

Original Research Article

<https://doi.org/10.20546/ijcmas.2021.1008.089>

## Economics of Sericultural Business in Osmanabad District of Maharashtra, India

S. H. Kamble\*

Department of Agricultural Economics, College of Agriculture, Latur, Vasant Rao Naik  
Marathwada Krishi Vidyapeeth, Parbhani, India

\*Corresponding author

### ABSTRACT

Sericulture is an art of rearing silkworm for the production of cocoons which is the raw material for the production of silk. Silk is the queen of fabrics, starting from the Vedas to this day. India is the second largest producer of raw silk in the world next to China. India's raw silk production was 1450 tonnes in 2014-15. Mulberry raw silk contributes about 85 per cent the total silk production in India. The total area of mulberry in the country is around 282244 hectares. The area under mulberry plantation and raw silk production of Maharashtra is 4504 hectares and Marathwada is 200 tonnes and 444 hectares 10.53 tonnes respectively. India also the largest importer of raw silk and largest consumer of the silk in the world. Sericulture has a remarkable advantage of simultaneously addressing several governments of India's development properties related to economic growth and social development. Sericulture is an important agro based rural industry that helps our economy and generates higher income and employment. It is practiced in a wide range of agro-climatic regions. In fact, the recent technological advancements have made it possible to practice it on an intensive scale, mainly due to increased profits obtained from it as compared to most of the crops and enterprises. Multistage sampling design was adopted in selection of district, tehsil, villages and sericulture producers. In first stage, Osmanabad district was selected in Osmanabad district, Osmanabad and Kalam tehsils were selected. Five villages from each tehsils were selected. Sixty sericulture producers were selected. The data were collected during the year 2015-2016 from 1<sup>st</sup> July, 2015 to 30<sup>th</sup> June 2016. The analytical techniques like tabular analysis, functional analysis, and frequency and percentage method were used to analyze the data in the present study. A gross return was found to be Rs 43135 from per field and Rs 74370.62 from per hectare of mulberry garden, Cost-C was Rs 36901.45 and Rs 63623.19 from per field and per hectare, respectively. In regards to the cocoon production gross return from the 3.48 batches was Rs 78895.19 and from one batch was Rs 22670.00 Total cost was Rs 49707.11 and Rs 14283.34 from 3.48 and one batch, respectively. Net profit from 3.48 batches was Rs 29187.98 and from one batch was Rs 8387.18. The output-input ratio was 1.58. Per kg cost of production was found to be Rs 200.75.

#### Keywords

Sericulture, silk  
mulberry, cocoons,  
raw silk production,  
*Bombyx mori*

#### Article Info

Accepted:  
20 July 2021  
Available Online:  
10 August 2021

## **Introduction**

Sericulture is an art of rearing silkworm for the production of cocoons which is the raw material for the production of silk. Silk is the queen of fabrics, starting from the Vedas to this day. There are four types of silk mulberry (*Bombyx mori*) tassar (*Antheraea paphia*), eri (*Philosomia ricini*) and muga (*Antheraea assama*). India is the second largest producer of raw silk in the world next to China. India's raw silk production was 1450 tonnes in 2009-10. Mulberry raw silk contributes about 85 per cent the total silk production in India. The total area of mulberry in the country is around 282244 hectares. The area under mulberry plantation and raw silk production of Maharashtra is 4504 hectares and Marathwada is 200 tonnes and 444 hectares 10.53 tonnes respectively. India also the largest importer of raw silk and largest consumer of the silk in the world. Sericulture has a remarkable advantage of simultaneously addressing several governments of India's development properties related to economic growth and social development. Sericulture is an important agro based rural industry that helps our economy and generates higher income and employment. It is practiced in a wide range of agro-climatic regions. In fact, the recent technological advancements have made it possible to practice it on an intensive scale, mainly due to increased profits obtained from it as compared to most of the crops and enterprises.

The success of sericulture business is completely depends on the factors like silkworm variety quality of mulberry leaves and management. Because these factors decides the quality and quantity of good cocoon production. To increase the cocoon production and to reduce the labour cost it is advisable to choose silkworm strain and mulberry variety which is suitable for particular set of condition, soil and climate.

There is a scope for development of sericulture industry in Maharashtra. From the point of view of farmers (rearers) innovators, extension workers. There is a need for finding out the relative production for obtaining higher net returns from sericulture enterprise. By considering the above aspects the present study has been undertaken in Osmanabad district with following objectives:

The main objectives of this study to estimate cost of cultivation of mulberry crop and also to estimate costs and returns of cocoon production.

## **Materials and Methods**

Multistage sampling design was adopted in selection of district, tehsil, villages and sericulture producers. In first stage, Osmanabad district was selected in Osmanabad district, Osmanabad and Kalam tehsils were selected. Five villages from each tehsils were selected. Sixty sericulture producers were selected. Then cross sectional data were collected with the help of well-structured pretested schedule by personal interview method. The data were collected during the year 2019-2020 from 1<sup>st</sup> July, 2019 to 30<sup>th</sup> June 2020. The analytical techniques like tabular analysis, functional analysis, and frequency and percentage method were used to analyze the data in the present study.

## **Results and Discussion**

### **Cost of Cultivation of Mulberry**

#### **Establishment of mulberry garden**

Establishment cost of mulberry garden was estimated and is presented in Table 1. Total cost was Rs 82214.39 in which rental value was predominant item of expenditure followed by human labour, irrigation and interest on working capital.

In other words, proportionate expenditure on rental value of land was found to be 34.36 per cent followed by that of human labour (23.61 per cent) and irrigation (14.94 per cent). The results were conformity with the results obtained by Radhika Rani (2003) in regard to expenditure on various items in establishment cost of mulberry garden.

### **Physical inputs and outputs in mulberry cultivation**

Per field and per hectare physical inputs and outputs in mulberry cultivation were estimated and are presented in Table 2. Regarding per field mulberry garden, use of hired human labour was 23.94 man days for 0.58 hectare. Use of bullock labour was 6.78 pair days. On the contrary, use of machine labour was 3.60 hours.

In regard to manure, it was 6.41 quintals. Use of nitrogen, phosphorus and potash was 170.04 kg, 50.84 kg and 17.65 kg, respectively. Use of irrigation water was 3430 cubic meter. Use of plant protection was 2.26 liters. Use of family labour was 17.36 man days in mulberry cultivation. It was also observed from table that yield of main produce i.e. mulberry leaves was 66.25 quintals and the by produce (sticks) was 14.29 quintals. Regarding per hectare physical inputs and output use of hired human labour for the per hectare mulberry farm was 41.27 man days. Use of bullock pair was 11.68 pair days. While use machine labour was 6.20 hours. In regard to manure, use of manure was 11.05 quintals. Use of nitrogen, phosphorus and potash was 293.17 kg, 87.65 kg and 30.43 kg respectively. Use of irrigation water was 5913.79 cubic meter. The use of family labour was 29.93 man days. It was also observed from the table that the yield of the main produce (mulberry leaves) was 114.22 quintals and by produce from (sticks) was 24.64 quintals per hectare.

### **Costs and returns in mulberry cultivation**

Annual expenditure of mulberry cultivation with respect to per field (0.58 ha) and per hectare was estimated and is presented in Table 3. Per field cost of cultivation was Rs 36901.45 while per hectare cost of cultivation was Rs 63623.19. Among individual items amortization cost was predominant item of expenditure.

Per field amortization cost was Rs 8358.85 while that of per hectare was Rs14411.81. In other words, proportionate expenditure on amortization cost was 22.65 per cent. Rental value of land was the next important item of expenditure. It was Rs 5486.35 for 0.58 hectare while that was Rs 9459.22 for one hectare. In short, the share of rental value of land was found to be 14.87 per cent. In the next order use of fertilizer was Rs 3538.69 for 0.58 hectare of mulberry garden while that of Rs 6101.18 for one hectare of mulberry garden. Share of fertilizer expenditure in mulberry cultivation was 9.59 per cent.

Irrigation was the next important item of expenditure whereas per field expenditure was Rs 3430.00 and per hectare expenditure was Rs 5913.79. Thus proportionate expenditure on irrigation was 9.29 per cent. It was clear that share of manure in expenditure was 8.68 per cent followed by hired human labour (7.78 per cent), interest on working capital (6.21 per cent) and family human labour (5.66 per cent). Other items of expenditure showed negligible percentage in mulberry cultivation.

In regard to return it was also observed from table 3 that main produce of mulberry in the form of green leaves was Rs 33125.00 per field while that of Rs 57112.00 per hectare. Share of main produce in gross return was 76.79 per cent. By produce of mulberry plants in the form of sticks was Rs 10010.00 per field and that of Rs 17258.62 per hectare.

**Table.1** Per hectare establishment cost of mulberry garden

Particular	Amount (Rs/ ha)	Per cent
<b>1. Human labour</b>	19411.67	23.61
<b>2. Cuttings</b>	4466.67	5.43
<b>3. Manure</b>	6166.66	7.50
<b>4. Fertilizers</b>	2318.16	2.82
<b>5. Irrigation</b>	12286.67	14.94
<b>6. Land revenue</b>	30.00	0.04
<b>7. Interest on working capital @13 %</b>	5808.37	7.06
<b>8. Depreciation @ 10 %</b>	1655.32	2.02
<b>9. Rental value of land</b>	28250.00	34.36
<b>10. Interest on fixed capital@ 11%</b>	1820.87	2.22
<b>11. Total cost</b>	82214.39	100.00

**Table.2** Annual physical inputs and outputs of mulberry cultivation

Particular	Physical unit	Mulberry garden (unit / 0.58 ha)	Mulberry garden (unit/ ha)
<b>INPUT</b>			
<b>1.Hired human labour</b>	man day	23.94	41.27
<b>2.Bullock labour</b>	pair day	6.78	11.68
<b>3.Machine labour</b>	hours	3.60	6.20
<b>4. Fertilizers</b>			
(a) Nitrogen	Kg	170.04	293.17
(b) Phosphorus	kg	50.84	87.65
(c) Potash	kg	17.65	30.43
<b>5. Manure</b>	q	6.41	11.05
<b>6. Plant protection</b>	lit	2.26	
<b>7.Irrigation</b>	m <sup>3</sup>	3430	5913.79
<b>8.Family labour</b>	man day	17.36	29.93
<b>OUTPUT</b>			
<b>1.Mainproduce(leaves)</b>	q	66.25	114.22
<b>2.By produce(sticks)</b>	q	14.29	24.64

**Table.3** Annual expenditure in mulberry cultivation

Particular	Amount (Rs/ 0.58 ha)	Amount (Rs /ha)	Per cent
<b>COSTS</b>			
1.Hired human labour	2872.80	4953.10	7.78
2.Bullock labour	1695.00	2922.00	4.59
3.Machine labour	1620.00	2793.10	4.39
4.Fertilizers	3538.69	6101.18	9.59
5.Manures	3205.00	5525.86	8.68
6.Plant protection	850.00	1465.52	2.30
7.Irrigation	3430.00	5913.79	9.29
8.Land revenue	34.48	59.44	0.09
9.Incidental expenditure	360.50	621.55	0.98
10.Interest on working capital@ 13%	2288.84	3946.27	6.21
11.Depreciation on capital assets @ 10%	513.21	884.84	1.39
12.Cost-A ( $\Sigma$ items 1 to 11)	20408.52	35187.10	55.29
13.Rental value of land	5486.35	9459.22	14.87
14.Interest on fixed capital @ 11%	564.53	973.32	1.53
15.Amortised cost	8358.85	14411.81	22.65
16.Cost-B ( $\Sigma$ item 13 to 15)	34818.25	60031.40	39.05
17.Family human labour	2083.2	3591.60	5.66
18. Cost-C ( $\Sigma$ item 16 to 17)	36901.45	63623.19	100.00
<b>RETURNS</b>			
19.Main produce	33125.00	57112.00	76.79
20.By produce	10010.00	17258.62	23.21
21.Gross return	43135.00	74370.62	100.00
22.Net return	6233.55	10747.43	---
23.Output input ratio	1.17	1.17	---
24.Per quintal cost of leaves production	202.95	202.95	---

**Table.4** Annual physical inputs and outputs in cocoon production

Particular	Physical unit	Unit /3.48 batches	Unit/ batch
<b>INPUT</b>			
1.Hired human labour	man day	23.81	6.84
2. Family labour	man day	102.94	29.58
3. Disease free layings	no	657.50	188.94
4. Mulberry leaves	q	56.35	16.19
5.Disinfecting material	kg	184.60	53.04
6. Electricity	el. unit	428.98	123.27
<b>OUTPUT</b>			
1.Main produce(cocoons)	kg	386.00	110.92
2.Byproduce(silkworm excreta)	kg	35.27	10.13

**Table.5** Costs and returns in cocoon production

Particular	Amount Rs/3.48 batch	Amount Rs/batch	Per cent
<b>COSTS</b>			
1.Hired human labour	2857.20	820.80	5.75
2. Family labour	12352.80	3549.60	24.85
3.Disease free layings	1643.75	472.34	3.31
4.Mulberry leaves	11436.23	3286.27	23.01
5.Disinfecting material	11076	3182.76	22.28
6.Electricity	1102.48	316.80	2.22
7.Miscellaneous	715.83	205.69	1.44
8.Interest on working capital@13%	5353.96	1538.49	10.77
9.Variable cost (∑item 1 to 10)	46538.25	13372.75	93.62
10.Depreciation on asset @10%	1508.98	433.61	3.04
11.Interest on fixed capital@11%	1659.88	476.98	3.34
12.Fixed cost (∑ item 9 to 10)	3168.86	910.59	6.38
13.Total cost (∑ item 9 and 12)	49707.11	14283.34	100.00
<b>RETURNS</b>			
14. Main produce (cocoon)	78189.59	22468.27	99.11
15. By produce (Silkworm manure)	705.50	202.72	0.89
16. Gross return	78895.09	22671.00	100.00
17. Net profit (GR-TC)	29187.98	8387.18	---
18. Output input ratio (GR/TC)	1.58	1.58	---
19. Per kg cost of cocoons	200.75	200.75	---

The share of by produce in gross return was 23.21 per cent. Thus gross return per field was Rs 43135.00 while that was Rs 74370.62 per hectare. In general output-input ratio was 1.17. Per quintal cost production of green leaves was Rs 202.95. The results were conformity with the results obtained by Radhika Rani *et al.*, (2003) in regard to expenditure on various items in costs and returns of mulberry cultivation.

### Costs and Returns of Cocoon Production

#### Physical inputs and outputs in cocoon production

Annual for 3.48 batches per batch physical inputs and outputs in cocoon production were estimated and are presented in Table 4.

Regarding 3.48 batches, use of hired human labour was 23.81 man days. Use of family human labour was 102.94 man days. The use of disease free layings was 657.50 in numbers.

The use of mulberry leaves was 56.35 quintals. Use of the disinfecting material was 184.60 kg and the use of electricity for rearing was 428.98 el units. It was observed that the main produce (cocoon) from 3.48 batches in a year was 386.00 kg and the by produce (manure) was 35.27 kg. While use of hired human labour for per batch was 6.84 man days. Use of family human labour was 29.58 man days. Then the use of disease free layings was 188.94 in number. Use of mulberry leaves was 16.19 quintals. Use of disinfecting material was 53.04 kg. The use of electricity was 123.27 units. It was observed that the



main produce (cocoon) from per batch was 110.92 kg and by produce (silkworm excreta) was 10.13 kg.

### **Costs and returns of cocoon production**

Costs and returns in cocoon production business were estimated and are presented in Table 5. The total cost for 3.48 batches during the year was Rs 49707.11 while that of for one batch was Rs 14283.34. It was clear that predominant item of expenditure was family labour. Expenditure on family labour for 3.48 batches was Rs 12352.80 while that of for one batch was Rs 3549.60. The proportionate expenditure on family labour was 24.85 per cent. Expenditure on mulberry leaves the second most important item of expenditure. Thus expenditure on mulberry leaves was Rs 11436.23 for 3.48 batches and Rs 3286.27 for one batch, respectively. The share of expenditure on mulberry leaves was 23.01 per cent. In next order, expenditure on disinfecting material was Rs 11076.00 for 3.48 batches. Expenditure on disinfecting material was Rs 3182.76 per batch. Proportionate expenditure on disinfecting material was 22.21. It implied that more than 70 per cent expenditure was done on use of family labour, mulberry leaves and disinfecting material together in cocoon production. In short share of variable cost was 93.62 per cent. Proportionate expenditure fixed cost was 6.38 per cent. It inferred that long term investment was very small as compare to current investment. In regard to return from cocoon production, main produce (cocoon) that was Rs 78189.59 from 3.48 batches while that was Rs 22468.27 from one batch. Return from by produce was Rs 705.50 from 3.48 batches and Rs 202.73 from one batch, respectively. Thus gross return from cocoon production was found to be Rs 78895.09 from 3.48 batches and Rs 22671.00 from one batch. Proportionate share of cocoon was 99.11 per cent while by produce share was negligible (0.89 per cent). Thus net profit

was Rs 29187.98 from 3.48 batches during the year. Net profit per batch was Rs 8387.18. In general output-input ratio was 1.58 in cocoon production business. It was obvious that per kg cost of cocoon production was found to be Rs 200.75. The result were confirming with the results obtained by Lakshmanan *et al.*, (1997) in regard to human labour and disease free layings in cocoon production.

1. Net profit obtained from cocoon production from 3.48 batches was Rs 29187.98 and from per batch was Rs 8387.18.
2. In regard to regression coefficient with respect to disease free layings and disinfecting materials were positive and significant.
3. Hence there was scope to increase these variables in cocoon production.

### **References**

- Dodamain, M. T., 1996. Economics of silk cocoon production in Gulbarga district Karnataka. M.Sc. (Agri) thesis (Unpub.), submitted to university of Agric, Sci.Bangalore.
- Hajare, 2008. Sericulture brings better income. *J. Indian silk*, 46(1):27.
- Lakshmanan S. B., H. Mallikarjuna, 2006. An economic analysis of sericulture farming business in Tamil Nadu. An empirical study. *Mysore. J. Agric. Sci.*,40(1): 96-101.
- Lakshmanan S. B., H. Mallikarjun, Jayaram R., Gnapathy Rao M. R. Subramaniam R. G., Geetadevi and Datta R. K., 1997. Economic issue of production of mulberry cocoon in Tamil Nadu- A micro economic study. *Indian J. Seric*, 35(2): 128-131.
- Radhika Rani C. H. and T. Narender, 2003. Economics of mulberry cultivation. A study in Ananathpur districts. *J. Res. ANGRAU*,31(2): 54-57.

**How to cite this article:**

Kamble, S. H. 2021. Economics of Sericultural Business in Osmanabad District of Maharashtra, India. *Int.J.Curr.Microbiol.App.Sci.* 10(08): 793-800.  
doi: <https://doi.org/10.20546/ijcmas.2021.1002.089>