

COMPARATIVE ECONOMICS OF COMMERCIAL YOUNG SILKWORM REARED WORMS PER 100 DFLS IN SOUTH INDIA

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ABSTRACT: Rearing of young age silkworms up to II moult is called chawki rearing, which usually last up to 8 days. In sericulturally advanced countries, young age larvae are supplied to the farmers by Silkworm Seed Production Centres through well organized co-operative Commercial “Young Silkworm Rearing Centres” or “Chawki Rearing Centres”. The present investigation was carried out by data obtained from the Commercial Chawki Rearing Centres (CRCs) in Southern India comprising three states namely Karnataka, Andhra Pradesh and Tamil Nadu during 2006. The data were analysed using budgetary method and cost concepts. Detailed study of the economics per 100 dfls (disease free layings) revealed that the major economic factor contributing for the total cost of production was recurring cost, which was found to be 94.3%, 82% and 91% in Karnataka, Andhra Pradesh and Tamil Nadu states respectively. Another important item was cost of chawki rearing equipment, which was worked out to about 5.7% (Karnataka), 18% (Andhra Pradesh) and 9% (Tamil Nadu). Cost of production, sale of chawki worms and net income were found to be higher in Tamil Nadu than the other two states.

KEY WORDS: Chawki worms, Chawki Rearing Centre, Cost of Production, dfls (disease free layings) and South India.

Sericulture is spread over 60,000 villages throughout the sub continent but is mostly concentrated in South India among three states viz.; Karnataka, Andhra Pradesh and Tamil Nadu, almost raising 90 per cent of mulberry silk and West Bengal and Kashmir contributing the rest 10 per cent (Datta & Mahesh Nanavaty, 2005). Young age silkworm rearing which is considered critical for successful harvest of cocoon is popularly known as chawki rearing. Young silkworm rearing in South India is popularized by Central Silk Board (CSB) by establishing Chawki rearing Centres (CRC). In recent years, many cocoon producers have started buying chawki worms from CRCs considering less labour involvement and increased cocoon yield (Umesh et al., 2001). Hence, the present study is aimed for the comparative commercial economics of chawki reared worms per 100 dfls in South India.

MATERIALS AND METHODS

Data were collected from South Indian sericulture states Karnataka, Andhra Pradesh and Tamil Nadu each 15 CRCs from 3 states during 2006. The economic performance was collected by personal interview method with a structured schedule designed to meet the objectives of the study. The cost of production of chawki rearing, fixed cost, operational cost and the contribution of the cost in percentages of the total cost, net return were calculated per 100 dfls.

Fixed costs (Non recurring cost): The fixed cost is calculated by considering all the items used for chawki rearing. A depreciation charge on each of the

equipment used for each individual farmer was calculated as mentioned below (Acharya et al., 1993).

$$\text{Annual depreciation} = \frac{\text{Purchase value of the equipment}}{\text{Expected life of the equipment (years)}}$$

The average life span of the asset that has been informed by the individual sample farmer was taken for computing the depreciation value.

Equipments used in chawki rearing: Rearing trays, rearing stands, feeding stands, heaters and humidifiers, leaf chopping board/machine, plastic appliances and generator.

Rearing house: Most of the farmers are conducting rearing in separate rearing house and the value is calculated based on the actual cost of the building.

Recurring cost (Operational costs): The operational cost includes the leaf cost, cost on disinfectants and chemicals (Acharya et al., 1993). The inputs utilized in chawki rearing *viz.*, labour cost and disinfectants (chlorine dioxide, formalin, bleaching powder, lime powder and Vijetha), have been considered. The cost incurred on paraffin paper, cost of transportation of chawki reared worms to the farmers' house *etc.*, were calculated on the basis of actual cost. The cost of mulberry leaf utilized for rearing of young silkworms was computed on the basis of cost of production of mulberry leaf. Similarly, the value of the mandays was calculated based on the prevailing wage rates in the study area for male and female labour.

Interest on the working capital: The interest rate was calculated at 10% per annum on the actual cost incurred by the respondents.

Chawki charge (Rate): The actual price realized for the chawki reared worms/100 dfls was assessed from the cost of production of chawki worms.

Net-income: The net income from the chawki rearing was estimated by deducting the total cost of chawki rearing from the gross income (Jagannathan, 1995).

RESULTS AND DISCUSSION

The average chawki charge per 100 dfls in Karnataka, Andhra Pradesh and Tamil Nadu has been worked out. The cost of production per 100 dfls was calculated by including the cost of leaf utilized to rear 100 dfls and depreciation cost of rearing equipments.

Fixed cost for 100 dfls: The cost incurred on equipment and rearing house utilized for chawki rearing were taken into consideration (Table 1). The cost incurred on rearing trays was Rs.2.41 in Karnataka, Rs.10.41 for Andhra Pradesh and Rs.9.39 in Tamil Nadu. Rearing tray was the major cost component irrespective of the states. It was due to the cost spent on rearing trays was maximum because of more number of trays utilized by the Chawki Rearing Centres (CRC). The recommended numbers of trays per 100 dfls were 8 trays (2'x3') up to 2nd moult. Whereas, Karnataka utilized less number of trays, thus the

cost incurred on trays was less in Karnataka. The next major share of cost was found to be incurred on the electrical appliances such as, heater, humidifier, cooler to maintain required temperature and humidity in the chawki building. It was found to be Rs.0.83, Rs.3.10, and Rs.2.04 in Karnataka, Andhra Pradesh and Tamil Nadu respectively. Andhra Pradesh CRCs were equipped fully to maintain the temperature and humidity in the chawki building. This was due to the involvement of Japan International Co-operation Agency (JICA), where CRC equipments were adequately supplied during the project period. The depreciation value on rearing equipment for these states was Rs.6.36, Rs.20.00 and Rs.17.41. The results revealed that the CRC's of Andhra Pradesh spend more on fixed cost as compared to their counter parts in Tamil Nadu and Karnataka.

The percentage share of non-recurring and recurring cost of chawki rearing per 100 dfls is depicted in Table 3. The major share is occupied by the recurring cost (94.3%) the non recurring (5.7%) in Karnataka. In the non recurring expenditure (Fig. 4) the major share was occupied by rearing trays (37%), electric appliances (33%), rearing equipments (22%), plastic items (5%) and disinfection tank (3%).

In case of Andhra Pradesh the share of recurring cost was 82% and the non recurring cost was 18% (Table 3). The major share of non recurring cost was occupied by (Fig. 4) electric appliances (49.78%) followed by rearing trays (35%), rearing equipment (11.7%), disinfection tank (2.02%) and plastic item (1.5%).

The major recurring and non recurring cost was found to be 91% and 9% in case of Tamil Nadu (Table 3). In non recurring cost (Fig. 4) components were that of rearing trays (53.94%), electric appliances (25.84%), rearing equipments (14.28%), plastic items (3.46%) and disinfection tank (2.48%).

Recurring cost for 100 dfls: Karnataka incurred a recurring cost of Rs.104.10, Andhra Pradesh Rs.151.91 and for Tamil Nadu Rs.173 per 100 dfls (Table 2). The cost of chawki leaf was the major cost component irrespective of the state. It was estimated to be Rs.41.7 for Karnataka, Rs.45.3 for Andhra Pradesh and Rs.53.5 for Tamil Nadu. The consumption of leaf was more in Tamil Nadu followed by Andhra Pradesh and Karnataka. Tamil Nadu and Andhra Pradesh CRCs chawki reared up to 2nd moult, where as in Karnataka chawki worms reared up to 1st moult. This was clearly confirmed the consumption of leaf and cost of leaf were maximum in Tamil Nadu and Andhra Pradesh as compared to Karnataka.

The next major cost component was that of labour wages in chawki rearing, which was found to be Rs.12.7, Rs.34.5 and Rs.50.9 in Karnataka, Andhra Pradesh and Tamil Nadu respectively. Involvement of human labour was high in Tamil Nadu followed by Andhra Pradesh and Karnataka. Tamil Nadu and Andhra Pradesh CRCs conducted chawki rearing up to 2nd moult (8 days). Karnataka is an exception to this system as the chawki worms were found distributed after the 2nd moult, after first moult (3 days) and even after just hatching (Balasubramanian, 2006). Hence, the labour cost was found to be less in Karnataka compared to other two states. The cost of disinfectants used per 100 dfls was Rs.11.4 (Karnataka), Rs.31.5 (Andhra Pradesh) and Rs.20.3 (Tamil Nadu). In case of Karnataka disinfection was carried out once in a month (5-6 crops) because of continuous and overlapping batches. Where as, in Andhra Pradesh and Tamil Nadu, the number of batches was three per month and it reflected on the cost of disinfectants in Andhra Pradesh and Tamil Nadu. The cost incurred on paraffin paper was Rs.10.4, Rs.14.4 and Rs.15.9 in Karnataka Andhra Pradesh and Tamil Nadu respectively. The cost of transportation of chawki worms was Rs.5.5 in Karnataka. Andhra Pradesh and Tamil Nadu farmers lift the chawki worms on

their own. Interest on working capital estimated was Rs.9.46, Rs.13.81 and Rs.15.73 respectively. The total recurring cost was high in Tamil Nadu (Rs.173) compared to Andhra Pradesh (Rs.151.91) and Karnataka (Rs.104.10).

The percentage wise recurring cost components per 100 dfls of Karnataka is presented in Fig. 1. The maximum share was accounted for chawki leaf cost (39) followed by disinfectant cost (13.4), rearing man days (11.77), paraffin paper cost (9.65), interest on working capital (9), building (6), other cost (5.5) and transportation (5.25). The percentage wise recurring cost components per 100 dfls of CRCs of Andhra Pradesh is depicted in Fig. 2. The maximum share accounted for chawki leaf (41.7) followed by rearing man days (20.1), disinfectant cost (12.4), interest on working capital (9), paraffin paper cost (7.1), other cost (6.1) and building (3.26). In case of Tamil Nadu (Fig. 3) the maximum percentage of share was occupied by chawki leaf cost (30.9) followed by rearing man days (29.4), disinfectant cost (13.4), paraffin cost (9.21), interest on working capital (9.09), other cost (5.2) and building (2.9).

Cost of production per 100 dfls of chawki larvae: The total cost of 100 dfls was estimated for Rs.110.47 in Karnataka Rs.171.92 in Andhra Pradesh and Rs.190.41 for Tamil Nadu (Table 3). Overall the cost of production per 100 dfls was more in Tamil Nadu followed by Andhra Pradesh and Karnataka. The sale price of chawki worms per 100 dfls was estimated Rs.249.20 in Karnataka, Rs.273.95 in Andhra Pradesh and Rs.390 in Tamil Nadu. The sale price of chawki worms was high in Tamil Nadu because of high production cost. It maybe due to less number of CRCs, that the demand was more. Where as, in Andhra Pradesh, fixed sale price at medium rate, though Karnataka CRCs supplied chawki worms up to 1st moult they fixed the sale price nearer to Andhra Pradesh sale price. Hence, economically there is a large gap in cost of production, sale price and net returns between the three states. Similar observations were made by Acharya et al. (1993). The net returns per 100 dfls were accounted to Rs.138.73, Rs.102.03 and Rs.199.59 in case of Karnataka, Andhra Pradesh and Tamil Nadu respectively. These results are in conformity with Umesh et al. (1999). The results indicated that cost of production, sale price of chawki worms and net returns were high in Tamil Nadu than the other two states. Sale price of chawki larvae found significant association with the net returns, irrespective of the state. Sale price of chawki larvae is sensitive variable; a slight increase in the sale of chawki worms would imbalance the net returns of CRC. Hence, Karnataka and Andhra Pradesh CRCs should follow the effective measures which were taken up by the Tamil Nadu CRCs to get higher net returns per 100 dfls.

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Fig:4 Percentage of various cost components of non recurring cost of 100 dfls in three states

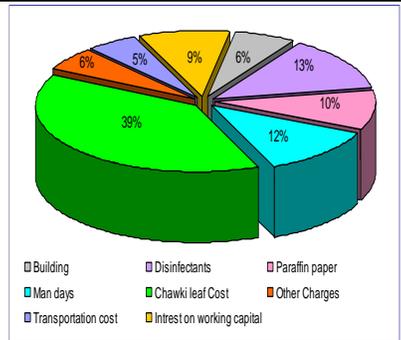
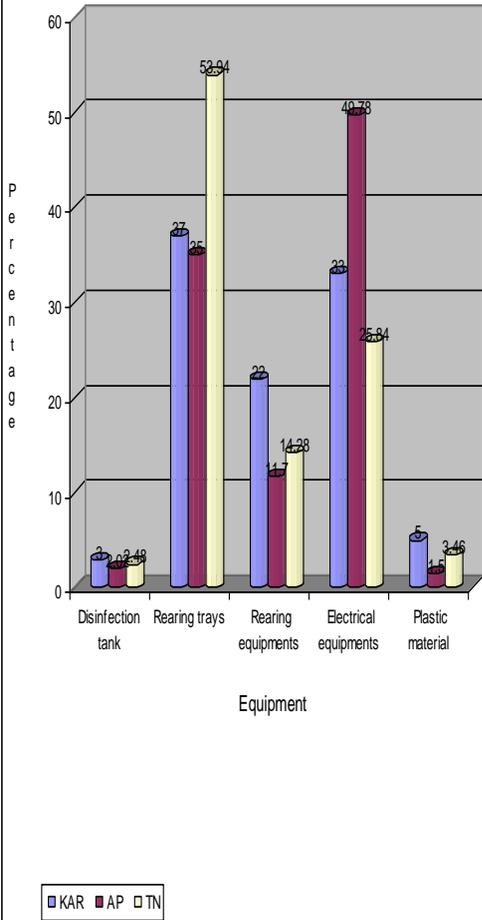


Fig. 1: Percentage of various cost components in recurring cost of 100 dfls in Karnataka

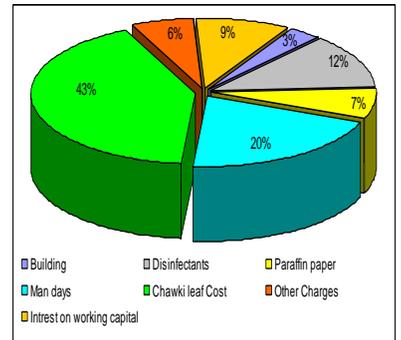


Fig:2: Percentage of various cost components in recurring cost of 100 dfls in Andhra Pradesh

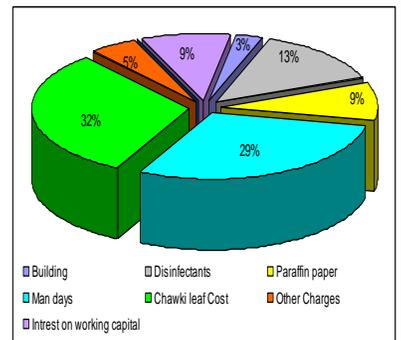


Table 1. Estimated fixed cost for chawki rearing of silkworms of 100 dfls.

Particulars	Cost (Rupees)		
	Karnataka	Andhra Pradesh	Tamil Nadu
1. Disinfection tank	0.18	0.40	0.43
2. Plastic rearing trays	2.41	10.41	9.39
3. Rearing stands	1.02	0.60	0.80
4. Incubation frame	0.09	0.40	0.27
5. Feeding stands	0.04	0.50	0.09
6. Leaf chopping machine	0.10	0.60	0.68
7. Room heater + humidifier + Aircooler	0.83	3.10	2.04
8. Power sprayer and mask	0.40	0.70	0.87
9. Thermometer	0.04	0.05	0.04
10. Plastic items (Litter basket/bags)	0.26	0.04	0.59
11. Chopping board + Knives	0.07	0.20	0.00
12. Bed cleaning net	0.13	0.50	0.66
13. Generator	0.61	2.60	1.55
14. Ant-wells	0.19	0.00	0.00
Total fixed cost (Rs)	6.36	20.01	17.41

Table 2. Estimated variable cost for chawki rearing of silkworms of 100 dfls.

Particulars	Cost (Rupees)		
	Karnataka	Andhra Pradesh	Tamil Nadu
1. Building rent/Apportioned cost	6.3	3.5	5.0
2. Disinfectants	11.4	31.50	20.3
3. Paraffin paper	10.4	14.4	15.9
4. Man days	12.7	34.5	50.9
5. Bed Disinfectant	1.9	3.1	2.9
6. Chawki leaf cost	41.7	45.3	53.5
7. Electricity Charges of CRC	3.2	3.8	7.4
8. Supervision Cost	1.5	2.0	1.6
9. Transportation cost	5.5	0.0	0.0
Total Variable Cost	94.61	138.10	157.5
10. Interest on Variable Cost (@ 10%)	9.46	13.81	15.73
Grand total of Variable cost for Chawki rearing	104.1	151.91	173.0

Table 3. Cost of production for chawki rearing of silk worms of 100 dfls.

Particulars	Cost (Rupees)					
	Karnataka		Andhra Pradesh		Tamil Nadu	
	Rupees	Percentage	Rupees	Percentage	Rupees	Percentage
Non-Recurring (Fixed cost)	6.37	5.7	20.01	18.0	17.41	9.0
Recurring (Operational cost)	104.10	94.3	151.91	82.0	173.00	91.0
Total cost of production	110.47	100.0	171.92	100.0	190.41	100.0
Sale of Chawki larvae	249.20	--	273.95	--	390.00	--
Net Returns	138.73	--	102.03	--	199.59	--