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NS Gaikwad
Department of Agricultural Economics, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

SS More
Department of Agricultural Economics, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

VG Jadhav
Department of Agricultural Economics, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Corresponding Author:
NS Gaikwad
Department of Agricultural Economics, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Studies on cost and returns of cocoon production in Solapur district of Maharashtra

NS Gaikwad, SS More and VG Jadhav

Abstract
Sericulture is formed from the Greek word 'sericos', which means silk and the English word 'culture', meaning rearing. Sericulture is an agro-industry that produces silk as a by product. Silk is a fibrous protein generated by the silkworm in order to spin a cocoon. Silk has a natural sheen and an affinity for colours, as well as being light weight, soft to the touch and long lasting. Silk is known as the "Queen of Textile" because of its distinct features. India has the second position of the world largest producer after China. The result revealed from the study that, the gross return from per hectare mulberry garden estimated was Rs. 3,23,543.00 with cost of cultivation Rs. 1,90,596.09 In regard to cocoon production the gross return from 4.75 batches was Rs. 5,36,719.60 and from one batch it was Rs. 1,12,993.60. Total cost from 4.75 batches calculated was Rs. 2,69,312.19 on the other hand from one batch it was Rs. 56,697.31 Net profit obtained was Rs. 2,67,407.41 and Rs. 56,296.29 from 4.75 batches and one batch, respectively. The output - input ratio obtained was 1.99 whereas per Kg. cost of cocoon production obtained was 700.

Keywords: Sericulture, mulberry, cocoon production, output-input ratio, farmer

Introduction
Sericulture is formed from the Greek word 'sericos', which means silk and the English word 'culture', meaning rearing. Sericulture is an agro-industry that produces silk as a by product. Silk is a fibrous protein generated by the silkworm in order to spin a cocoon. Silk has a natural sheen and an affinity for colours as well as being light weight, soft to the touch and long lasting. Silk is known as the "Queen of Textile" because of its distinct features. China alone produces more than 60% of world's silk. The total raw silk production in the country during 2019-20 was 35,820 MT and in 2021-21 is 33,770 MT. India was the largest importer of raw silk and largest consumer of the silk in the world. Among the four varieties of silk produced in 2020-21, mulberry accounts for 70.72 percent (23,860 MT), Tasar 8.02 percent (2,705 MT), Eri 20.55 percent (6,935 MT) and Muga 0.71 percent (239 MT) of the total raw silk production of 33,770 MT. In 2019-20 area under sericulture production of Maharashtra was 17,885 ha and in 2020-21 is 15,897 ha as well as in 2021-22 is decreased as compare previous year i.e. 15,529 ha. In our countries there are large number of small and marginal farmer hence we have to suggest them to increase area under integrated farming system Sericulture is best example for that. Sericulture can give the more return than specialized farming. It increase the marketed surplus.

Methodology
Multistage sampling design were adopted in selection of district, Tehsils, villages and sericulture growers. In the first stage, Solapur district was purposively selected on the basis of availability of area under Sericulture production. In second stage on the basis of area under sericulture production, two tehsils of Solapur district were be selected namely, Mohol and Pandharpur for the present study. In the third stage from each selected Tehsils, *viz*. Peertakali, Kurul, Koravali, Shingoli, Jamgaon, Kamati from Mohol tehsil Bhandishegaon, Gopalpur, Bhalwani, Vakhari, Babulgaon, Upari from Pandharpur tehsil were selected on the basis of highest area under sericulture production. In the fourth stage 5 sericulture growers will be randomly selected from each selected villages. Thus from 12 villages, 60 growers were selected. Worked out cost and returns in cocoon production was achieved by application of cost concepts namely variable cost and fixed cost.

Results and Discussions

Use of physical inputs and outputs in cocoon production

On an average 4.75 batches were taken by the selected sericulture growers were observed in the study area. Per batch annual physical inputs and outputs include in cocoon production were calculated and presented in table no.1

It could be seen from the table that, selected sericulture farmer include use of family human labour, hired human labour, disease free layings, mulberry leaves, disinfecting material (Bleaching powder, Lime powder, Vijetha, Formalin) paraffin paper, net, jut gunny bag and electricity for rearing annual cocoon batch. Use of hired human labour worked out to 24.74 man days for 4.75 batch and for 1 batch 5.21 and use of family labour 26.46 man days per batch. The total disease free laying used was 185.00 no. and amount of mulberry leaves used was 41.25 quintal for 1 batch. The total disinfecting material used was 70.97 Kg. which include use of Bleaching powder 9.18 Kg., Lime powder 42.00 Kg., Vijetha 14.80 Kg., Formalin 4.99 Kg. for 1 batch and for 4.75 it was 43.60 Kg., 199.50 Kg., 70.30 Kg., 23.70 Kg. respectively.

Table 1: Use of physical inputs and outputs in cocoon production

Sr. No.	Input	Units	Unit/4.75 batches	Unit/batch
1	Hired human labour	Man days	24.74	5.21
2	Family labour	Man days	125.68	26.46
3	Disease free layings	No.	878.75	185.00
4	Mulberry leaves	Qt.	195.93	41.25
5	Disinfecting material	Kg.		
a)	Bleaching powder	Kg.	43.60	9.18
b)	Lime powder	Kg.	199.50	42.00
c)	Vijetha	Kg.	70.30	14.80
d)	Formalin	Kg.	23.70	4.99
	Total	Kg.	337.10	70.97
6	Paraffin paper	Meter	2249.88	473.66
7	Net	Bundle	9.02	1.90
8	Jut gunny bag	No.	78.42	16.51
9	Electricity	El. Unit	314.26	66.16
	Output			
1	Main produce (Cocoon)	Kg.	763.94	160.83
2	By produce (Silkworm manure)	Kg.	195.98	41.26

The total amount of electricity used for rearing one batch calculated was 66.16 El unit. and for 4.75 it was 314.26 El. Unit. Use of paraffin paper 473.66 meter, net 1.90 bundle, jut gunny bag 16.51 No. for 1 batch and for 4.75 batch it was 2249.88 meter, 9.02 bundle, 78.42 no. In regard to returns generated from one batch of cocoon the total cocoon production was 160.83 Kg. and silkworm manure it was 41.26 Kg and for 4.75 batch it was 763.94 Kg., 195.98 Kg. respectively.

Cost and return of cocoon production

Per batch as well as for 4.75 batches annual cost and returns of cocoon production was calculated and presented in table 2

The total cost incurred for 4.75 batches was Rs. 2,69,312.19 and for 1 batch it was Rs. 56,697.31. From table 4.12 it was observed that, per batch the highest cost incurred by mulberry leaves was Rs. 9,281.25 followed by disease free laying it was Rs. 7,400.00 for 1 batch and for 4.75 batch it was Rs. 44,085.93 and Rs. 35,150.00 respectively. Thus the highest proportionate share of expenditure contributed by the mulberry leaves with 16.37 percent followed by disease free laying 13.06 percent respectively. The proportionate expenditure on hired human labour, disinfecting material, Family labour was Rs. 1,564.00, Rs. 2,421.16, Rs. 6,615.00 for one batch and for 4.75 batch it was Rs. 7,429.00, Rs. 11,500.51, Rs. 31,421.25 respectively.

Table 2: Costs and return of cocoon production

Sr. No.	Particular	Amount Rs./ 4.75 Batches	Amount Rs/batch	Percent
1	Hired human labour	7429.00	1564.00	2.76
2	Family labour	31421.25	6615.00	11.67
3	Disease free layings	35150.00	7400.00	13.06
4	Mulberry leaves	44085.93	9281.25	16.37
5	Disinfecting material	11500.51	2421.16	4.28
6	Paraffin paper	13499.50	2842.00	5.02
7	Net	22562.50	4750.00	8.37
8	Jut gunny bag	784.51	165.16	0.29
9	Electricity	1571.44	330.83	0.58
10	Miscellaneous	23172.06	4878.33	8.60
11	Interest on working capital @13%	25300.63	5326.45	9.39
12	Variable cost (∑ item 1 to 11)	216477.33	45574.18	80.39
13	Depreciation on asset @10%	24015.85	5055.97	8.91
14	Interest on fixed capital @ 12%	28819.01	6067.16	10.70
15	Fixed cost (∑ item 13 to 14)	52834.86	11123.13	19.61
16	Total cost (∑ item 12 and 15)	269312.19	56697.31	100

	Returns			
17	Main produce (Cocoon)	534759.75	112581.00	99.64
18	By produce (Silkworm manure)	1959.85	412.60	0.36
19	Gross return	536719.60	112993.60	100
20	Net profit (GR-TC)	267407.41	56296.29	
21	Output input ratio (GR/TC)	1.99	1.99	
22	Per Kg. cost of cocoons	700	700	

The cost incurred by paraffin paper, net, jut gunny bag was Rs. 13,499.50, Rs. 22,562.50, Rs. 784.51 for 4.75 batch and for 1 batch it was Rs. 2,842.00, Rs. 4,750.00 and Rs. 165.16 respectively. The cost incurred by electricity and miscellaneous was worked out to Rs. 330.83 and Rs. 4,878.33 for 1 batch and for 4.75 batch it was Rs. 1,571.44, Rs. 23,172.06 respectively. The cost incurred by interest on working capital, depreciation on capital asset, interest on fixed capital was worked out to Rs. 5,326.45, Rs. 5,055.97 Rs. 6,067.16. for 1 batch and for 4.75 batch it was Rs. 25,300.63, Rs. 24,015.85 and Rs. 28,819.01 respectively. It inferred that the proportionate expenditure on variable cost was 80.39 percent. The share of expenditure on fixed cost was 19.61 percent which indicate that long term investment was very small as compare to current investment.

In regards to returns generated from cocoon production it could be seen from the table 4.12 that per batch per annum the total income generation from main produce i.e. cocoon was found to be Rs. 1,12,581.00 and from by produce i.e. silkworm manure it was Rs. 412.60 and for 1 batch income generation from cocoon was Rs. 5,34,759.75 and from silkworm manure Rs. 1959.85 for 4.75 batch. The net returns estimated from one batch were Rs. 56,296.29 and for 4.75 batches it was Rs. 2,67,407.41 with benefit-cost ratio 1.99, Per Kg. cost of cocoon production calculated was Rs 700.

Conclusions

1. The area under mulberry cultivation was 0.71 hectares which indicated the important share in cropping pattern with 26.37 percent.
2. Net profit obtained from mulberry cultivation from one hectare was 1,32,946.91 whereas from cocoon production from 4.75 batches it was Rs. 2,67,407.41
3. Per quintal cost of mulberry production was estimated to Rs. 550 and per Kg. cost of cocoon production calculated was Rs. 700.

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