International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(4): 1610-1614

Received: 01-05-2020
Accepted: 05-06-2020

Kiran Lata
Ph.D., Scholar, Division of Agricultural Economics & ABM, SKUAST-J, Chatha, Jammu and Kashmir, India

Jyoti Kachroo
Professor & Head, Division of Agricultural Economics & ABM, SKUAST-J, Chatha, Jammu and Kashmir, India

Manish KR Sharma
Professor & Head, Division of Statistics & Computer Science, SKUAST-J, Chatha, Jammu and Kashmir, India

SP Singh
Assistant Professor, Division of Agricultural Economics & ABM, Chatha, Jammu and Kashmir, India

Kamlesh Bali
Associate Professor, Division of Sericulture, SKUAST-J, Chatha, Jammu and Kashmir, India

Moni Gupta
Associate Professor, Division of Biochemistry, Chatha, Jammu and Kashmir, India

Corresponding Author:
Kiran Lata
Ph.D., Scholar, Division of Agricultural Economics & ABM, SKUAST-J, Chatha, Jammu and Kashmir, India

An economic assessment of sericulture enterprise in rain-fed areas of Jammu region

Kiran Lata, Jyoti Kachroo, Manish KR Sharma, SP Singh, Kamlesh Bali and Moni Gupta

DOI: https://doi.org/10.22271/chemi.2020.v8.i4p.9839

Abstract
The study conducted in the Jammu region of J&K state has investigated the economics of sericulture farming in three districts namely, Kathua, Rajouri and Udhampur by taking 270 silkworm rearers, 90 from each district through primary survey during the year 2017-18. The study has revealed that sericulturists of Kathua district incurred highest establishment cost per acre (₹ 14099.96) for the mulberry garden followed by Udhampur (₹ 13216.29) and Rajouri (₹ 12948.81) with overall average as ₹ 14007.70. Human labour, saplings, machine labour, farm yard manure (FYM) and fertilizers has been found to be the important components comprising the total cost of which human labour contributed the most towards the total cost followed by expenditure on saplings. Highest maintenance cost per acre per year for mulberry garden has been found to be borne by the sericulturists of Udhampur district (₹ 4872.88) followed by Kathua (₹ 4480.14) and Rajouri (₹ 4441.61) with overall average as ₹ 4685.52. Of the two components (manures and manuring and fertilizers and its application) comprising the total maintenance cost, manures and manuring contributed more towards the total cost as compared to that of fertilizers and its application. The cost incurred per ounce for cocoon production has been found to be highest in Kathua district (₹ 8953.03) followed by Rajouri (₹ 8760.36) and Udhampur (₹ 8262.77) with overall average as ₹ 8756.23. Variable cost has been the major component of the total cost and among the various items constituting the variable cost, the highest share has been found to be of human labour followed by leaf cost, transportation and marketing and cost of disease free layings in the study area. The rearers of Udhampur district (₹ 23940.00) earned highest income followed by Rajouri (₹ 23268.60) and Kathua (₹ 23063.33) with overall average as ₹ 23865.00. Furthermore, the results revealed highest benefit cost ratio in Udhampur district (2.90) followed by Rajouri (2.66) and Kathua (2.58) with overall average as 2.73. Garrett's Ranking technique highlighted non-availability of shed, price variation, poor quality of seed, crop damage, delayed marketing of the produce and non-possession of required number of rearing kits as the major constraints related to cocoon production. The study suggested for provision of good quality seed, organizing departmental vans for transporting cocoons, exclusive development in the source of mulberry foliage by putting more area under bush type mulberry plants, introduction of price control measures (like MSP) for stabilizing the cocoon prices, and above all improvement in extension services as it is a pre-requisite for the progress and success of sericulture enterprise.

Keywords: Sericulture, cocoons, income, benefit cost ratio, extension services

Introduction
India is predominantly an agrarian economy as evident from the fact that half of its population is directly or indirectly dependent on agriculture for their livelihood (Anonymous, 2017) [1]. Further, about 70 per cent of India's population resides in rural areas and more than 40 per cent of rural population still lives below the poverty line (Hosali and Murthy, 2015) [6]. In India, rapid increase in the population has resulted in decreased agricultural land holding size. The small size holdings by a large proportion of farmers' in the absence of alternative sources of income is considered as one of the main factors of rural poverty and hindered agricultural growth. Also, the agriculture sector is confronted with a number of factors such as limited land availability, limited cash returns and is confined to one or two seasons in a year that limits its potential for generating new jobs in rural areas and thus pushes villages to look for supporting rural industries like sericulture, apiculture, poultry and dairying. Concerning this issue, the establishment of rural based industries like sericulture can be an efficient tool in creating new job opportunities as well as providing supplemental income to landless farmers, entrepreneurs

and artisans throughout the year. Such an enterprise is highly suitable to highly populous countries like India where large number of rural people are jobless, landless and abundant labourers. Sericulture, rightly known as "Industry of the poor" is both an art and science of raising silkworms for silk production and has turned out to be a highly remunerative enterprise and promising rural industries because of its unique characteristics of being eco-friendly, agro-based, labour intensive, short gestation period, capacity to develop into a family enterprise with low capital investment, high output and reasonably good assured returns (Singh, 1994) [8]. Sericulture has gained a special place among the agro-based cottage industry of our country.

Asia is the main producer of silk in the world contributing 95 per cent of the total global output, bulk of which comes from China and India. China has come up as the world's single biggest producer and chief supplier of silk to the world markets while India ranks second with respect to silk production having a share of about 15.49 per cent in the global production (Rattan, 2016) [7]. India is the only country in the world that can produce all the four commercially known varieties of silk namely, Mulberry, Eri, Tasar, and Muga with an advantage of practicing sericulture all through the year, thus, yielding a stream of about 4-6 crops due to its tropical climate. Due to the prevalence of favourable climatic conditions, mulberry is cultivated mainly in five states of the country namely, Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Jammu and Kashmir called as traditional sericulture states that jointly account for about 97 per cent of each mulberry silk production as well as area under mulberry cultivation. Among these traditional sericulture states Karnataka is the principal silk producing state which accounts for about 58 per cent of the total mulberry raw silk production in the country (Bhat, 2014) [3]. The non-traditional sericulture states include Arunanchal Pradesh, Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Maharashtra, Madhya Pradesh, Uttar Pradesh, Uttaranchal, Manipur, Meghalaya, Tripura, Mizoram, Nagaland, Sikkim and Orissa.

Sericulture is one of the traditional occupations of Jammu and Kashmir that has assumed special significance as subsidiary occupation. Having potential to generate attractive income it supplements the income of the famers in addition to their returns from other crops as it integrates well with the farming systems and thus plays a very important role in the rural development. Several socio-economic studies have affirmed that the benefit-cost ratio in sericulture is highest among comparable agricultural crops (Ganghopadhyay, 2008) [4]. It helps in improving the economic condition of the landless farmers and weaker sections of the society as most of the families engaged with this venture belong to economically backward sections of the society like scheduled castes, schedule tribes and adivasis. It is practiced in 20 districts of the state out of which major silk producing districts are Anantnag, Kupwara, Pulwama, Baramula, Ganderbal, Udhampur, Rajouri, Reasi and Kathua. About 30455 families in the state are engaged with this venture producing about 973 MTs of silk cocoons and generating an income of about ₹ 2224 lakh (Anonymous, 2016) [2]. With this background, the present study was undertaken with the following objectives:

- To estimate the costs and returns from sericulture production.
- To identify the constraints in sericulture production.

Study Area and Methodology

Multi-stage sampling technique was adopted for accomplishing the objectives of the study. At the first stage, three districts namely Kathua, Rajouri and Udhampur were purposively selected based on highest number of silkworm rearers and cocoon production as the sericulture has flourished well in these districts of Jammu region. Then, two development blocks from each selected district were selected purposively based on same criteria. Further, three villages from each selected block were selected randomly and at the final stage, 270 silkworm rearers (15 from each village, 45 from each block and 90 from each selected district) were randomly selected and interviewed using pre-tested schedule during the year 2017-18.

Analytical Procedure

Computation of costs and returns

For the computation of costs and returns, various cost concepts framed by CACP were used and the input items included under each category of cost are indicated below:

Cost A_1 = Hired human labour, hired and owned bullock labour, hired and owned machine labour, value of farmyard manure, value of chemical fertilizers, Irrigation, value of plant protection, land revenue, depreciation charges, value of seed (DFLs), value of disinfectants, interest on working capital, other miscellaneous cash expenses.

Cost A_2 = Cost A_1 + rental value of leased in land

Cost B_1 = Cost A_2 + interest on fixed capital

Cost B_2 = Cost B_1 + rental value of owned land

Cost C_1 = Cost B_1 + imputed value of family labour

Cost C_2 = Cost B_2 + imputed value of family labour

Garrett's Ranking Technique

The constraints and problems faced by the silkworm rearers in silkworm rearing and cocoon production were analyzed using Garrett's ranking technique (Garrett and Woodworth, 1969). The ranks given by each respondent were converted into per cent position by using the formula:

$$\text{Per cent position} = \frac{100*(Rij-0.5)}{Nj}$$

Where

R_{ij} = Rank given to i^{th} constraint by the j^{th} individual, and

N_j = Number of constraints ranked by the j^{th} individual

The estimated per cent positions were converted into scores using Garrett's table. The mean score values estimated for each factor were arranged in the descending order. The constraint with the highest mean score was considered as the most important one and others followed that order.

Results and Discussion

Cost structure of sericulture farming in selected districts of Jammu region

Establishment cost of Mulberry Garden

The operation wise establishment cost of mulberry garden (Table 1) indicated that the sericulturists of Kathua district incurred highest cost (₹ 14099.96) followed by Udhampur (₹ 13216.29) and Rajouri (₹ 12948.81) with overall average as ₹ 14007.70. The expenditure on human labour, planting material, machine labour and farm yard manure (FYM) were observed to be the important components among the various

items that constituted the total cost. Human labour was the major component of the total cost for which the highest figure was observed in Kathua (₹ 4520.51) and lowest in Rajouri (₹ 3808.00) with overall average as ₹ 4374.95. The next highest share was found to be of planting material and was found highest for Kathua (₹ 3380.56) again and lowest in Udhampur (₹ 2960.00) with overall average as ₹ 3255.00. The next important component i.e. expenditure on farm yard manure was recorded highest in Udhampur (₹ 2368.41) and lowest in Rajouri (₹ 2078.84) with overall average as ₹ 2225.84.

Maintenance cost of Mulberry Garden

The per year maintenance cost of mulberry garden (Table 2) revealed that the total maintenance cost was highest in Udhampur (₹ 4872.88) followed by Kathua (₹ 4480.14) and Rajouri (₹ 4441.61) while overall average turned out to be ₹ 4685.52. Of the total maintenance cost, the higher contribution was of manures and mannuring towards the total cost rather than fertilizers and its application. Maintenance cost among the selected districts was noticed highest in Udhampur (₹ 3168.41) and lowest in Rajouri (₹ 2878.84) with overall value as ₹ 3025.84 while the expenditure on fertilizers and its application was ₹ 1212.45, ₹ 1265.67 and ₹ 1289.85 in Kathua, Rajouri and Udhampur, respectively with overall average as ₹ 1261.00.

Cost of Silkworm Rearing

The per ounce cost structure of cocoon production (Table 3) revealed that the rearers of Kathua district incurred highest cost (₹ 8953.03) followed by Rajouri (₹ 8760.36) and Udhmampur (₹ 8262.77) with overall average as ₹ 8756.23. Of the two components comprising the total cost (i.e. fixed and variable cost), variable cost was the major component which constituted 85.26, 85.10 and 85.80 per cent while the fixed cost constituted 14.73, 14.90 and 14.19 per cent in Kathua, Rajouri and Udhampur, respectively. However, at overall level the variable and fixed cost constituted 85.75 per cent and 14.24 per cent, respectively. Among the various items comprising the variable cost, the highest share was of human labour followed by leaf cost, transportation and marketing and cost of disease free layings (DFLs). Human labour contributed 54.17, 51.53, 53.13 and 52.48 per cent towards total cost in Kathua, Rajouri, Udhampur and at overall level, respectively while the leaf cost constituted 13.92, 15.86, 14.29 and 15.84 per cent in Kathua, Rajouri, Udhampur and at overall level, respectively. The next important component in the list was transportation and marketing of cocoons the share of which was found to be 6.88, 7.26, 7.49 and 7.09 per cent to the total cost in Kathua, Rajouri, Udhampur and at overall level, respectively.

Concept wise Costs and Profits from Cocoon Production

The cost distribution of cocoon production along with the profits from silkworm rearing in the study area (Table 4) depicted that the highest cocoon yield was obtained by the rearers of Udhampur district (25.20 kgs) followed by Rajouri (25.02 kgs) and Kathua (24.93 kgs) with overall average yield as 25.08 kgs. Also the gross income was found to be highest in Udhampur (₹ 23940.00) and lowest in Kathua (₹ 23063.33) while the overall gross income was found to be ₹ 23865.00. The concept wise analysis of costs revealed that cost A_1 and A_2 were worked out to be same as no rearer was found leasing in land. Cost A was found highest in Rajouri (₹ 4129.50) and lowest in Udhampur (₹ 3768.02) with overall average as ₹ 4038.77. Similarly cost B_1 and B_2 were found same as none of the rearer was found leasing out the land and was observed to be highest for Rajouri (₹ 4245.98) and lowest for Udhampur (₹ 3872.71) with an overall average of ₹ 4150.10. Again, cost C_1 and C_2 were noticed to be same and was highest in Kathua (₹ 8953.03) and lowest in Udhampur (₹ 8262.77) with overall average as ₹ 8745.22. The income over various cost concepts indicated that net returns over cost A were highest in Udhampur (₹ 20171.98) and lowest in Kathua (₹ 19073.22) with an overall average of ₹ 19826.23. The same pattern was observed for returns over cost B i.e. highest in Udhampur (₹ 20067.29) while lowest in Kathua (₹ 18959.93) with overall average as ₹ 19714.90. The returns over cost C were observed to be ₹ 14110.30, ₹ 14508.24 and ₹ 15677.23 in Kathua, Rajouri and Udhampur with overall average figure as ₹ 15119.78.

The return per rupee investment or the benefit cost ratio over cost A was observed to be highest in Udhampur (6.35) and lowest in Rajouri (5.63) with 5.91 as overall average. Furthermore, the returns over cost B were observed to be highest in Udhampur (6.18) and lowest in Rajouri (5.48) with overall average as 5.75. However, over cost C the returns were observed highest in Udhampur (2.90) while lowest in Kathua (2.58) with the figure at the overall level as 2.73.

Table 1: Establishment cost of mulberry garden in selected districts of Jammu region (₹/acre)

Sr. No.	Particulars	Kathua	Rajouri	Udhampur	Overall
i)	Human labour (family)	4520.51	3808.00	3808.78	4374.95
ii)	Machine labour	2100.23	2059.52	2064.71	2098.45
iii)	Saplings/Planting material	3380.56	3035.00	2960.00	3255.00
iv)	FYM	2086.49	2078.84	2368.41	2225.84
v)	Fertilizer	812.45	865.67	889.85	861.00
vi)	Interest on working capital	1199.72	1101.77	1124.53	1191.817
	Total	14099.96	12948.81	13216.29	14007.10

Table 2: Per year maintenance cost of mulberry garden in selected districts of Jammu region (₹/acre)

A.	Maintenance cost (2nd year onwards)	Kathua	Rajouri	Udhampur	Overall
i)	Mannures and mannuring	2886.49	2878.84	3168.41	3025.84
ii)	Fertilizers and its application	1212.45	1265.67	1289.85	1261.00
iii)	Interest on working capital	381.20	297.10	414.62	398.68
	Total	4480.14	4441.61	4872.88	4685.52

Table 3: Cost structure of cocoon production in selected districts of Jammu region (₹/ounce)

Sr. No.	Items	Kathua	Rajouri	Udhampur	Overall
1.	**Fixed cost**	1319.22	1305.05	1172.96	1247.30
i)	Depreciation on rearing house and equipments	1205.93	1188.57	1068.27	1135.97
ii)	Interest on fixed capital	113.29	116.48	104.69	111.32
2.	**Variable cost**	**7633.81**	**7455.31**	**7089.81**	**7508.93**
i)	Human labour (family)	4849.63	4514.38	4390.06	4595.12
ii)	Leaf cost*	1246.10	1389.70	1180.83	1386.53
iii)	Disease free layings (DFLs)	448.80	450.36	453.60	451.48
iv)	Disinfectants	240.03	250.16	223.11	230.02
v)	Waste newspaper	59.60	59.84	57.36	58.91
vi)	Coal	145.38	126.87	139.29	137.85
vii)	Transportation and marketing	615.98	636.36	619.29	621.23
vii)	Interest on working capital	28.29	27.63	26.28	27.79
	Total cost	**8953.03**	**8760.36**	**8262.77**	**8756.23**

Note: * Includes both imputed and purchased value of leaves

Table 4: Distribution of costs and measure of profits from sericulture/silkworm rearing in selected districts of Jammu region (₹/ounce)

Items	Kathua	Rajouri	Udhampur	Overall
Yield (kg)	24.93	25.02	25.20	25.08
Gross Income	23063.33	23268.60	23940.00	23865.00
Cost (₹/ounce)				
Cost A1	3990.12	4129.50	3768.02	4038.77
Cost A2	3990.12	4129.50	3768.02	4038.77
Cost B1	4103.41	4245.98	3872.71	4150.10
Cost B2	4103.41	4245.98	3872.71	4150.10
Cost C1	8953.03	8760.36	8262.77	8745.22
Cost C2	8953.03	8760.36	8262.77	8745.22
Net Income over above cost concepts (₹/ounce)				
Cost A1	19073.22	19139.10	20171.98	19826.23
Cost A2	19073.22	19139.10	20171.98	19826.23
Cost B1	18959.93	19022.62	20067.29	19714.90
Cost B2	18959.93	19022.62	20067.29	19714.90
Cost C1	14110.30	14508.24	15677.23	15119.78
Cost C2	14110.30	14508.24	15677.23	15119.78
Benefit cost ratio				
Cost A1	5.78	5.63	6.35	5.91
Cost A2	5.78	5.63	6.35	5.91
Cost B1	5.62	5.48	6.18	5.75
Cost B2	5.62	5.48	6.18	5.75
Cost C1	2.58	2.66	2.90	2.73
Cost C2	2.58	2.66	2.90	2.73

Constraints faced by silkworm rearers (Garrett's Ranking Technique)

The constraints faced by the sample silkworm rearers of Kathua, Rajouri and Udhampur district were ranked using Garrett's Ranking technique which highlighted about twenty constraints regarding cocoon production in the study area. The major constraints in Kathua district were non-availability of shed, price variation, poor quality of seed, crop damage and non-possession of required number of rearing kits. Similarly, in Rajouri the ranking of various constraints revealed non-availability of shed, crop damage, poor quality of seed, price variation and delayed marketing of the produce as the major constraints. In Udhampur also poor quality of seed, crop damage, price variation, non-availability of shed and non-possession of required number of rearing kits were the major problems. Furthermore, at overall level non-availability of shed, price variation, poor quality of seed, crop damage and non-possession of required number of rearing kits were observed to be the major onstraints.

However, the least ranked constraints included most needy were not given consideration while providing shed, distant market place for sale of cocoons, no. of cocoon buyers coming for buying the produce, shortage and high cost of leaves, lack of health insurance in case any member gets injured while harvesting the leaves, non-cooperation of family members, department charges for providing market facilities, seed, etc., lack of transport facilities, lack of technical guidance and training, non-availability of land for mulberry plantation, awareness about pre and post disinfection, awareness about leaf quality and feeding schedule, untimely supply of inputs like seeds, disinfectants, etc., untimely payment for the produce.

Table 5: Garrett's Ranking Scores of constraints in silkworm rearing of Jammu region

Constraints	Garrett's Mean Score	Rank
Kathua		
Non availability of shed	79.69	I
Price variation	78.06	II
Poor quality of seed	76.92	III

Crop damage	71.30	IV
Non-possession of required number of rearing kits	70.44	V
Rajouri		
Non availability of shed	81.00	I
Crop damage	78.27	II
Poor quality seed	77.89	III
Price variation	72.76	IV
Delayed marketing of cocoons	61.54	V
Udhampur		
Poor quality seed	81.50	I
Crop damage	79.44	II
Price variation	76.52	III
Non availability of shed	70.37	IV
Non-possession of required number of rearing kits	68.59	V
Overall		
Non availability of shed	79.69	I
Price variation	78.06	II
Poor quality seed	76.92	III
Crop damage	71.30	IV
Non-possession of required number of rearing kits	70.44	V

Conclusions

The study has thrown light on the importance of rural agro based cottage industries like sericulture that are instrumental in creating job opportunities by providing employment and income to the people in rural areas. The study has shown that the benefit cost ratio obtained in sericulture farming was more than one which makes it clear that the investment in sericulture is economically viable and commercially feasible. When compared among the districts comprising the study area, highest benefits over costs were enjoyed by the rearers of Udhampur district (2.90) followed by Rajouri (2.66) and Kathua (2.58) with overall benefits as 2.73 for the study area. The major constraints that were affecting the cocoon production included non-availability of shed, price variation, poor quality of seed, crop damage, delayed marketing of the produce and non-possession of required number of rearing kits while the least ranked constraints involved non-consideration to most needy while providing shed, distant market, no. of cocoon buyers, shortage and high cost of leaves, lack of health insurance, non-cooperation of family members, department charges for providing market facilities, seed, etc., lack of transport facilities, lack of technical guidance and training, non-availability of land for mulberry plantation, awareness about pre and post disinfection, awareness about leaf quality and feeding schedule, untimely supply of inputs and untimely payment for the produce. The study has suggested for provision of good quality seed, organizing departmental vans for transporting cocoons, exclusive development in the source of mulberry foliage by putting more area under bush type mulberry plantation, introduction of price control measures (like MSP) for stabilizing the cocoon prices, and above all improvement in extension services as it is a pre-requisite for the progress and success of sericulture enterprise.

References

1. Anonymous. Economic Survey. Directorate of Economics and Statistics, Planning and Development Department, Govt. of Jammu and Kashmir, 2017.
2. Anonymous. Digest of Statistics. Directorate of Economics and Statistics, Planning and Development Department, Govt. of Jammu and Kashmir, 2016.
3. Bhat TA. An Analysis of Public Private Partnership in Sericulture in Jammu and Kashmir State (India). Journal of Economics and Sustainable Development. 2014; 5(11):121-126.
4. Ganghopadhyay D. Sericulture industry in India- An overview. India, Science and Technology, 2008.
5. Garrett HE, Woodeorth RS. Statistics in psychology and education. Vakils, Feffer and Simons Pvt. Ltd., Bombay, 1969, 329.
6. Hosali R, Murthy C. To analyse the cost of mulberry and cocoon production in Haveri district. International Journal of Commerce and Business Management. 2015; 8(1):58-63.
7. Rattan M. Economic Analysis of Bivoltine Cocoon Production in Bilaspur District of Himachal Pradesh. *M.Sc. (Agri.)* Thesis, CSKHPKV, Palampur, H.P, 2016.
8. Singh S. Appraisal of Sericulture in Rajasthan. Institute of Development Studies, Jaipur (mimeo), 1994.