IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 7, July 2021

DOI: 10.17148/IARJSET.2021.8763

IMPACT OF COVID-19 ON THE SERICULTURE PRODUCTION AND PROFITABILITY OF SERICULTURE IN PUNJAB

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Abstract: The ongoing health crisis around COVID-19 has affected all walks of life .like Health crisis; economic growth and development throughout world were greatly affected. India also declared a three-week nation-wide lockdown in last of March in the initial phase, which has subsequently been extended for achieving satisfactory containment of the virus spread. All the sectors in the economy were hit by COVID-19 and sericulture industry is also badly affected to this pandemic. In this connection, Sericulture farmers want to come out of the cocoon they have been forced into due to the long lockdown. It is not just these farmers; even silk reelers are under the impact of the pandemic. Reelers who produce silk yarn say the drastic fall in price has taken the sheen off the silk. Schedule was used to collect the data over online conference. The study was attempted to assess the economic impact of COVID-19 on profitability of sericulture enterprise in many states. Some farmers were randomly selected for data collecting on mulberry cultivation and silkworm rearing from major sericultural districts of Punjab. Schedule was used to collect the data over tele-conference discussion and secondary data on cocoon arrivals and prices from market was also collected for the period one year 2019 – 2020. It was drastic fall in price of mulberry cocoon from the reelers due to lock down. As a result, farmers have incurred double loss *i.e.*, they have not recovered cost of production and forgone the opportunity of getting usual net returns. Based on quantum of loss, the Government of Punjab should rescue the sericulture farmers through announcement of reasonable relief/ compensation which helps them to come out from COVID-19 shock.

Keywords: COVID-19, Cocoons, Mulberry Sericulture, Prices, Market.

1. INTRODUCTION

The entire world is facing the difficult time of COVID-19 incidence. The pandemic COVID19 has affected all the human life activities like health crisis, economic growth and development throughout world. COVID-19 crisis period has resulted in a sudden disruption of businesses across the globe as well as India. These activities increases day by day, Indian Government then announced nationwide lockdown to control this dangerous virus to spread. Like other sectors, Sericulture also affected by this deadly virus COVID -19; sericulture and weaving being a source of livelihood for thousands of families. Best Solution to control the spread of this pandemic COVID-19 was Lockdown. So the nationwide lockdown was imposed on 24th March, 2020 by our respectable PM. Imposition of lockdown not only saves life of billions peoples while on other hand it had negative effect on the growth and development of the Indian economy .All the sectors in the economy have faced the brunt of COVID-19. Agriculture and sericulture in specific is not an exception to this malady. The present paper is to assess the economic impact of COVID-19 lockdown on profitability of sericulture farmers in India especially in Punjab. Punjab has some position both in mulberry production and mulberry silk cocoon production in the country. Mulberry sericulture is extensively cultivated in many districts of Punjab State. in the initial phase, which has subsequently been extended for achieving satisfactory containment of the virus spread . In this connection, Sericulture farmers want to come out of the cocoon they have been forced into due to the long lockdown. The study was attempted to assess the economic impact of COVID-19 on profitability of sericulture enterprise in many states. Some farmers were randomly selected for data collecting on mulberry cultivation and silkworm rearing from major sericultural districts of Punjab. Schedule was used to collect the data over tele-conference discussion and secondary data on cocoon arrivals and prices from market was also collected for the period one year 2019 - 2020

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2. METHODOLOGY

Main motive of this paper is to compare the impact of COVID-19 in lockdown on profit of sericulture enterprise and before Lockdown period. It was depend upon number of factors like mulberry cultivation, cocoon production, number of crops reared per year, number of dfls reared per crop, yield obtained from mulberry and cocoon yield. For this methodology used was a sample of 150 farmers chosen from different places of Pathankot district of Punjab for collecting data through tele discussion which were made over tele-con in. Primary data collected related to the mulberry crops and cocoon production for the year 2018 is different to with the lockdown period. In order to see the effect of lockdown, data on production costs and returns during the same months of the agricultural year 2019-20 was elicited from the sample farmers, we selected. Secondary data on arrivals and prices of bivoltine & crossbreed cocoon was collected from Central Silk Board Sujanpur Distt. Pathankot from January 2019 to July 2020.

3. RESULTS & DISCUSSION

Sericulture industry depends upon mainly on comprises of two factors *i.e.*, Mulberry plantation and
Silkworm Rearing.

a) Mulberry Plantation:

Mulberry leaves are the main food of silkworm; farmers usually cultivate mulberry to continuous supply of mulberry leaves for rearing of silkworm whole the year and farmers in Punjab is to take-up 10 crops per 150 dfls per crop in a year. By this practice farmers is getting income and employment throughout the year. Thus, a total of 1500 dfls are reared from one acre of mulberry garden of Variety V1.

The cost of mulberry to the maintenance of mulberry garden per acre per annum is shown in Table 1. The cost is sub-divided into fixed costs & variable costs. Variable costs shared 60.23% of the total cost while the rest was shared by fixed cost. The total cost incurred towards mulberry cultivation per acre was Rs.93309.00. Of the variable cost the expenditure made on FYM was the highest at Rs.24000.00 sharing 25.72% of the total cost. Since mulberry leaves are fed to silkworms, in order to retain the quality of leaves resorting the organic way of cultivation is indispensible. Labour formed the second major cost item Rs.18600.00 sharing 19.81% of the total cost. Labour is essential to apply FYM, fertilizer, plant protection chemicals, to irrigate and weeding operations. Inter-cultivation with bullock labour is also essential to keep field free from weed. Inorganic fertilizers were used in limited quantity @ 6 quintal/ acre to supplement required nutrients to the crop and plant protection chemicals was also taken up in order to keep mulberry leaves free from pests and diseases.

Table 1: Maintenance Cost of Mulberry Garden (Rs./ Acre) [Pre-COVID-19/ COVID-19 Period]

#	Particulars	Quantity	Rate (Rs.)	Value (Rs.)
	Variable Cost			
A	**LABOUR**			
	Human Labour (Mandays)	43	300	12900 (13.83%)
	Bullock Labour (Mandays)	6	950	5700 (6.11%)
B	**INPUTS**			
	Farm Yard Manure (FYM)	6	4000	24000 (25.72%)
	Fertilizers (quintal)	6	2000	12000 (12.86%)
	Plant protection chemicals(lit)	4	400	1600 (1.71%)
	Total Variable Cost (TVC)			56200 (60.23%)
	FIXED COST			
	Depreciation		8089 (8.67%)	
	Interest on fixed capital		12220 (13.10%)	
	Rental value of Land		16800 (18.00%)	
	Total Fixed Cost (TFC)		37109 (39.77%)	

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Total Cost (TC)	93309
Leaf Yield (kg)	24856
Cost per kg leaf	3.75

Since mulberry leaves are fed to silkworms, in order to retain the quality of leaves resorting the organic way of cultivation is indispensible. Labour formed the second major cost item Rs.18600.00 sharing 19.81% of the total cost. Labour is essential to apply FYM, fertilizer, plant protection chemicals, to irrigate and weeding operations. Inter-cultivation with bullock labour is also essential to keep field free from weed. Inorganic fertilizers were used in limited quantity @ 6 quintal/ acre to supplement required nutrients to the crop and plant protection chemicals was also taken up in order to keep mulberry leaves free from pests and diseases. Among the fixed costs, depreciation on pump-set, sprinkler/drip irrigation structure and other necessary tools or implements used in mulberry cultivation was cost accounted at Rs. 8089.00, interest on fixed capital worked out to Rs.12220.00,

Opportunity cost of land in terms of rental value of land was considered and accounted in cost of cultivation at Rs.16800.00. The total yield obtained from V1 variety of mulberry per acre came to 24856.00 kg. Thus, cost per kg of mulberry leaves worked out to Rs. 3.75.

b) Rearing of Silkworms

Sericulture industry mainly depends upon rearing of silkworm. The usual practice among farmers is to take up 10 crops each of 150 dfls. The economics of one sericulture crop (150dfls) is presented in Table 2. Farmers usually procure larvae which has completed 2nd moult from Chawki Rearing Centers/grainages. Next instars will be reared by the farmers in the rearing units. In order to procure 150 dfls (chawki worms), farmers incurred an expenditure of Rs.3450.00. Availability of larvae which has crossed 2nd moult with intense management of chawki was procured for late age silkworm rearing. Chawki rearing should have to be done with at most care if not in the later stage farmers may have to bear loss. Mulberry leaves formed the major chunk at Rs. 9322.50 in the total cost of production of silk cocoon. Labour was the next major cost item amounting to Rs. 5940.00 Labour was essential to perform activities such as disinfection of rearing units and implements, harvesting & feeding of shoots at 3rd, 4th and 5th instars, bed cleaning, collection and transferring of worms ready for spinning cocoon to mountages, collection & grading of cocoons. About 63.63% of labour was required for the maintenance of 4th and 5th instar as larvae exhibits voracious feeding of mulberry leaves during these stages, as evidenced in the study of Rajit & Kumaresan (2019).

Table 2: Economics of Sericulture (150 dfls)

#	Particulars	Quantity	Rate (Rs.)	Value(Rs.)
A	**Labour** (Mandays)			
	Third instar	1.8	300	540 (1.86%)
	Forth instar	3.6	300	1080 (3.72%)
	Fifth instar	9	300	2700 (9.29%)
	Transfer of worms to Chandrike	2.4	150	360 (1.24%)
	Collection of Cocoons & its Grading	4.8	150	720 (2.48%)
	Disinfection of Rearing House	0.9	300	270 (0.93%)
	Bed Cleaning	0.9	300	270 (0.93%)
B	**Inputs**			
	Larvae after 2nd Moult (dfls)	150	23	3450 (11.87%)
	Bleaching Powder (kg)	7.5	30	225 (0.77%)
	Lime (kg)	7.5	10	75 (0.26%)
	Decol (L)	3	200	600 (2.06%)
	Astra (g)	150	200	600 (2.06%)

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Vijetha (kg)	6	100	600 (2.06%)
Mulberry leaves (kg)	2486	3.75	9322.50 (32.07%)
Total Variable Cost			**20812.50 (71.60%)**
Depreciation			1497 (5.15%)
Interest on fixed capital			6757 (23.25%)
Total Fixed Cost			**8254 (28.40%)**
Total Cost			29066.50

Disinfectants like Bleaching powder, Lime, Ankush, Astra and Vijetha were essential in the management of silkworm diseases. The total expenditure on disinfectants came to Rs. 2100.00. Bleaching powder, Decol, Ankush and Asrta are used for disinfecting shed and necessary equipments involved in rearing silkworms. Vijetha and lime were used as bed disinfectants. Lime dusting ensures uniform moulting and reduces moisture in the bed. Vijetha is dusted before bed cleaning to manage silkworm diseases. Thus, the total variable costs incurred towards rearing of 150 dfls came to Rs. 20812.50 (71.60%). With respect to fixed costs, depreciation on shed, rearing stand, mountages and other rearing appliances came to Rs.1497.00 and interest on fixed capital worked out to Rs. 6757.00. Thus, fixed cost worked out to Rs. 8254.00 sharing 28.40% of the total cost. Thus, the total cost required to rear 150 dfls came to Rs. 29056.50.

On rearing 150 dfls of bivoltine silkworm, farmers obtained cocoon yield of 120 kg (Table 3). The average selling price of cocoon per kg was Rs.400.00. At this selling price, gross returns realized by farmers came to Rs.48000.00. Net returns worked out to Rs.18933.50. Cost incurred per kg of cocoon worked out to Rs.242.22 and profit accrued per kg of cocoon came to Rs. 157.78. The expenditure pattern remained same during pre-COVID-19 and COVID-19 induced lockdown periods. The only change was observed in terms of price realized per kg of cocoon. The average selling price per kg of cocoon during the pre-COVID-19 period was Rs.400.00 while that of COVID-19 period was Rs.200.00. This was evident with study of Niyati and Vijayamba (2020). Thus, gross returns was accrued to farmers during COVID-19 induced lockdown period was Rs.24000.00. This returns has not even covered the total cost incurred by farmers *i.e*. Rs. 29066.50 leading to a double loss.

Table 3: Profitability of Cocoon Production in Pre-COVID-19 and induced Lockdown Period (150 dfls)

#	Particulars	Pre-COVID-19	COVID-19	P-value (t-test)
1	Total Cost (Rs.)	29066.50	29066.50	
2	Cocoon Yield (kg)	120	120	
3	Price (Rs.)	400	200	**
4	Gross return	48000	24000	**
5	Net return	18933.50	-5066.50	**
6	Cost per kg	242.22	242.22	
7	Gross Return per kg	400	200	
8	Profit per kg	157.78	-42.22	**

** P≤0.01

The farmers have forgone the normal profit of Rs.18933.50 which could have accrued to them if Corona incidence would not have been there. Another loss was in the form of their inability to recover the total cost incurred *i.e*., Rs.5066.50. Thus, the total loss per crop of 150 dfls worked out of Rs.24000.00. The reason for drastic fall in price from Rs.400.00 to Rs.200.00 was lack of demand for cocoons from silk reelers in the Ramanagaram market. The demand for silk from the buyers was also declined due to rear/meager celebration of festivals & functions during these months.

Arrivals and prices of bivoltine cocoon in Ramanagaram cocoon market (Jan 2018 to July 2020) depicted using Radar graphs, clearly indicated decline in prices from Rs.500 during pre-COVID-19 period to Rs.200 during COVID-19 period. With respect to arrivals much of deference was not observed except in the month of April 2020 (Fig.1).

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Arrivals and prices of crossbreed cocoon depicted using line graph, entitled downward trend *i.e.*, prices from Rs.450 to Rs.170 and arrivals from 700 MT to 409 MT during time span covering Pre-COVID-19 and COVID-19 period (Fig.2). The same decreasing trend in cocoon arrivals & prices was also observed in other markets of Karnataka (Silk Bulletin, 2020). Thus, Government should initiate necessary arrangements to increase the demand for silk cocoon by the silk reelers thereby mismatch in demand & supply can be bridged leading to price stabilization.

c) Constraints faced by sericulture farmers during COVID-19 lockdown period:

- Crash in cocoon prices from Rs.500 to Rs.170 due to unwillingness of reelers to purchase cocoons
- Closure of cocoon markets
- Some of the farmers have stopped rearing due to non-availability of 2nd instar chawki/larvae at

chawki rearing centres (CRCs) as they were closed during lockdown availability of hired workers. Farmers encountered personal inconveniences *viz.*, lack of transportation, lack of boarding & lodging, possibility of getting infected with COVID-19 are few instances etc.

- Non-availability of critical inputs and silkworm rearing appliances as majority of shops were closed during lockdown

d) Support anticipated by the farmers from the Government during lockdown period

Farmers anticipated various kinds of support from the government to tackle pandemic COVID-19 crisis (Kumaresan *et al*, 2020 & Anonymous, 2020). The major anticipated measures were:

- Fixing minimum support price for cocoon

- Incentives for cocoon
- Direct procurement of cocoons by the government arranging transportation facility
- Establishment of cocoon bank & stifling facilities
- Re-opening up of closed cocoon markets

CONCLUSION

The study concluded that lockdown period coincided with two crops each of 150 dfls leading to double loss (*i.e.*, Rs.48000.00). Farmers in addition to economic loss have encountered personal inconveniences at the time of marketing of silk cocoon to Ramanagara market like lack of food, stay, transport and possibility of getting infected with corona virus. Looking into the magnitude of loss, Govt. of Karnataka should announce a reasonable relief/ compensation to sericulture growers to retain their interest in sericulture enterprise. Besides, the Government should plan for covering such unforeseen situations having negative repercussions on-farming community under insurance coverage.

REFERENCES

1. Anonymous (2019) *Seri-States of India- A Profile*, Central Silk Board. pp.1-8.
2. Anonymous (2020) Udhampur's sericulture farmers demand opening of Cocoon Auction Market amid COVID-19crisis. ANINews.
3. Chinnappa B., Kiran Kumar R Patil, Manjunatha G. R and Soumya H. S. (2020) Economic Utilisation of Areca Leaf Sheaths for Rural Livelihood. Indian Journal of Agricultural Economics, 75(1), 90-110
4. CSRTI-Mysore (2019) Annual Report of Central Sericultural Research & Training Institute (2018-19), pp.1-126.
5. Kumaresan P., Nanjunda S., Jaganathan K., Kumar Santosh Gopal, Rudranna Gowda H., Ravikumar D., Geetha G. S., Joycy Rani Dasari, Halagunde Gowda G. R. and Shambhulingappa H.H. (2020) An Impact Analysis of Coronavirus Crisis on Indian Silk Industry, Central Silk Board, pp:1-39.
6. Laiqh A. Khan (2020) Ban sought on import of silk from China, The Hindu, updated on 16july 2020 (https://www.thehindu.com/news/national/karnataka/ban-sought-on-import-of-silk- from-china/article32094830.ece)
7. Manjunatha G. R., Shafi Afroz, Dipesh Pandit, Biswas T. D. and Chanda S. (2018) MTS-3599: Study on mulberry sericulture production in West Bengal: A Statistical Approach, Annual report (2018-19) of CSRTI-Berhampore, *pp. 133.*
8. Niyati, S and Vijayamba, R (2020) COVID-19 in Rural India–II: I Had to Sell Cocoon @Rs 150/kg, Instead of Rs 500/kg**,** NEWS CLICKS updated on 7 April 2020 (https://www.newsclick.in/COVID-19-Rural-India-Sell-Cocoon-Rs-150-kg-Instead-%20Rs%20500-kg)
9. Rajit Ranjan Okhandiar and Kumaresan, P. (2019) Indian Sericulture Industry leaps ahead, 6th Asia-Pacific Congress of sericulture & Insect Biotechnology (APSERI-2019), CSB, Mysore during 2-4 March 2019, pp.7-11.

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10. Silk Bulletin (2020) Silk flash of Central Silk Board, Browsed on March-Aug 2020 (http://csb.gov.in/statistics/prices/silk-flash/) WHO (2020) Coronavirus Disease (COVID-19) Dashboard of WHO, browed on 17 Aug 2020 (https://covid19.who.int).

11. Anonymous (2019) *Seri-States of India- A Profile*, Central Silk Board. pp.1-8.

12. Anonymous (2020) Udhampur's sericulture farmers demand opening of Cocoon Auction Market amid COVID-19crisis. ANI News.opening-of-cocoon-auction-market-amid-covid-19-crisis20200609103806/)

13. Chinnappa B., Kiran Kumar R Patil, Manjunatha G. R and Soumya H. S. (2020) Economic Utilisation of Areca Leaf Sheaths for Rural Livelihood. Indian Journal of Agricultural Economics, 75(1), 90-110

14. CSRTI-Mysore (2019) Annual Report of Central Sericultural Research & Training Institute (2018-19), pp.1-126.

15. Kumaresan P., Nanjunda S., Jaganathan K., Kumar Santosh Gopal, Rudranna Gowda H., Ravikumar D., Geetha G. S., Joycy Rani Dasari, Halagunde Gowda G. R. and Shambhulingappa H.H. (2020) An Impact Analysis of Coronavirus Crisis on Indian Silk Industry, Central Silk Board, pp:1-39.

16. Laiqh A. Khan (2020) Ban sought on import of silk from China, The Hindu, updated on 16 July 2020 (https://www.thehindu.com/news/national/karnataka/ban-sought-on-import-of-silk- from-china/article32094830.ece)

17. Manjunatha G. R., Shafi Afroz, Dipesh Pandit, Biswas T. D. and Chanda S. (2018) MTS-3599: Study on mulberry sericulture production in West Bengal: A Statistical Approach, Annual report (2018-19) of CSRTI-Berhampore, pp. 133.

18. Niyati, S and Vijayamba, R (2020) COVID-19 in Rural India–II: I Had to Sell Cocoon @Rs 150/kg, Instead of Rs 500/kg, NEWS CLICKS updated on 7 April 2020 (https://www.newsclick.in/COVID-19-Rural-India-Sell-Cocoon-Rs-150-kg-Instead-%20Rs%20500-kg)

19. Rajit Ranjan Okhandiar and Kumaresan, P. (2019) Indian Sericulture Industry leaps ahead, 6th Asia-Pacific Congress of sericulture & Insect Biotechnology (APSERI-2019), CSB, Mysore during 2-4 March 2019, pp.7-11.

20. Silk Bulletin (2020) Silk flash of Central Silk Board, Browsed on March-Aug 2020 (http://csb.gov.in/statistics/prices/silk-flash/)

21. WHO (2020) Coronavirus Disease (COVID-19) Dashboard of WHO, browed on 17Aug2020(https://covid19.who.int.

22. Yeshi Ngima; Dorjee Tsering. "Impact of COVID-19 on Education". International Research Journal on Advanced Science Hub, 2, Special Issue ICAMET 10S, 2020, 34-39. doi: 10.47392/irjash.2020.196

23. Remya S. "Covid19 and Environment-A Theoretical Review from Higher Education Students Perspective". International Research Journal on Advanced Science Hub, 2, Special Issue ICARD 2020, 2020, 227-230. doi: 10.47392/irjash.2020.124

