

Analysis of production and productivity of Silkworm rearing units and the constraints faced by Sericulture farmers in Krishnagiri District of Tamil Nadu

¹Lingavarayan. T. and ²R Selva Kumar

Department of Agricultural Economics,
Faculty of Agriculture, Annamalai University, Annamalainagar,
Chidambaram, Tamil Nadu - 608 002 (India)
E-mail of the corresponding author: lingavarayan1996@gmail.com
Mobile of the corresponding author: +91-86100 55819 (India)

Abstract

The main aim of the study is to determine the temporal performance in the trends of mulberry area, production and productivity of cocoon and to measure the instability and determine the constraints involved in the production and marketing above mentioned variables. The present study was carried out in Krishnagiri district which ranks first in the area of mulberry cultivation and silkworm cocoon production for which the data was collected through the secondary sources alongside Tamil Nadu data. As per the data, the area under mulberry was prevalent in the taluks of Shoolagiri, Veppanapalli, and Hosur which were ranked first, second, and third respectively. The blocks with the most mulberry cover were chosen from the three taluks above. Ninety farmers were chosen. The primary data were collected first hand by the researcher. The results indicated instability in all the three variables- Production, Productivity and Area of mulberry cultivation. The constraints in production and marketing of the mulberry and cocoon were obtained from the sample farmers and ranked through the means of Garret's ranking technique.

Key words : Sericulture, Mulberry, Cocoon, Production, Productivity.

Sericulture is one of the rural-based agro industries to earn global reputation ever since times immemorial. It encompasses activities such as rearing of silkworms for the production of silk, cultivation of mulberry and silk reeling activities. Sericulture provides ecological and economically sustainable means of livelihood for the poor, small and marginal farmers, agricultural labourers and women in particular. Sericulture is a labour intensive

¹*Research Scholar [Agri-Business Management] (Corresponding author) and ²Assistant Professor.

industry in all its phases which is a testament to its versatility and value generation in multiple avenues. It can generate employment up to 11 persons for every kilogram of raw silk produced out of which more than 6 persons are women. The industrial production of raw silk and fabric employs a large number of semiliterate and semi-skilled poor workers throughout the year. A large chunk of the cost incurred in the conversion of soil to silk reaches poor workers involved in the value addition at each stage like cocoon production, silk reeling, fabric production, dyeing and printing. Sericulture industry is therefore, discretely helping in building an egalitarian society in highly populous and countries with agrarian economy like India and China.

Silk is the most elegant textile in the world with unparalleled grandeur and natural sheen. It has inherent affinity for dyes, high absorbance quality, light weight, soft touch, resilience, excellent drape and high durability⁶ Hence it has its own sobriquet, the “Queen of Textiles”. Historical evidence shows that silk was discovered in China and later the industry spread into other parts of the world. In India, Tamil Nadu is an apt and progressive location in the aspect of providing favourable climatic conditions to support mulberry and silk production which is evident from its increased area of mulberry from 49699.65 acres in the year of 2021-22 as compared with the area of 13485.63 acres during the period of 2002-03 (Handlooms, Handicrafts, Textiles and Khadi Department, Tamil Nadu). Hence this study is taken up to understand the yearly trends and instability in the area of mulberry cultivation, production, productivity of cocoon and the constraints faced in cultivation of mulberry,

production and marketing of cocoon by the sericulture farmers in Krishnagiri District. The district has an area of 7433.77 acres of mulberry cultivation and cocoon production of 2411.13 metric tonnes (Department of Sericulture, Salem).

Objectives :

The main aim of the study is to determine the temporal performance in the trends of mulberry area, production and productivity of cocoon and to measure the stability and determine the constraints involved in the above mentioned variables. Hence the study was undertaken by framing the underlying objectives:-

1. To analyze the Instability Index in Area under Mulberry, Production of Silk and Productivity in Krishnagiri District and Tamil Nadu State.
2. To analyze the Constraints faced by the Mulberry Cultivation, Cocoon Production and Marketing of Cocoon in the study area.

The present study is based on the secondary data (time series) pertaining to the area of mulberry in Acre, Production of cocoon in Metric tonnes, and Productivity in Kg per Acre of cocoon which was taken for a period of 20 years (2002-2022). The study area selected was Krishnagiri district of Tamil Nadu, being one of the leading silk production states in India. The selection was made based on the high area under mulberry and cocoon production.

For the constraints faced by mulberry farmers, silkworm growers from various

units were chosen for data collection in the study area. As per the data, the area under mulberry was prevalent in the taluks of Shoolagiri, Veppanapalli, and Hosur which were ranked first, second, and third respectively. The blocks with the most mulberry cover were chosen from the three taluks above. Ninety farmers were chosen, representing 2.20 percent of total sample, and dispersed throughout the blocks based on their probability proportion to the total number of farmers in the blocks. The primary data were collected first hand by the researcher. The secondary data required for the studies were collected from the published sources such as Ministry of Agriculture-Government of India. The data collected were processed and tabulated for subsequent analysis, keeping in view the study area; appropriate tools were employed to analyze the data. The Problem of this study is to discover issues with mulberry production, cocoon production, and farmer profitability in a specific study region.

Instability Index :

Cuddy-Della index is most commonly used measures of instability of time series data and is universally acceptable. The indices were originally developed by John Cuddy and Della Valle for measuring the instability in time series data². This index is a better measure included as a component of instability all cyclical fluctuations present in the time series data, whether regular or irregular, as well as any component of instability all cyclical fluctuations present in the time series data, whether regular or irregular, as well as any component which could be defined as “white noise”. The original formulation of the index is given as follows,

$$Ix = \frac{SEE}{\bar{Y}} \times 100$$

Where, Ix = Instability index

SEE = Standard error of the trend line estimates.

\bar{Y} = Average value of the time series data

It was shown that instability could also be measured as:

$$IX = CV \sqrt{(1 - \bar{R}^2)}$$

Where,

CV = Coefficient of variation

\bar{R} = Adjusted coefficient of multiple determination

Garrett's Ranking Technique :

Garrett's ranking technique was employed used to rank problems in the Mulberry cultivation of cocoon production and Marketing of cocoon in the order of their importance.

The respondents were asked to rank the problems and ranks given by respondents were converted into percent position with the use of formula

$$\text{Percent position} = [100 (R_{ij} - 0.5) / N_j]$$

Where,

R_{ij} = Rank given for i^{th} problem by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

By referring to Garrett's table, the percentage positions for each rank were converted into mean scores by using Garrett's table. Individual respondents' scores for each problem were totaled together and divided by the total number of respondents with scores. The average scores were combined together.

All of the problems' mean scores were organized in decreasing order, and rankings were assigned. As a result, the most critical issues were determined.

Instability Index for Mulberry Area, Production and Productivity of Raw Silk :

Cuddy and Della Valle² index was used as the measure of instability in the mulberry area, production and productivity of cocoon both for Krishnagiri District and Tamil Nadu. Table-1 shows the Instability analysis worked out separately for Krishnagiri District and overall Tamil Nadu distributed among two timelines namely period I (2002-03 to 2012-13), period II (2012-13 to 2021-22). A consolidated data of these two timelines were also taken up separately for analysis.

From the results, it could be observed that the instability in area of mulberry cultivation and production of cocoon was the highest during period I (19.69 and 24.21) in Tamil Nadu. These variables recorded lower instability values in Krishnagiri District (15.94 and 19.92) as compared with the entire Tamil Nadu during period I whereas the variable productivity was found to be having highest instability value (5.91) as compared with entire

Tamil Nadu (2.26). For period II, the instability in area of mulberry cultivation and productivity of cocoon was the highest (10.66 and 14.53) in Krishnagiri District whereas these variables recorded lower instability values in Tamil Nadu (8.89 and 13.36). In the case of production, Tamil Nadu had the highest instability value (11.46) as compared with Krishnagiri district (9.92).

Altogether, the overall scenarios for the two decades (2002-03 to 2021-22) were consolidated and the results revealed that the variable production of cocoon in Tamil Nadu recorded higher instability value (36.47) as compared with Krishnagiri district (18.03). The area of mulberry cultivation and productivity of cocoon was found to record higher instability values (18.64 and 18.02) in Krishnagiri district as compared with Tamil Nadu (14.51 and 14.69). (Table-1, Figs. 1&2).

Constraints faced by the mulberry cultivating farmers, cocoon producers in the marketing of cocoon at the study area- Garret's Ranking Technique :

I. Constraints of farmers in mulberry cultivation :

In this section, Garret's ranking

Table-1. Instability Index for mulberry area, production and productivity of Raw silk

Particulars	KRISHNAGIRI			TAMIL NADU		
	Period I 2002-03 to 2011-12	Period II 2012-13 to 2021-22	Over all 2002-03 to 2021-22	Period I 2002-03 to 2011-12	Period II 2012-13 to 2021-22	Over all 2002-03 to 2021-22
Area	15.94	10.66	18.64	19.69	8.89	14.51
Production	19.92	9.92	18.03	24.21	11.46	36.47
Productivity	5.91	14.53	18.02	2.26	13.36	14.69

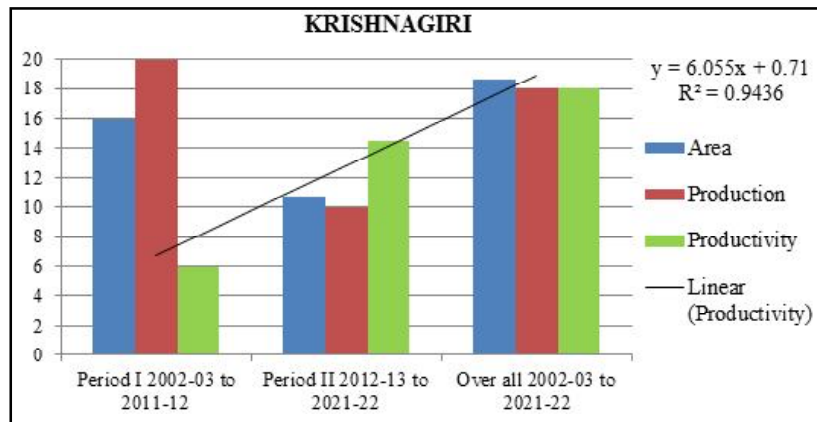


Fig. 1. Instability Index for mulberry area, production and productivity of Raw silk in Krishnagiri District

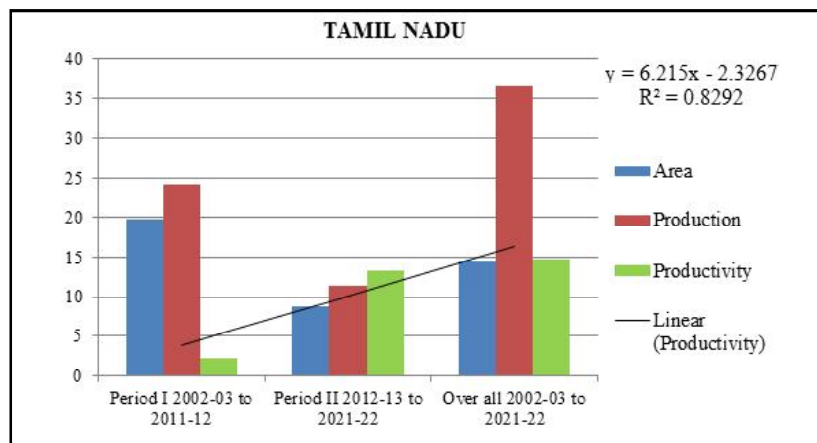


Fig. 2. Instability Index for mulberry area, production and productivity of Raw silk in Tamil Nadu

technique was used to rank the factors that affected the mulberry cultivation. The major factors that affect the cultivation were identified and the growers were asked to rank the six factors in the order of their importance. The ranks assigned to the six factors were presented in Table 2 showed that shortage of irrigation waters in summer was given the first rank with the overall mean score 88.96 of followed by scarcity of labour with higher wage

rate mean score 87.54, the third important problem Lack of Knowledge about time of planting with mean score 87.02, Incidence of pest and disease method of pruning, Non availability of good quality Saplings and Lack of knowledge on time of application of FYM and NPK. With overall mean scores of 86.91, 85.34 and 84.68, these variables were found to be the trivial problems faced by the growers.

Table-2. Constraints of farmers in mulberry cultivation

S. No	Particulars	Mean Score	Rank
1	Shortage of irrigation water in summer	88.96	I
2	Scarcity of labour with higher wage rate	87.54	II
3	Lack of knowledge about time of planting	87.02	III
4	Incidence of pest and disease method of pruning	86.91	IV
5	Non availability of good quality saplings	85.34	V
6	Lack of knowledge on time of application of FYM and NPK	84.68	VI

II. Constraints of farmers in cocoon production:

In this section, Garret's ranking technique was used to rank the factors that affected the mulberry cultivation. The major factors that affect the cultivation were identified and the growers were asked to rank the six factors in the order of their importance. The ranks assigned to the six factors were presented in Table-3 showed that the lack of skilled labour was given the first rank with the overall mean score 91.05, followed by incidence of pests and diseases which recorded a mean score of 90.34 and being the second important problem, the variable high temperature during summer was ranked third with a mean score 89.75. Poor grading system of Cocoons, Difficulty in obtaining of DFLs and Non Availability of inputs on time with overall mean scores of 88.03, 87.47 and 86.01 respectively

and were found to be the minor problems faced by the grower in cocoon Production. (Tables 2&3).

III. Constraints of farmers in marketing of cocoon :

The major factors that affect the marketing of cocoon were identified and the growers were asked to rank the six factors in the order of their importance. The ranks assigned to the six factors were presented in Table-4 which showed that the price fluctuation was given the first rank with the overall mean score 91.01, followed by poor information of market trends with the mean score of 88.97 being the second important problem. With mean score of 86.93, absence of storage and warehousing facilities ranked third and the other variables high transportation

Table-3. Constraints of farmers in cocoon production

S. No	Particulars	Mean Score	Rank
1	The Lack of Skilled labour.	91.05	I
2	Incidence of pests and disease.	90.34	II
3	High Temperature during summer.	89.75	III
4	Poor grading system of Cocoons.	88.03	IV
5	Difficulty in obtaining of DFLs.	87.47	V
6	Non Availability of inputs on time.	86.01	VI

Table-4. Constraints of farmer in marketing of cocoon

S. No	Particulars	Mean Score	Rank
1	Price fluctuation.	91.01	I
2	Poor information of market trend.	88.97	II
3	Absent of storage and warehousing facilities.	86.93	III
4	High transportation Cost.	85.23	IV
5	Manipulations by the intermediaries in the trade of reeler's.	84.89	V
6	Price received are not remunerative.	84.05	VI

Cost, Manipulations by the intermediaries in the trade of reeler's, and Price received are not remunerative ranked fourth, fifth and sixth in the Garrett's table with overall mean scores of 85.23, 84.89 and 84.05 respectively. They are found to be the minor Problem faced by the grower in marketing of cocoon.

From the study area, it could be inferred that there exists instability in the area of Mulberry farming, silk worm rearing, and cocoon production both at Krishnagiri district and the entire state level. These issues are connected to providing appropriate guarantee in full employment to rural people. If this industry flourishes on a large scale in the rural areas, the chronic unemployment problem in the country will be addressed to a considerable extent. Hence the policymaking should give impetus to encourage farmers take sericulture with more incentives thus ensuring high efficiency and profits with reduction in investment and marketing costs.

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