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Assess the impact of training on mulberry and cocoon production (yield and income) for trained and untrained sericulture farmers in Coimbatore district, state of Tamil Nadu, India

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Abstract
India produces the greatest quantity of silk in sericulture, second only to China. It includes an environmentally friendly production process and gives tribal people women included more job options. The research was carried out in 2021–2022 on 150 farmers from the same district, both trained and untrained. Trained farmers in the year of 2019-2020 (January to December - Batch wise) underwent five days of training at Tamil Nadu Sericulture Training Institute, Hosur. A pre – tested schedule was administrated to collect information on the cost incurred for different input cultural operations and returns. Sample cost accounting method was employed to work the out cost and return profile of mulberry leaf production and silkworm rearing per year. The parameters were analyzed for the trained and untrained farmers, cost of production, yield (leaf and cocoon) and income. This study assesses to impact of training on yield and income for trained and untrained farmers as: 1. Reared of Dfls / acre / year trained category on 759 (Bombyx mori) Dfls and untrained farmers reared to 692 Dfls (Bombyx mori). 2. Yield per kg/ year trained farmers produced 644 kg of cocoon and untrained category on 540 kg of cocoon 3. Gross income generated to trained farmers Rs. 3, 85,209 lakhs and untrained farmers Rs. 3,05,769 lakhs.4. Expenditure of cocoon production wise trained and untrained Rs. 2,27,580 & Rs. 2,07,450 lakhs. 5.Net return of trained and untrained farmers wise Rs.1,57,629 /- lakh and Rs.1,00,003 cost of production per kg of cocoon was trained category in Rs. 341/- and untrained farmers Rs. 3951/- 7. Cocoon yield (%) wise trained 85 *per cent* and untrained 78 *per cent*.

Keywords: Mulberry, leaf production, cocoon production, net return, yield and income

Introduction

Sericulture being a Labour intensive agro industry plays a vital role in alleviating poverty by employing rural folk. Sericulture is a labor-intensive rural agricultural sector that generates a steady revenue all year round. It offers year-round employment and requires little initial outlay. (Hanumappa and Erappa., 1985) [2]. Sericulture not only offers periodical income, but also utilizes the untapped family Labour for various activities Lakshmanan *et al.* (1996) [3]. Sericulture is being practiced by entrepreneur in the southern parts of India as a household and commercial agricultural activity**.**

According to Jolly (1998) [4], there are two reasons why sericulture is a successful rural industry. First of all, it provides family labor with year-round, well-paying employment; secondly, it guarantees periodic revenue for small and medium-sized properties as well. When compared to other crops, sericulture is the most profitable cash crop from an individual's perspective.

Tamil Nadu is a state that led the way in mulberry sericulture in India. The state's western region, which includes Coimbatore, Tirupur, Erode, Dindugal, and the northwest region, which includes Dharmapuri, Krishnagiri, Salem, Namakkal, and Perambalur, supports the majority of mulberry cultivation. Therefore, it is very evident that there is tremendous potential to develop sericulture

Fig 1: Silkworm – Bombyx mori

The District Coimbatore is invested with a very pleasant and favorable environment condition, suitable soils and rich rainfall for mulberry cultivation and silkworm rearing (Bombyx mori) 1225 farmers in an area of 2838.25-acre

mulberry (HHT & K policy note 2021 -2022*)*. Hence the present study aimed to assess the impact of training on mulberry and cocoon production (yield and income) for Trained and Untrained sericulture Farmers in Coimbatore District, Tamil Nadu, India.

Research Methodology

The study was taken up in the Coimbatore district of Tamil Nadu, where the majority of farmers grow bivoltine silkworms. A Survey conducted in selected five blocks of Periyanaickenpalayam, Karamadai, Alandurai, Annur and Kinathukadavu in Coimbatore district. The sample was drawn from the trainees who had undergone training at Tamil Nādu Sericulture Training Institute, Hosur during the period (from January 2019 to December 2020). The study is based on primary data sources of farmer's level and collected data from two groups of farmer's *viz*., Trained and untrained farmers who adopt new bivoltine sericulture technologies. From each group 150 samples were collected and total of 300 samples were used in the study.

1. Cost of production of mulberry garden the cost items considered for garden establishment were

1. Fixed cost
2. Farm yard manure
3. Fertilizer application
4. Manure application
5. Intercultural operation
6. Pruning & cleaning
7. Growth promoters and pesticide application
8. Other expenditure

The total cost of garden establishment was divided and accounted for 15 years to arrive at the share of fixed cost per annum.

Fig 2: Mulberry Garden

2. Cost of cocoon production per acre / year in Coimbatore district the cost incurred on silk worm rearing

1. Fixed cost
2. Cost of Layings,
3. Chawki charges
4. Disinfectant materials
5. Labour cost
6. Transport and marketing,
7. Electric charges
8. Other expenditure.

Fig 3: Rearing building

The amount allocated for fixed costs per year was calculated by dividing the entire cost of the silkworm raising shed by ten years. Primary data the researcher formulated well-defined objective based on the interview schedule prepared. Interview schedule format was surfaced based on the objectives of the study and all-relevant information was collected from a respective respondent in the study area. The statistical tools of mean (Direct method), Percentage and stand deviation was used in the analysis.

Results and Discussion

The Cost of developing a mulberry garden with (trained and untrained) for farmer in Coimbatore district in presented in Table 1. The cost items considered for garden establishment were human Labour, machine power, farm yard manure, chemical fertilizers, planting materials and irrigation on investment. The highest share of the cost associated with garden establishment. Whereas trained farmers for irrigation (37.8 %) followed by man power (18.1 %) and farm yard manure (20.2 %), Untrained farmers group for irrigation (38.1 %) followed by man power (10.2%) and farm yard manure (10.2 %). The study revealed that trained farmers had incurred more towards establishment of mulberry garden compared to untrained farmers as reported by Balasaraswathi *et al.*, 2006 [1] and Susikaran, 2019 [10]. The cost of construction of silkworm rearing shed for farmers in (trained and untrained) Coimbatore district is presented in Table 2. The components were rearing shed, Netrica types of machinery and nylon nets for door and window. The highest associated with rearing shed 15 years, following by appliances 10 years, nylon nets 5 years. The study clearly indicates that the trained farmers know the Importance of rearing shed, so highly spending the amount.

Table 1: Cost on Establishment of mulberry garden

#	variables	Unit	Trained		Share (%)	Untrained		Share (%)
			Unit	Cost		Unit	Cost	
1	Human Labour	Mandays	41	14350	18.1	45	15750	20.0
2	Machine power	Hours	8	4800	6.0	8	4800	6.1

3	Farm yard manure	MT	8	16000	20.2	4	8000	10.2
4	Chemical fertilizers	Kg	400	4250	5.4	200	2125	2.7
5	Irrigation	Drip	1	30000	37.8	1	30000	38.1
6	Planting material	Sapling	5000	5000	6.30	5000	5000	6.4
7	Pesticide & other growth promoters	Chemicals		2000	2.5		8000	10.2
8	Other expenditure			3000	3.8		5000	6.4
	Subtotal (A)			79400	100.0		78675	100.0

Table 2: Construction of silkworm rearing shed

S. No	Materials	Trained			Untrained		
		Value (Rs)	Depreciation (years)	Value of Annum	Value (Rs)	Depreciation (years)	value of Annum
1.	Construction of rearing shed (1000 Sq. ft)	600000	15	40000	400000	15	26667
2.	Rearing stand (1200 sq. ft)	80000	10	8000	65000	10	6500
3.	Netrika	30000	10	3000	30000	10	3000
4.	Machines (sprayer, bush cutter)	25000	5	5000	25000	5	5000
5.	Nylon net (Door and windows)	12000	5	2400	10000	5	2000
	Total	747000		67686	530000		43167

The present investigation observed that the cost matrix for producing mulberry leaves (Rs/ac) shows that the overall cost is made up of both fixed and variable cost components. The entire cost of garden establishment was taken into account over a period of 15 years in order to determine the fixed cost per year. The overall variable cost of the various inputs used, as shown in Table 3, includes labor costs for humans, machinery, farm yard manure, chemical fertilizers, irrigation, and other items. It is interesting to record that about trained 23.3 *per cent* and untrained 24.6 *per cent* of total cost was incurred human labour in leaf production activities. The cost incurred was in FYM, chemical fertilizer, mandays and fixed cost (garden establish put together accounted about 79.9 *per cent* and had 70.5 *per cent* of the cost in trained and untrained farmers. Jayaram *et al.* (1996) [3] pointed out that high cost on input is due to awareness about inputs and reluctance of farmers in accepting the improved practices generated by the research institutes. The study clearly indicated that the untrained farmers produce mulberry leaves for low cost than the trained farmers (Ruchira Shukla., 2012) [7]

Table 3: Cost (Rs/ acre) of Mulberry leaf production in Trained and Untrained farmers

#	variables	Quantity	Trained		Share (%)	Untrained		Share (%)
			Unit	Cost		Unit	Cost	
I	Operational cost							
1	Human Labour	Mandays	20	6000	23.3	18	5400	24.6
2	Machine power	hours	4	2400	9.3	4	2400	10.9
3	Farm yard manure	MT	2	4000	15.5	1	2000	9.1
4	Chemical fertilizers	kg	124	2200	8.5	150	2600	11.8
5	Irrigation			2657	10.3		2657	12.1
6	Miscellaneous			3000	11.6		1500	6.8
	Operational cost			20257	78.6		16557	75.3
I	Fixed cost (establishment of mulberry garden /acre)			5527	21		5425	25
II	Total (I+II)			25784	100.0		21982	100.0

In the particular location, under irrigated conditions, we receive five crops year, shown by Table 4. Trained and untrained farmers (average) wise We get net of profit Rs.35314.00 & Rs.23904.00 in irrigated condition per 1.52 acre for trained and 1.68 acre for untrained. The cost of land input (trained and untrained wise) Rs.91560.00, Rs.72144.00. In irrigated condition trained farmers can harvest 130 kgs of cocoon from 150 Dfls and untrained 108 kg of cocoons from 138 Dfls per crop. (100 Dfls mean approximately 50000 silkworm larvae). The cost incurred for cocoon production: The major components are leaf production and Labour (trained and untrained) farmers wise 70.3 *per cent* & 65 *per cent*. Human labor was found to have a positive and significant correlation with cocoon production by Neelakantsastry (1982), Marihonnaiah (1986), and Kulkarni (1993) [5]. Srinivasa *et al*., (2007) [8] past year some kind of results given trained farmers had high income, Subrata Trivedi and Kunal (2015) [9].

Table 4: Cost and Return studies for Trained and Untrained farmers

S. No	Variable	Unit	Trained		Untrained	
			Cost	Share %	Cost	Share %
1	Fixed cost					
	1. Depreciation on rearing house & appliances	Rs	13537	24.1	8633	17.9
II	Operational cost					
1.	Cost on laying (150 Dfls)	No's	825	1.5	825	1.7
2.	Chawkie charges (150 Dfls)	No's	1700	3.2	1700	3.5
3.	Disinfectant (Crop)	Rs	1000	1.8	1000	2.1
4.	Labour cost for rearing (crop)	Rs	10100	18.0	10800	22.4

5.	Transport and Marketing Expenditure		Rs	2000	3.6	2000	4.1
6.	EB charge		Rs	300	0.5	300	0.62
7.	Other expenditure		Rs	1000	1.5	1000	2.1
8.	Mulberry leaf		Rs	25784	45.8	21982	45.6
III	Operational cost (II)			42709	75.9	39607	82.10
	III	Return					
1.	Gross return (150 Dfls)		Rs	91560		72144	
2.	Total cost (I+II)		Rs	56246		48240	
3.	Net Return			35314		23904	

Table 5 and 6 revealed that the impact of trained and untrained farmers clearly indicates that in the case of trained farmers was leaf yield 21900 kg, with brushing leaf of 759 Dfls, with 85 per cent cocoon yield and return of 40.92 *per cent* compared to untrained farmers leaf yield 19700 kg, with brushing leaf of 692 Dfls, with 78 *per cent* cocoon yield and return 32 *per cent*. Trained farmers gained the high knowledge and adoption of moriculture and silkworm rearing technologies ultimately high income and yield returns. The training programme has enhanced the technology adoption level among the sericulturists and thereby adding up on their income.

Fig 4: Bombyx mori – Cocoon

Fig 5: Construction of Cocoon

Table 5: Impact of Training on Yield and Income in Trained Farmers

#	Particular	Unit	Value	
			Trained mean	Trained SD
1	Average Mulberry area	acre	1.52	-
2	Leaf yield (Acre/year)	kg	21900	-
3	Cost of leaf (acre)	Rs	25784	-
4	Cost of leaf / kg	Rs	0.93	-
5	Reared of Dfls Annum (average/acre/year)	No's	759	205.87
6	Cocoon yield (average/acre/year)	kg	644	180.05
7	No of crop /year	No's	5	-
8	Cocoon yield (100 dfls)	kg	85	-
9	Gross income (Rs.)	Rs	385209	112480.60
10	Expenditure on cocoon production	Rs	227580	61761.59
11	cost of production /kg	Rs	341	-

12	Average Cocoon price /kg	Rs	599	-
13	Cost of Total production	%	59.08	-
14	Net return/ac/year	%	40.92	53424.48
15	Sample	No's	150	-

Table 6: Impact of Training on Yield and Income in Untrained Farmers

#	Particular	Unit	Value	
			Trained mean	Trained SD
1	Average Mulberry area	acre	1.68	-
2	Leaf yield (Acre/year)	kg	19700	-
3	Cost of leaf (acre)	Rs	21982	-
4	Cost of leaf / kg	Rs	1.10	-
5	Reared of Dfls Annum (average/acre/year)	No's	692	153.74
6	Cocoon yield (average/acre/year)	kg	540	119.71
7	No of crop /year	No's	5	-
8	Cocoon yield (100 dfls)	kg	78	-
9	Gross income (Rs.)	Rs	305769	72800.87
10	Expenditure on cocoon production	Rs	207450	45318
11	cost of production /kg	Rs	384	-
12	Average Cocoon price /kg	Rs	566	-
13	Cost of Total production	%	68	-
14	Net return/ac/year	%	32	32362
15	Samples	No's	150	-

Conclusion

It is revealed from the study that impact of training could increase the knowledge and adoption level of the improved technologies learn during the training programmes reflecting in yield and income level compared to untrained farmers. To reduce the cost of production, they should be motivated and demonstrated with adoption of new bivoltine sericulture technique. Training the farmers directly by scientist will have an advantage to clear their doubts on the spot of on-the-spot and hence, inclusion of a greater number of scientists in the farmer's training programme is suggested. Hence from the study, it is proven that training plays an important role in sericulture. Thus, more training programme should be conducted in the study area and making the farmers to attend these training is utmost important.

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