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Studies on Constraints, Knowledge and Adoption Level of Sericulture Technologies in North Western and Western Zones of Tamil Nadu

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The present study was conducted among 200 randomly selected farmers in north western and western zones of Tamil Nadu. The knowledge and adoption level of technologies were analyzed using knowledge and adoption index for both the zones. Knowledge of sericulture technologies in north western and western zones were 77.02 per cent and 91.04 per cent respectively. The linear discriminate analysis revealed that, dfls/ha/year and price of cocoon were the factors highly discriminated the low and high adoption group of farmers. In north western zone, high cost of inputs and non availability of chawki worm centres whereas the main constraints in mulberry production and silkworm rearing, middlemen interference was considered as main constraint in marketing of cocoon. In western zone, non availability and high cost of human labour were considered as the main problem in mulberry cultivation and silkworm rearing. Lack of competitive marketing was the Sericulture technology, major constraint in marketing of cocoons in western zone.

Key words: Sericulture, knowledge coefficient, adoption coefficient, discriminant function, constraints.

India has the unique distinction of being the only country producing all the five known commercial silks, namely, mulberry, tropical tasar, oak tasar, eri and muga, of which muga with its golden yellow glitter is unique and prerogative of India. The raw silk production in India was 18272 MT of which mulberry plantation was 181089 ha during 2011 -2012. The non-mulberry silks especially tasar and eri silks contributed primarily for the growth in the silk production during the last one-decade in India. The mulberry raw silk production grew only at a moderate level primarily due to drastic reduction in area under mulberry in the major silk producing states (Qadri, 2012). Mulberry sericulture is mainly practiced in five states namely Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal and Jammu and Kashmir jointly accounting for about 96 per cent of the total mulberry silk production in the country.

Tamil Nadu occupies a pride of place among the silk producing states of the country. In addition, Tamil Nadu is one of the progressive states of India with great potential for scientific method of mulberry cultivation and silkworm rearing. The state is divided into ten Agro-climatic regions suitable for growing mulberry all around the year. The top silk producing zones include north western zone (Dharmapuri, Krishnagiri, Salem, Namakkal and Permabalur) and western zone (Coimbatore, Tiruppur, Erode, Dindigul and Theni). In terms of mulberry area north western zone contribute 6300.83 hectares and western zone constitute 5378.44 hectare. The total area under mulberry in Tamil Nadu was 14770.10 hectares during 2012-2013 (Department of Sericulture, Salem, Tamil Nadu). The major districts growing mulberry crops in the state are Krishnagiri, Trippur, Erode, Dharmapuri, Dindigul, Namakkal, Salem, Vellore, Theni and Tirunelveli. The zone wise area particulars of mulberry for the year 2012-2013 are presented in Table 1. As mulberry is an important crop in both the zones and also a money spinning enterprise for the farmers in the districts, there is a need to study the knowledge and adoption indices of mulberry cultivation and silkworm rearing. With this view, the present study was undertaken to study the level of adoption of recommended technologies by sericulture farmers and to identify the constraints in mulberry cultivation, silkworm rearing and marketing of cocoons in north western and western zones of Tamil Nadu.

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Materials and Methods

Mulberry cultivation and silkworm rearing were the criteria adopted to identify the knowledge and adoption indices in the two major sericulture zones of Tamil Nadu namely north western and western zone of Tamil Nadu. 100 sericulture famers each from north western and western zone were randomly selected for the study. To collect the responses, survey was conducted in consultation with the officials of the State Department of Sericulture, Government of Tamil Nadu. A specially designed schedule was used for data collection for the period, 2012-2013 by personnel interview with farmers. The data collected were tabulated and inferences were drawn on simple percentage basis. The knowledge and adoption level of 11 mulberry cultivation technologies and 13 silkworm rearing technologies were scored as

full, partial and nil as measured during the personal interview. Possession of complete knowledge was considered as “full”, incomplete knowledge was considered as “partial” and non- possession of knowledge on the technology was considered “nil”. The extent of knowledge and adoption level of recommended technologies were worked out using scoring techniques as suggested by Singhvi *et al*., (1994), Samal (1992) and Vijaykumari and Rajan (2006).

In addition, adoption of the technology as per the recommendations was considered as “full”, deviation from this was considered as “partial” and not adoption was considered as “nil” adoption. The numerical value of 2, 1 and 0 were given to the measured responses of full, partial and nil respectively. The total scores of the farmers for all the technologies were separately worked out. The knowledge and adoption coefficients were calculated by using the formula:

Based on these indices the respondent famers were categorised either as low adopters or high adopters. Various factors associated with these two categories were then analyzed using simple analysis followed by linear discriminant function analysis. The

$$\text{Knowledge coefficient} = \frac{\text{Actual score obtained on knowledge level}}{\text{Total score obtainable}} \times 100$$

$$\text{Adoption coefficient} \quad \frac{\text{Actual score obtained on adoption level}}{\text{Total score obtainable}} \times 100$$

linear discriminant function analysis was used in the current study to evolve the strong determinants for the condition of categories such as low adopters and high adopters of technological practices in sericulture. The following form of linear discriminant function was employed;

$$z = \sum_{i=1}^{p} b1x1 \quad \ldots\ldots (1)$$

Where; Z= Composite discriminant score

X_i = Variables selected to discriminate between the groups and

b_i = Linear discriminate coefficient

The function was constructed by choosing values of b_i’s in such a way that resulting composite score will have maximum utility in distinguishing the two groups. The optional values for the weighing coefficients were determined, such that the difference between the mean score for the two groups will be maximized relative to the variation within the group. The function to be maximized was first defined by Fisher (1936). This is the ratio of “In between groups variance” to “the within group variance”.

$$f(b1,b2\ldots bp) = \frac{n_1 n_2 (b_1 d_1 + b_2 d_2 + \ldots\ldots\ldots\ldots + b_p d_p)^2}{\ldots\ldots\ldots\ldots (2)}$$

$$= \frac{n_1+n_2 \sum_{i=1}^{p} \sum_{j=1}^{n} S_{ij}\, b_i\, b_j}{= (n_1 n_2/n_1+n_2) + (b^1 dd^1 b/b^1 sb) \ldots\ldots\ldots\ldots\ldots\ldots (3)}$$

Where, d_1 = the vector of mean measures. difference on ‘p’ S = within group covariance matrix

bi = unknown weighting coefficients and n_1

and n_2 = the sample size in each group

Maximizing the above function (2) with regard to ‘b_i’ yields a set of ‘p’ equations in ‘p’ unknowns *viz.,*

$b_1S_{11}+b_1 S_{12}+\ldots\ldots\ldots\ldots\ldots\ldots b_pS_{1p} = d_1$

$b_1S_{21}+b_2 S_{22}+\ldots\ldots\ldots\ldots\ldots\ldots b_pS_{2p} = d_2$ and

$b_1S_{n1}+b_1 S_{n2}+\ldots\ldots\ldots\ldots\ldots b_pS_{np} = d_n \ldots\ldots\ldots\ldots$ (4)

This can be solved by using simultaneous equation model

Test of Significance

The discriminant function was tested for significance to examine whether or not the variables considered together were strong enough to discriminate between two groups. This was done by using the following.

$$F = X D_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

$$P (n_1+n_2)(n_1+n_2-$$

2) Where,

D_2 = Mahalanobis statistic given by $d_1S_1d = d_1bi$

p = Number of variables

n_1 = Number of socio-economic and rearing variables in Western Zone

n_2 = Number of socio -economic and rearing variables in North Western Zone

This follows the F distribution with (P) and (n_1+n_2-P-1) degrees of freedom. If the discriminant function is significant, it will be concluded that the function is capable of effective discrimination between the group of farmers being high adopters and group of farmers being low adopters.

Classification of the respondents:

The classification of the groups of farmers in to high adopters and low adopters was done on the basis of Z score of each group.

The Z score for each group was calculated as:

$$Z_1 = \sum_{i=1}^{p} bi \text{ X } 1i \ldots\ldots\ldots \text{Group --- (1)} \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$Z_1 = \sum bi \; X \; 2i$ ……Group --- (2) ……(7)

Where b_i = the discriminant coefficients

X_1 = Mean value of the discriminating variable for each group.

Next, the logical point for classification of groups into "high adopters" and "low adopters" would be to determine the half way between Z_1 and Z_2 score and is defined as

If the Z score of the groups is less than the Zc value, the group is classified as "high adopters" and if it is more towards the centre then it is classified as "low adopters"

$$Z_c = \frac{(Z_1 + Z_2)}{2} \quad \ldots\ldots (8)$$

In addition, the respondents were asked to rank the constraints in mulberry cultivation, silkworm rearing and cocoon marketing. These ranks were converted into percent position by Garrett's rating system (Garrett, 1981).

Where

Rij = Ranks given to the i_{th} constraint by the j_{th} individual

$$\text{Per cent position} = \frac{100 \; X \; (R_{ij} - 0.5)}{N_j}$$

Nj = Number of constraints ranked by the j_{th} individual.

By referring to the Garrett's table, the per cent positions estimated were converted into scores. Thus for each factor the scores of the various respondents were added and the mean values were estimated. The mean values were arranged in descending order. The constraint with the highest mean value was considered as the most important one and the others followed in that order.

Results and Discussion

Knowledge and adoption level of north western zone

The data on knowledge level of mulberry cultivation indices (Table 2) revealed that all of farmers surveyed in north western zone (98%) of possessed complete knowledge on high yielding mulberry variety. About 86 per cent of sample farmers possessed full knowledge on spacing and 78 per cent of them possessed full knowledge on farm yard manure. More than 50 per cent of the sample farmers possessed full knowledge on green manuring, bio-fertilizers, chemical fertilizer, seri-boost and IPM for Tukra. However 32 per cent of farmers had no knowledge on soil testing and 31per cent on drip irrigation.

In respect to full adoption level, 86 per cent of sample farmers used farm yard manure. More than 70 per cent of sample farmers adopted chemical fertilizers, high yielding mulberry variety and spacing. About 64 per cent of sample farmers had no knowledge on green manuring. A sincere effort of the extension agencies in improving adoption of

Table 1. Area under mulberry production in Tamil Nadu (2012-2013)

S.No.	District	Mulberry Area (ac)
	North western zone	
1	Krishnagiri	7553.25
2	Dharmapuri	3412.75
3	Salem	2032.05
4	Namakkal	2470.00
5	Perambalur	95.20
	Western zone	
1	Coimbatore	1381.50
2	Tiruppur	3827.70
3	Erode	3741.30
4	Dindigul	2804.10
5	Theni	153.15

Source: Department of Sericulture, Salem, Tamil Nadu (2012)

recommended dose of FYM would go a long way in the improvement of mulberry variety in north western zone. Majority of the sample farmers in north western zone were very conscious of the necessity of farm yard manure and mulberry variety. As a result, majority of the farmers (98 %) had complete knowledge on mulberry variety and also majority of them (76 %) adopted fully and 14 per cent the farmers adopted partially the recommended practices.

The knowledge and adoption level in silkworm rearing technologies in north western zone of Tamil Nadu was also worked out (Table 3). In north western zone, majority of the sample farmers had knowledge on shoot rearing and silkworm race. With respect to adoption level, more than 70 per cent of sample farmers adopted improved silkworm race and shoot rearing. Majority of the sample farmers (80 %) possess full knowledge on silkworm race and shoot rearing. The sample farmers to an extent of 60 per cent possessed full knowledge on rearing room, incubation, bed spacing, hygiene, temperature and humidity, room disinfection, bed disinfection and bed cleaning whereas 70 per cent of the sample farmers partially adopted IPM for Uzi fly.

Knowledge and adoption level of western zone

In western zone all the sample farmers possessed full knowledge on mulberry variety, spacing and farm yard manure. Though the farmers possessed full knowledge on farm yard manure, 8 per cent did not applied FYM (Table 2). Srinath *et al.* (2011) reported that 100 per cent of farmers had good knowledge and 67 to 72 per cent farmers fully adopted the technologies like farm yard manure application. In respect of IDM for root rot (60 %), IPM for Tukra (58%), bio fertilisers (56%) and green manuring (54 %) of the farmers possessed no adoption. Only few sample farmers had no knowledge on Seri-boost and soil testing. This is in consonance with the finding of Deepa and Sujathamma (2007). In addition the adoption level for soil testing is 10 per cent and Seri-boost is 12 per cent.

The knowledge and adoption on silkworm rearing technology data revealed that 100 per cent of sample farmers had both knowledge and adoption on silkworm race, rearing house, shoot rearing, room disinfection, incubation, black boxing and improved mountages. This is in consoance with the finding of

Table 2. Knowledge and adoption levels in mulberry cultivation technologies in Western and North Western Zones of Tamil Nadu

S.No.	Technology	North Western Zone (n=100)						Western Zone (n=100)					
		Knowledge level (%)			Adoption level (%)			Knowledge level (%)			Adoption level (%)		
		Full	Partial	No	Full	Partial	No	Full	Partial	No	Full	Partial	No
1	Soil testing	20	48	32	8	46	46	54	38	8	46	44	10
2	Mulberry variety	98	2	-	76	14	10	100	-	-	100	-	-
3	Spacing	86	14	-	72	18	10	100	-	-	100	-	-
4	Drip irrigation	44	25	31	19	24	57	96	4	-	84	16	-
5	FYM	78	22	-	86	14	-	100	-	-	92	8	-
6	Green manuring	60	28	12	16	20	64	92	8	-	56	24	54
7	Bio-fertilizer	56	30	14	28	45	27	86	10	4	16	28	56
8	Chemical fertilizer	56	38	6	78	22	-	92	8	-	84	16	-
9	Seri-boost	56	36	8	21	28	51	84	12	4	56	32	12
10	IPM for Tukra	50	38	12	10	36	54	42	38	20	14	28	58
11	IDM for Root rot	46	44	10	8	34	58	36	40	24	12	28	60

Krishnamoorthy and Radhakrishnan (2012).

Though the farmers in western zone were possessing full knowledge on bed cleaning, majority of the farmers to an extent of 56 per cent did not adopt bed cleaning. The reasons cited by the sample farmers were non availability of human labour (Table 3). In western zone area 100 per cent of the sample farmers possessed full knowledge on silkworm race, separate rearing house, shoot rearing, room disinfection, incubation, black boxing, bed spacing, bed cleaning and improved mountages. The necessity of cleaning did not arise as they provided enough bed space in order to keep the bed dry, the frequent application of the lime powder facilitated quick drying of the bed, the high wind flow that usually prevalent in the area quickened the drying of bed. This is in consoance with the finding of Krishnamoorthy and Radhakrishnan (2012).

Table 3. Knowledge and adoption levels in silkworm rearing technologies in Western and North Western Zones of Tamil Nadu

S.No.	Technology	North Western Zone (n=100)						Western Zone (n=100)					
		Knowledge level (%)			Adoption level (%)			Knowledge level (%)			Adoption level (%)		
		Full	Partial	No	Full	Partial	No	Full	Partial	No	Full	Partial	No
1	Silkworm race	80	20	-	84	16	-	100	0	0	100	0	0
2	Rearing house	76	24	-	66	18	16	100	0	0	100	0	0
3	Shoot Rearing	80	20	-	70	8	22	100	0	0	100	0	0
4	Room Disinfection	64	32	4	64	28	8	100	0	0	100	0	0
5	Incubation	66	30	4	60	30	10	100	0	0	100	0	0
6	Black Boxing	62	32	6	60	34	6	100	0	0	100	0	0
7	Bed Spacing	66	24	10	64	30	6	100	0	0	82	18	0
8	Bed Disinfection	64	28	8	64	28	8	86	14	0	72	28	0
9	Hygiene	66	24	10	64	26	10	86	14	0	62	38	0
10	Bed Cleaning	64	26	10	60	40	-	100	0	0	14	30	56
11	Temperature & Humidity	66	24	10	50	30	20	78	22	0	42	58	0
12	Improved Mountages	62	32	6	66	34	-	100	0	0	100	0	0
13	IPM for Uzi fly	40	44	16	14	70	16	48	22	30	16	56	26

Knowledge and adoption coefficient of sericulture technologies in north western zone and western zone

The importance of any technology depends on knowledge and adoption level of the technologies by the farmers. The results on knowledge and adoption indices of mulberry cultivation technology are given in Table 4. The knowledge coefficient of sericulture technologies (mulberry cultivation and silkworm rearing) of the sample farmers in north western zone and western zone were worked out to be 77.02 per cent and 91.04 per cent respectively. In north western zone the farmers were more literate, receptive and hence they acquired appreciably high knowledge. The adoption coefficient of sericulture technologies of the farmers of north western zone and western zone were 64.77 per cent and 78.08 per cent respectively. In addition, the knowledge and adoption indices of silkworm rearing technologies were higher than that of mulberry cultivation technologies in both the areas. This is in consonane with the findings of Krishnamoorthy and Radhakrishnan (2012) . The results revealed that the farmers of western zone were found to be more knowledgeable and their adoption of sericulture technologies was found to be higher when compared to the farmers of north western zone.

Table 4. Knowledge and adoption coefficient of sericulture technologies

Zones	Knowledge coefficient (%)			Adoption coefficient (%)		
	Mulberry cultivation technologies	Silkworm rearing technologies	Sericulture technologies	Mulberry cultivation technologies	Silkworm rearing technologies	Sericulture technologies
North western zone	73.86	79.69	77.02	52.05	75.54	64.77
Western zone	86.45	94.92	91.04	70.18	84.77	78.08

Discriminating socio-economic factors between the farmers of two zones

The results obtained through the analysis using linear discriminant function, revealed that the variables dfls/ha/year, price of cocoons/kg, were found to be the strong determinants contributing to an extent of 51.97 per cent and 24.40 per cent for discriminating the two groups of farmers one with

"High" and the other with "Low" adoption index (Table 5). In the case of north western zone the intensity of operation is less when compared to western zone. The average number of silkworm batches is five. Further the practice of the farmers to adopt the chawki reared worms is yet to pick up in north western zone. The traditional feeling of the farmers to have limited number of batches deterred them from taking up more number of silkworm crops/batches. Thus through the analysis it could be concluded that the dfls/ha/ year was found to be the major discriminating factor between the two group of farmers of western zone and north western zone.

Table 5. Factors Discriminating two groups of farmers in Western Zone and North Western Zones of Tamil Nadu

Factors	Coefficient (b_i)	Group Mean difference ($d_1 - d_2$)	b ($d_{i\ 1}$ $-d_2$)	% of contribution
Age	-0.0013	48.73	-0.07	-0.45
Education	0.0326	7.14	0.23	1.60
Family size	-0.0933	7.38	-0.69	-4.74
Land holding	0.0132	2.94	0.04	0.27
Mulberry area	-0.0542	0.64	-0.03	-0.24
Dfls/ha/year	0.0024	3159.18	7.56	51.97
Cocoon yield/kg/ha/year	0.0011	2095.54	2.36	16.21
Price of cocoon/kg	0.0117	303.67	3.55	24.40
Experience	-0.0119	14.05	-0.17	-1.15
Training	-0.0439	0.67	-0.03	-0.20
Extension contacts	0.1548	4.09	0.63	4.35
Extension participation	0.1446	3.97	0.57	3.94
Mass media participation	0.0985	2.70	0.27	1.82
Social participation	0.1169	2.77	0.32	2.22

D_2 = 13.93; Calculated F = 298.934*; Wilks' lambda = 0.209.

The dfls/ha/year factor contributed to 51.97 per cent and emerged as the strong determinant of high adopting group. The other important variable which contributed for the discrimination was price of the cocoons/kg. It could be seen from the data that the farmers of western zone reared bivoltine hybrid silkworm rearing and the rate obtained for the bivoltine hybrid cocoons was much higher in the market when compared to the price of the multivoltine cocoons. The average price of the bivoltine hybrid cocoons was ₹ 325.05/kg. Hence, the bivoltine hybrid silkworm rearing pushed the price of the cocoons which indirectly acted as a discriminatory factor. In the case of north western zone majority of the farmers reared multivoltine cocoons. The multivoltine cocoons fetched lesser price in the market. The average price was ₹ 267.38/kg. Thus, the price of the cocoons discriminated to an extent of 24.40 per cent between the two groups of farmers.

The other discriminatory factor to a lesser extent was cocoon yield/kg/ha/year contributed to 16.21 per cent. The other socio-economic factors like education, extension contacts, extension participation, mass media participation and social participation were also contributory for discriminating the two groups to a very meagre percentage level. Kumaresan and Geetha Devi (2009) reported that more education and high extension contacts significantly discriminated the farmers for the adoption of separate silkworm rearing houses.

The included variables in the discriminant function effectively discriminated the two groups. The D_2 and F-ratio calculated were 13.93 and 298.934 respectively. Wilk's lamda was used as the test of mean difference was found to be 0.209. The smaller the lamda indicated that the groups means differ with each other hence, the analysis of group were found to be different.

The discriminant score of high adoption participation (Z_1) was calculated by dividing the mean values of significant characteristics by their respective standard deviations and then multiplying these weighted values with their respective coefficients and adding them. Similarly the discriminant score for low adoption (Z_2) was also calculated. The critical score (Z) for these two groups were worked out. Based on the score obtained the proportion of group farmers rightly classified by the function was ascertained. It was found that 98 per cent of the group farmers were rightly classified. This is in consonance with the findings of Jayaram and Indumati (2010) when reported that 94 per cent of the farmers were rightly classified. Hence, the model is found to be valid to predict whether a person is likely to be in a "High" or "Low " group.

Table 6. Constraints faced by mulberry growers in cultivation

S. No.	Mulberry cultivation	North Western zone Percentage	Rank	Western zone Percentage	Rank
1.	Non-availability of human labours and high cost	58.65	II	65.15	I
2.	High cost of inputs	63.85	I	57.85	II
3.	Non availability of high yielding saplings	46.85	III	47.20	III
4.	Depleting ground water and scarcity of water	38.25	V	33.98	IV
5.	Pest and disease	44.00	IV	21.82	V

Constraints faced by sericulture farmers in north western zone and western zone

Information on constraints in mulberry production, silkworm rearing and marketing of cocoons as expressed by the sericulturists were ranked using Garrett's ranking technique for north western zone and western zone and result is showed below (Table 6, 7 & 8).

Table 7. Constraints faced in silkworm rearing

Silkworm Rearing	North Western zone Percentage	Rank	Western zone Percentage	Rank
Non-availability of human labours and high cost	45.81	IV	61.81	I
Chawki worms centre	52.04	I	43.11	III
High cost of inputs	50.82	II	53.38	II
Awareness of latest technology	47.18	III	26.90	IV

North western zone

The farmers expressed that the high cost of the inputs was the most important problem (63.85) followed by non-availability of human labours and high cost of the wages (58.65) were identified in the mulberry cultivation. The farmers in the study area faced four major problems in the silkworm rearing.

Table 8. Constraints faced in market mig

Market	North Western zone Percentage	Rank	Western zone Percentage	Rank
Middle man interference	51.72	I	53.58	II
Grading of cocoons	50.34	II	47.50	III
Fluctuation in cocoon price	46.13	IV	45.81	IV
Lack of completive marketing	47.98	III	55.00	I

The most important constraint was non availability of chawki worms centre (52.04) followed by high cost of inputs (50.82). As regard to marketing of cocoons four major constraints were identified. The producers expressed that the middle men interference (51.72) was the major constraint faced by the farmers followed by grading of the cocoons (50.34).

Western zone

The farmers expressed that the non-availability of human labours and high wages was the most important problem (65.15) in the mulberry production. The major constraint identified by the sample famers in silkworm rearing was non-availability of human labours and high wages (61.81). With regards to marketing of cocoons, lack of competitive marketing (55.00) and middle men interference (53.58) were the constraints identified by the sample famers.

The knowledge and adoption levels of the sericulture technologies was more in a socially sensitized area in western zone than north western zone. In western zone, the knowledge and adoption level of technologies, especially mulberry variety , spacing, silkworm race, rearing house, shoot rearing, room disinfection, incubation, black boxing and improved mountages were appreciable. Though north western zone is a traditional area, the adoption level of above technologies was found to be encouraging. However, on the other hand, majority of the sample farmers in north western zone were yet to adopt bivoltine race silkworm. Hence there is a dire need to motivate the farmers by extension agencies to conduct demonstration so as to instill confidence in them.

The overall results obtained through the analysis with a linear discriminant function in the current study clearly indicated that socio economic variables discriminated the farmers in to high level and low level adopters of technologies in sericulture. The dfls/ha/ year and price of cocoon were found to be one of the major determinants of adoption of technologies and thereby the rate of investments in sericulture. Constraints faced by the Sericulturists expressed was non availability of human labour and high cost of wages, non-availability of chawki worm centres and middlemen interference were the main problems in mulberry cultivation, silkworm rearing and marketing of cocoons. The possible reasons for non availability of human labour and high cost of wages as most of the labour in the area were more willing to work under Mahatma Gandhi National Rural Employment Guarantee Scheme.

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