related where grasserie infection and muscardine infection contributed 62.20% and 29.92% with 1<sup>st</sup> and 2<sup>nd</sup> rank respectively. In socio-personal and management category, a total of 4 major constrains were identified against income generation. However, based on the findings, it is to be mentioned that for any future income generation policy in sericulture care should betaken on identified factors and constraints based on their importance identified in this study.

## **Keywords**

Sericulture, farmer's income, constrains, socio-management factor.

## **Introduction**

Sericulture is considering as a labor-intensive agriculture oriented cultural practices that promotes employments to a large number of people worldwide for quality silk production. In India, it provides a solid livelihood of approximately 7.5 million people, in addition to a few allied businesses (ITC - Silk Review, 2001). It had been reported that this cash crop pays well to the marginal as well as large farmers with an average annual income of around rupees 40,000/hectare (Jagannath 1995; Chatterjee et al. 2015). Sericulture controls the migration of rural people to urban areas in search of jobs and income (Savithri et al. 2013) followed by providing a year-round source of income contributing to the rural economy's dynamism and vitality (Dewangan 2011). In sericulture, the improved cultural practices and new technology adoption behaviour plays vital role in income generation followed by improvement of quality life style and socio-economic standard of the rural population (Raju et al. 2017). Sericulture is practiced in fewer concentrated areas of West Bengal than the other traditional silk producing states (*e.g.*, Karnataka, Andhra Pradesh, Tamil Nadu, Jammu and Kashmir), as evidenced by the largest number of sericulture families per village ratios, *i.e.*, 48.9 percent in West Bengal (CSB, Ministry of Textiles, Govt. of India., 2003; Roy et al. 2013). As a result, spatial concentration is one of West Bengal's unique characteristics, which would result in uneven development of a specific region as a result of this livelihood (Roy & Mukherjee 2015; Roy & Sarkar 2015).

Mulberry sericulture serves the social objectives like providing off-farm employment of the farmers from leaf production to cocoon marketing through various steps involved in it. Gaps are noticed in production of quality cocoon for better economy return due to several constrains associated with these practices. Ultimately, farmers are getting low returns due to poor productivity of mulberry leaf followed by poor quality of cocoon production in comparison to

other agricultural crops. It had been reported that mulberry production is hampered due to constraints like; disease-pest attack (Ramkumar 1997; Mishra 2001), poor knowledge on manure application (Shivalingaiah et al. 1999), shortage of irrigation water (Shivamurthy 1988; Mathaiya 1997), poor technological know-how (Dayananda Patel 1985), unavailability of improved mulberry variety (Gopala 1991), poor extension support (Kumar et al. 1999) etc. Similarly, in quality cocoon production the constraints are reported mainly on poor knowledge about disease-pest control (Srinivasalu 1991; Gopala and Krishna 1993; Singhvi et al. 1994, Nikhade et al. 1995), cocoon marketing issues (Sreenivasa 1989; Kumar et al. 1994, Jagadisha 1999) etc. Planning for suitable intervention strategy to bridge this gap, it is necessary to identify the constraints faced by the farmers under certain region.

The present study envisages to assess the socio-economic and management factors and related constraints facing by the sericulture farmers at grass root level in relation to generate higher income in sericulture enterprise.

## **Materials and methods**

### ***Study area and sampling***

The present study was purposively conducted in the block Nabagram and Khargram in Murshidabad district, Karimpur-II in Nadia district and Kulpi block of South 24 Pargana district of West Bengal followed by our previous study locale (Sengupta et al. 2023). Total 10 number of villages were selected randomly from the selected blocks. Personal interview method was carried out with randomly selected a total of 127 respondents. The socio-personal and management variables are denoted as 'x<sub>n</sub>' whereas income is denoted as 'y' (table 1).

### ***Statistical data analysis***

The collected independent data of 21 variables were statistically measured by coefficient of correlation ( $r$ ) using SPSS software to understand and identify the degree of relationship in between independent variables with dependent variable income.

### ***Constraints data collection and analysis***

The respondents were asked to mention the constraints they experienced in mulberry production and cocoon production. Later, the identified constraints are categorized as socio-personal and management constraints. Further in one category there is differences in importance among different constraints. Importance of constraints vary from farmer to farmer. The constraints under each category were ranked based on their percentage of importance to the total respondents. The number of respondents and percentage of contribution are summarized in table 2. The graphical representation of the same are shown in figure 3 for mulberry production and figure 4 for cocoon production under three districts.

## **Results and discussion**

### ***Relationship status between independent and dependent variables***

The correlation coefficient ( $r$ ) of farmer's income ( $y$ ) in respect to all independent variables ( $x_1$ - $x_{21}$ ) were established. Individually, all the independent socio-personal variables ( $x_1$ - $x_{14}$ ) and management variables ( $x_{15}$ - $x_{21}$ ) were analyzed with dependent variable income ( $y$ ) using correlation coefficient (table 1) and graphically presented in figure 1&2. Amongst 14 independent socio-personal variables 7 were found positively correlated and they are  $x_1$ ,  $x_5$ ,  $x_6$ ,  $x_7$ ,  $x_{11}$ ,  $x_{12}$ , and  $x_{13}$  in which  $x_6$ ,  $x_7$ ,  $x_{12}$ ,  $x_{13}$  showed 1% significant level whereas remaining seven variables  $x_2$ ,  $x_3$ ,  $x_4$ ,  $x_8$ ,  $x_9$ ,  $x_{10}$  and  $x_{14}$  were found negatively correlated with respect to dependent variable income ( $y$ ) which are summarized in table 1. For income ( $y$ ), variable 'production of mulberry leaf per unit area in kilograms' ( $x_{17}$ ) showed highest positive value (0.796) and whereas

‘no. of employment days / year / labour’ ( $x_{19}$ ) showed the highest negative value (-0.216) at 5% significant level. It means income directly depends on the ‘production of mulberry leaf per unit area in kilograms’ while the ‘no. of employment days/year/labour’ hampers the income. Again, amongst the independent socio-personal variables ‘economic motivation’ ( $x_{12}$ ) is found having highest positive correlation with income indicating a social message to the rural unemployed youth and farmers to start practicing sericulture for income generation.

#### ***Assessment of socio-personal and management variables for income generation***

Among all agricultural activities, sericulture farmers found to be experienced with a set of factors where more the ‘land holding’ ( $x_6$ ), more the income (y) generation from here. Farmers having more lands, has more scope to continue sericultural activities at maximum level by establishing more mulberry garden, silk production units which will ultimately promote income. The ‘area under mulberry cultivation’ ( $x_7$ ) plays a significant role in getting more income from sericulture because more area under sericulture for different activities like plantation, silk worm rearing, cocoon production etc. will provide more employment opportunity to the family member. ‘Economic motivation’ ( $x_{12}$ ) also triggers a favorable attitude of farmers towards achieving higher income from sericulture. Farmers who already motivated economically are ready to adopt new improved package & practices with recommended technologies to increase production in sericulture and thus generate more income. In other way, the ‘economic motivation’ also encourages the farmers to upgrade their knowledge level about how to update themselves for modern communication and marketing channel, technology adoption behaviour which further enhanced the income. ‘Marketing support’ ( $x_{13}$ ) is an important backup system for higher income from sericulture too. A well-defined marketing strategy leads to an increase of income from sericulture which directly helps them to reach out the production. With a strong and

wide marketing support, a sericulture farmer can sale the production nationally and internationally. 'Number of family member engaged in sericulture' ( $x_{16}$ ) activities has a positive impact on income generation. As many as a greater number of family members is efficient in sericulture activities there will be less demand for outside labour. As a result, there will be a save in labour cost and income will be more. 'The production mulberry leaf per unit area' ( $x_{17}$ ) is an important variable for getting higher income in sericulture. If the leaf production is more, then more number of silkworms rearing is possible followed by more number of cocoon production will be achieved. Therefore, production of mulberry leaf is positively correlated and significant for income generation in sericulture. Again 'no. of employment days/ year/labour' ( $x_{19}$ ) has negative impact for income because more the number of employment days, more will be the labour engagement and it will lead to more payment for labour followed by increase of operational cost. Hence, the total cost for production will be higher and profit will be lesser and thus the number of employments days has negative impact on income generation of sericulture farmers.

### ***Constrains faced by the respondents***

In table 2, the rank-wise identified constrains are summarized of this study which are grouped into general constrains, socio-personal and management constrains. The number of respondents and percentage of contribution are graphically represented in figure 3 for mulberry production and in figure 4 for cocoon production under the three districts.

In general category, the constrains are identified against mulberry production and cocoon production related issues. A total of 14 constrains are recorded against mulberry production activities in which 7 are disease-pest related. Major disease as constrains is identified of root rot disease and pest of tukra (mealy bug) of mulberry plant where they have contributed 8.66% and

18.11% respectively. Apart from disease-pest, about 10.24% contribution is recorded for poor supply of manure and disinfectants. On the other hand, a total of 3 constrains are recorded against cocoon production in which 2 are solely disease related *i.e.*, grasserie infection and muscardine infection where they contributed 62.20% and 29.92% respectively. Interestingly, cocoon market related issue is identified of 7.88% as constrains for selling the cocoons specifically in south 24 pargana district.

In socio-personal and management category, a total of 4 major constrains are identified which have direct effects on farmer's income generation (table 3). The socio-personal factors 'land holding' and 'marketing support' are recorded as major constrains whereas 'poor mulberry production' and 'benefit-cost ratio' are recorded as management constrains. Overall, farmers those are having small amount of cultivation land, less production of mulberry leaves and hence less income generation which ultimately affect the benefit-cost ratio.

### **Conclusion**

In West Bengal, sericulture is mostly done by small and marginal farmers. These farmers are mostly unable to earn their revenue from their livelihood due to social and management problems. Development initiatives are not enough to strengthen the hands of these small and marginal farmers, resulting a deduction to obtain the most benefits because of those socio-economic and management issues. This research study has been carried out to identify the socio-personal and management factors and sericulture related constrains those are associated with farmer's income. However, based on the findings of this study, if the identified factors can be addressed in terms of income generation, the income of sericulture farmers will increase in the future.

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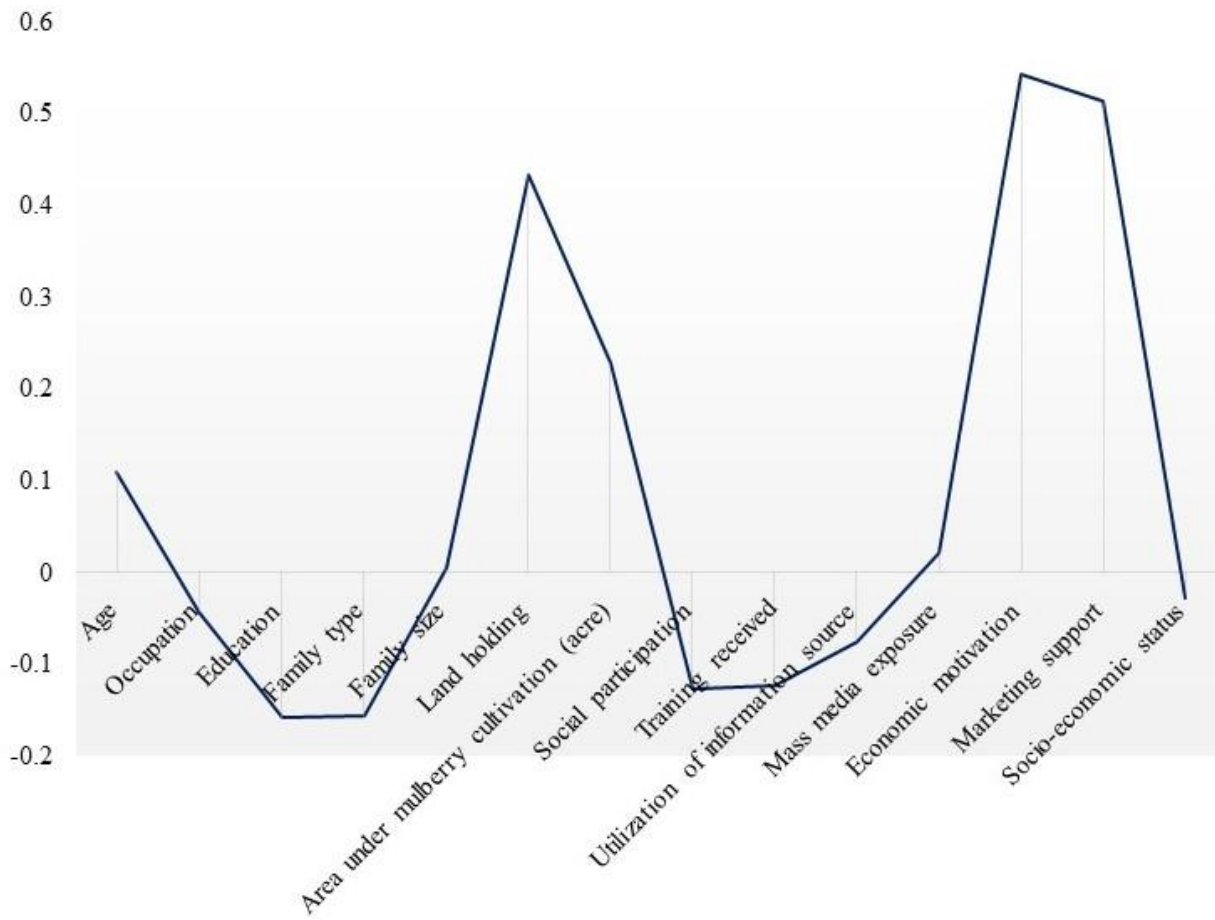
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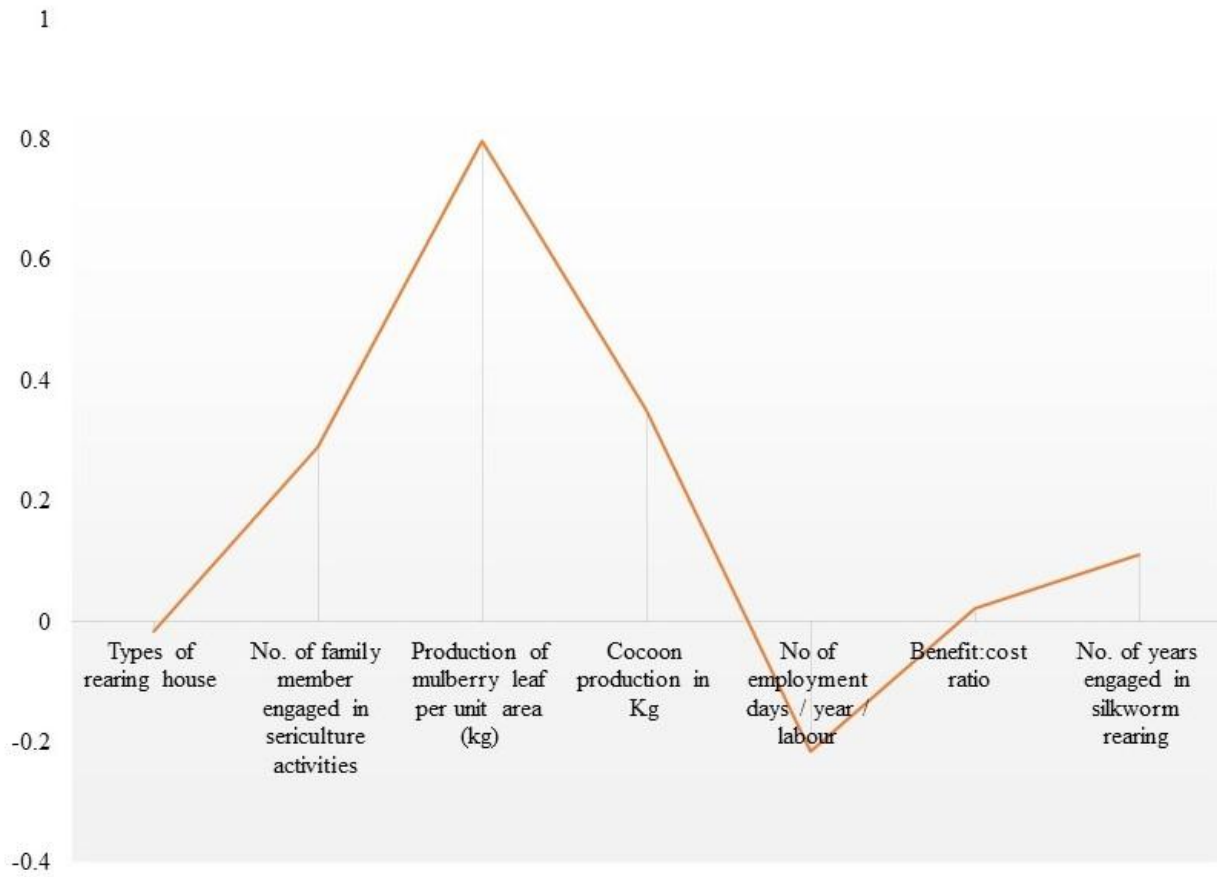
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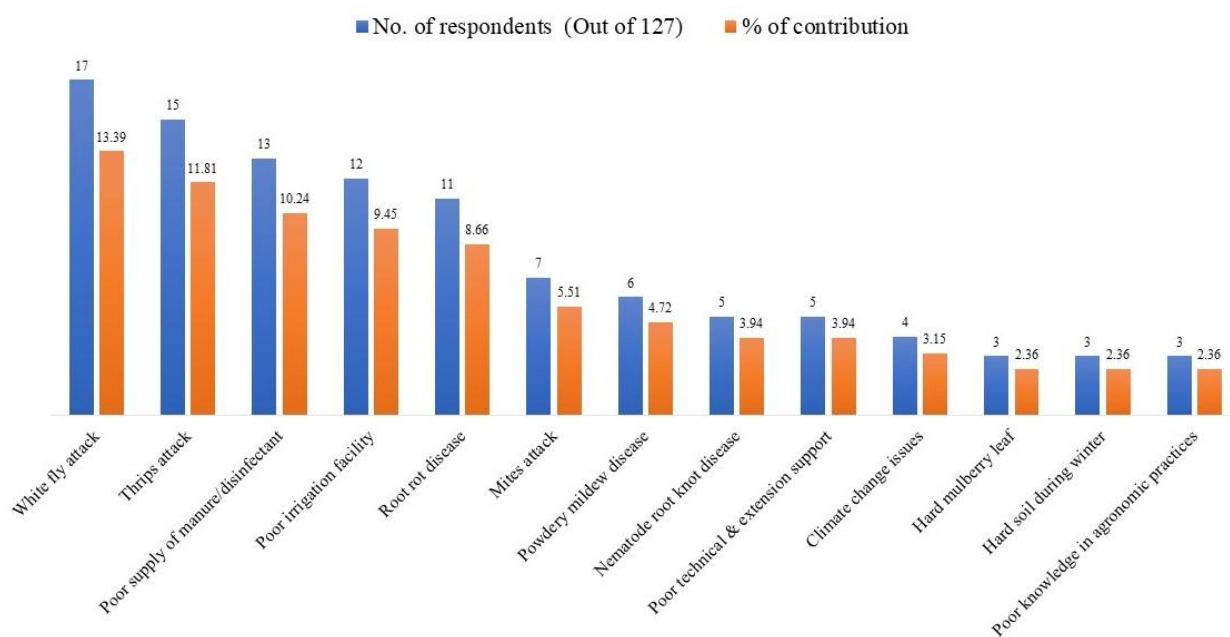
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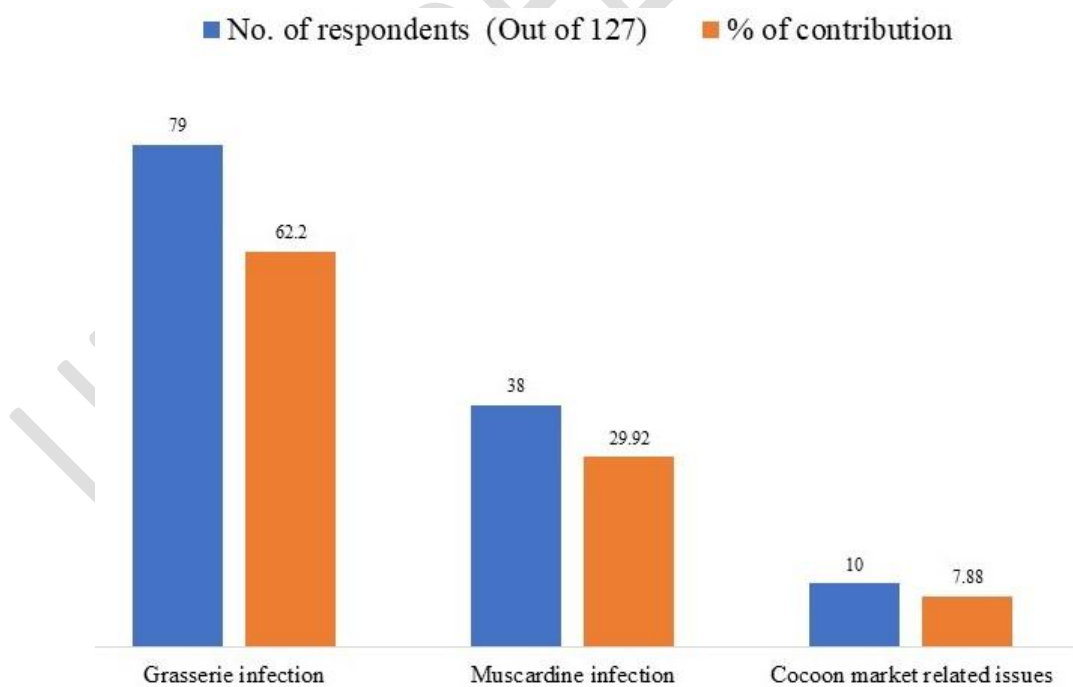
**Fig. 1:** Graphical representation of correlation coefficient (r) values of socio-personal variables ( $x_1$ - $x_{14}$ ) against farmers' income (y).



**Fig. 2:** Graphical representation of correlation coefficient (r) values of management variables ( $x_{14}$ - $x_{21}$ ) against farmers' income (y).



**Fig. 3:** Graphical presentation of identified constrains and % contribution in mulberry production.



**Fig. 4:** Graphical presentation of identified constrains and % contribution in cocoon production.

**Table 1:** Correlation coefficient ( $r$ ) of income ( $y$ ) with the causal variables ( $x_1 - x_{21}$ ).

Sl. no.	Independent variables	Symbol	' $r$ ' value
<i>Socio-personal variables</i>			
1.	Age	$x_1$	0.109
2.	Occupation	$x_2$	-0.043
3.	Education	$x_3$	-0.159
4.	Family type	$x_4$	-0.157
5.	Family size	$x_5$	0.004
6.	Land holding	$x_6$	0.432**
7.	Area under mulberry cultivation (acre)	$x_7$	0.228**
8.	Social participation	$x_8$	-0.128
9.	Training received	$x_9$	-0.123
10.	Utilization of information source	$x_{10}$	-0.076
11.	Mass media exposure	$x_{11}$	0.021
12.	Economic motivation	$x_{12}$	0.541**
13.	Marketing support	$x_{13}$	0.512**
14.	Socio-economic status	$x_{14}$	-0.029
<i>Management variables</i>			
15.	Types of rearing house	$x_{15}$	-0.018
16.	No. of family member engaged in sericulture activities	$x_{16}$	0.288**
17.	Production of mulberry leaf per unit area (kg)	$x_{17}$	0.796**
18.	Cocoon production in Kg	$x_{18}$	0.351**
19.	No. of employment days / year / labour	$x_{19}$	-0.216*
20.	Benefit:cost ratio	$x_{20}$	0.022
21.	No. of years engaged in silkworm rearing	$x_{21}$	0.111

\*\*Correlation is significant at the 1% level.

\*Correlation is significant at the 5% level.

**Table 2.** List of general constrains identified in this study.

Sl. No.	Constrains against mulberry production	No. of respondents (Out of 127)	% of contribution	Rank
1.	Tukra (Mealy Bug) attack	23	18.11	I
2.	White fly attack	17	13.39	II
3.	Thrips attack	15	11.81	III
4.	Poor supply of manure/disinfectant	13	10.24	IV
5.	Poor irrigation facility	12	9.45	V
6.	Root rot disease	11	8.66	VI
7.	Mites attack	7	5.51	VII
8.	Powdery mildew disease	6	4.72	VIII
9.	Nematode root knot disease	5	3.94	IX
10.	Poor technical & extension support	5	3.94	
11.	Climate change issues	4	3.15	X
12.	Hard mulberry leaf	3	2.36	XI
13.	Hard soil during winter	3	2.36	
14.	Poor knowledge in agronomic practices	3	2.36	
Sl. No.	Constrains against cocoon production	No. of respondents (Out of 127)	% of contribution	Rank
1.	Grasserie infection	79	62.20	I
2.	Muscardine infection	38	29.92	II
3.	Cocoon market related issues	10	7.88	III

**Table 3.** List of Socio-personal and management constrains identified for income.

Domain	Socio-personal	Management
Income	<ul style="list-style-type: none"> <li>• Small amount of land holding,</li> <li>• Poor marketing support</li> </ul>	<ul style="list-style-type: none"> <li>• Low rate production of mulberry leaves,</li> <li>• Lower Benefit: cost ratio</li> </ul>